

user manual

last change on: 07.04.2017

iCSmini 2

Controller box with embedded Linux server for use with iseg Hardware equipped with CAN or RS-232 interfaces

- Ethernet and WiFi connectivity
- Embedded Linux-Server with iCS control system
- 1 CAN D-SUB9, 1 RS-232 D-SUB9, 3 USB-A connectors
- Controls wide range of iseg Power Supplies, Crates, Modules, Devices (see compatibility list)
- small form factor
- rack and top-hat rail (EN 60715) mount kits available
- Preconfigured services: EPICS, SNMP, HTTP, SOAP, Websocket
- Webbrowser based control and configuration system
- Easy configuration and firmware updates of connected hardware



Document history

Version	Date	Major changes
1.0	29.02.2016	Initial release
1.1	29.03.2016	Compliance information WiFi
1.2	07.04.2017	ICS2.1 update

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Important security information

Please read all security warnings and notices carefully. iseg declines responsibility for any kind of damage, injuries or other consequences that are caused by improper use or negligence, whether or not under conditional intent.

WARNING advices in text indicate attention to hazards, that could lead to injuries or death.

CAUTION notes in text indicate information to avoid damages to the equipment.

INFO notes in text show important information and resources.

SAFETY ADVICE



WARNING

This device generates high voltages or is part of or attached to high voltage supplying systems. High voltages are dangerous and may be fatal.

USE CAUTION WHILE WORKING WITH THIS EQUIPMENT.
BE AWARE OF ELECTRICAL HAZARDS.

Always follow at the minimum these provisions:

- High voltages must always be grounded
- Do not touch wiring or connectors without securing
- Never remove covers or equipment
- Always observe humidity conditions
- Service must be done by qualified personnel only

ATTENTION



CAUTION

CHECK COMPATIBILITY

Please use this device only with compatible devices. Check compatibility lists first.

ATTENTION



CAUTION

CHECK COMPLIANCE FIRST

Before using this device or connecting supplementary WiFi hardware please make sure that it complies to your local and governmental requirements, laws and other terms or provisions. iseg accepts no liability for any case of unauthorized use of the provided hardware. See pg. 5 for more information.

Warranty information

This product is shipped with a warranty of 36 months, starting with issue of invoice. Within this period iseg will repair or replace in case of defective under proper use.

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2. General information

The iseg iCSmini2 is an intelligent external controller box with an embedded Linux-Server system and preinstalled iseg Communication Server (iCS). The iCS comes with a large set of preconfigured services as EPICS, Web-Control, SNMP¹, SOAP, Websocket, OPC-UA¹, isegHAL and HTTP-API. The iCS also delivers two main web based user applications. iCS**control** provides a quick and smart control interface of the connected hardware by using web-browser without software installation. iCS**config** is used for hardware and service configuration and firmware upgrades. Both can also be used on mobile devices like tablets or smartphones.

For native application control several software solutions are available:

- iseg SNMP Control
- iseg**Control** (Linux, Windows, Mac)²
- isegHalRemote-Library

3. Package contents / Accessories

Hardware	included	optional
iCSmini2	iCSmini2 control box (item code: CSmini2) Plug-in power supply (item code: 520176) Cable D-Sub 9 female-male (item code: Z592341) Gender changer (item code: 592742) CAN RJ45-D-sub 9 Adapter (Z583382)	USB surveillance cam (item code: Z520158) 19" rack mount kit (item code: Z516641)

4. Compatibility

The iCSmini2 controller box series is compatible to the following MMS crates:

Crate	Slots	Required controller firmware	Notes
ECH 224	4 MMS		
ECH 238	8 MMS	ECH238_212 ECH238_310	
ECH 124	4 MMC		
ECH 128	8 MMC		
ECH 12A	10 MMC / 9 MMC + 1 MMS-3U		

The iCSmini2 controller box series is compatible to the following HV-modules:

Module series	System	Required Firmware	Notes
EHS	MMS	E08C0_240 E08F0_244 E08F2_428 E16C1_118 E08C2_453 E08F2_655 E08C1_215	Serialnumber (6 digits) 73xxx0/1 Serialnumber (6 digits) 74xxx0/1 Serialnumber (6 digits) 72xxx0/1 Serialnumber (6 digits) 79xxx0/1 Serialnumber (7 digits) 73xxxxx and 78xxxxx Serialnumber (7 digits) 72xxxxx and 74xxxxx Serialnumber (7 digits) 79xxxxx
EDS	MMS	E16D0_443 E16D1_443 E24D1_552	Serialnumber (6 digits) 71xxx0/1 Serialnumber (6 digits) 71xxx0/1 Serialnumber (6 digits) 71xxx0/1

¹ Expected available middle of 2016


² Update to Version 2 is expected available middle of 2016

EBS	MMS	E08B0_211	Serialnumber (6 digits) 77xxx0/1
ESS	MMS	ESS01C_120	Serialnumber (7 digits) 77xxxxx
NHS	NIM	N06C2_210	CAN only
NHQ	NIM		RS-232 only (coming soon)

The iCSmini2 controller box series is compatible to the following standalone AC/DC HV-Supplies:

HV supply series	Required Firmware	Notes
HPS 1,5 – 10 kW	H101C1_225	CAN only
HPS compact	H201C0_3.05	CAN only
HPS 300-800 W	H101C0_541	CAN only
FPS	FLM5D1_203	CAN only
SHQ		RS-232 only

5. Technical data

Supply		
POWER in	24V DC / 1A	
Control elements		
Display LED	Power, Serial, CAN, WiFi	
Buttons	Reset, Diag	
Connectivity		
System connector	96pin backplane	
USB 2.0	1x USB-A	
USB 3.0	2x USB-A	
Ethernet (10/100/1000 MBit)	1x RJ-45	
CAN	1x D-SUB-9 male	
RS-232 serial interface	1x D-SUB-9 male	
Wireless interface	Intel Dual Band Wireless-AC7260 Standard 802.11n, 2,4 GHz, Ch. 1-11 Compliance notes see intel specifications	
Server hardware		
CPU	NXP/Freescale iMX6 Quad-Core 996 MHz	
RAM	1 GB DDR3 onboard	
Flash Memory	4 GB onboard	
CMOS Battery	Supported battery types: CR1216, BR1220, CL1225	
Operating system		
ICS2	Manufacturer specific Linux distribution	

Services	iCSservice (Websocket, HTTP, SOAP), SNMP, EPICS, HALservice	
Native control software	isegControl (Win 7/8/10 – 32/64bit, Linux, OS X 10.9 and higher)	
Web browser based control / config software	iCSconfig / iCScontrol: All platforms: Mozilla Firefox (version > 41), Google Chrome (version > 45), iOS (Safari): version > 7	
Environmental conditions		
Operating temperature range	10 – 40 °C	
Storage temperature range	-20 – 85 °C	
Humidity	30 – 70 % (non condensating)	
Compliance		
	RoHS, CE, UL-94, Conflict Mineral, REACH	

6. Dimensional drawing

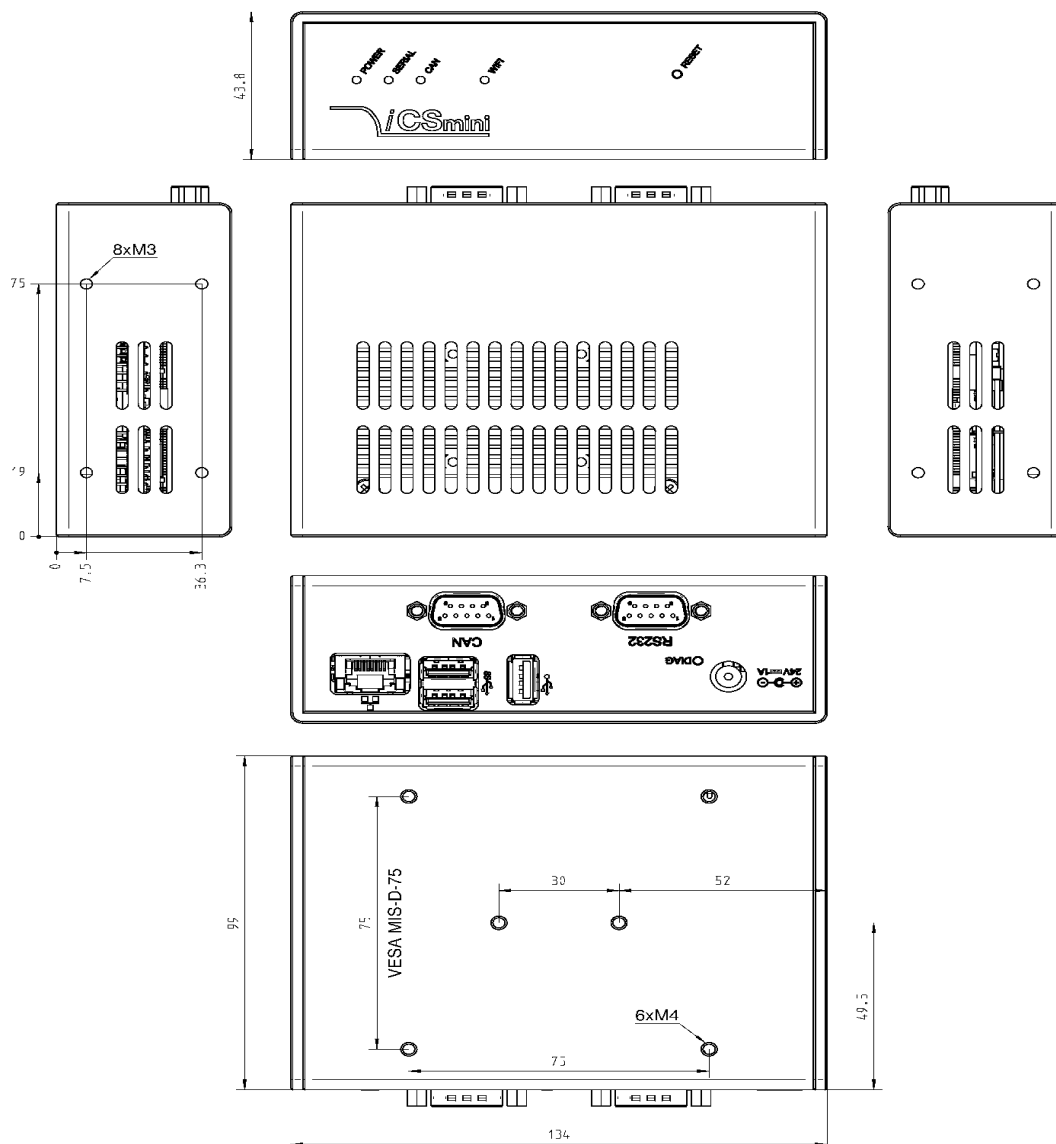


Abbildung 1: Figure 1: dimensional drawing of iCS2mini

7. Connecting and operation

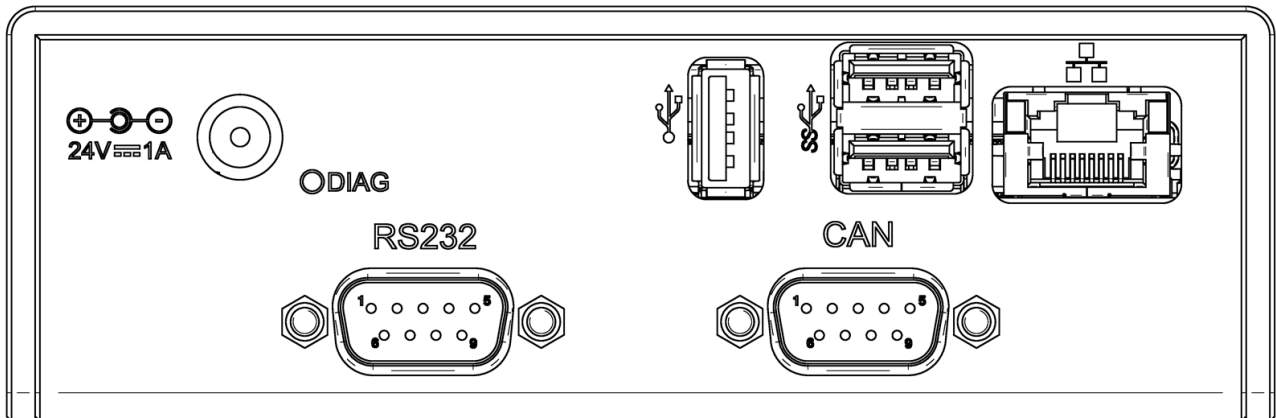


Figure 1: back side

The iCSmini2 can be connected to any compatible hardware by CAN or serial interface, please refer compatibility list (see pg. 4). Please make sure to get the right configuration of CAN - addresses, Bit-rates of CAN-Bus or RS-232 interface.

ATTENTION



Before plugging the power supply of iCSmini2 in or out, please make sure, all voltages are ramped down, connected crates or AC/DC supplies are switched off .

Connection and Termination

The CAN connector of the iCSmini2 is internally terminated by a 120 Ohm resistor. Any connected device or more device must be also terminated by 120 Ohm resistor at the last bus subscriber.

8. Front panel

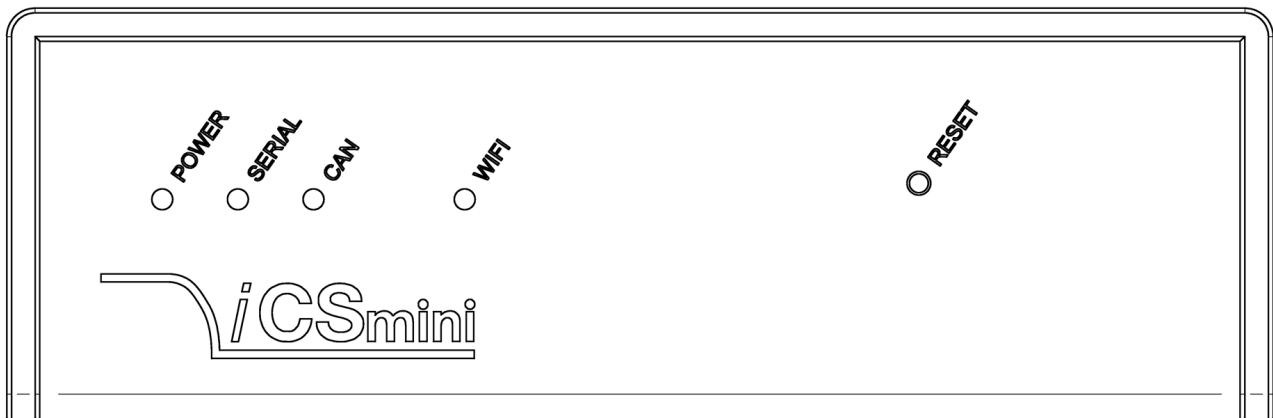


Figure 2: front side

LEDs and Reset pushbutton

Element	Function
LED POWER	Off: iCSmini2 off - no DC power

	Green: iCSmini2 powered on
LED SERIAL	Off: no serial connection Orange: serial connection enabled, but not established to any device Green: serial connection enabled and a device is connected Green flashing: serial connection enabled and a device is connected, data is submitted
LED CAN	Off: no serial connection Orange: CAN connection enabled, but not established to any device Green: CAN connection enabled and a device is connected Green flashing: CAN connection enabled and a device is connected, data are submitted
LED WIFI	Off: WiFi disabled Green: WiFi enabled

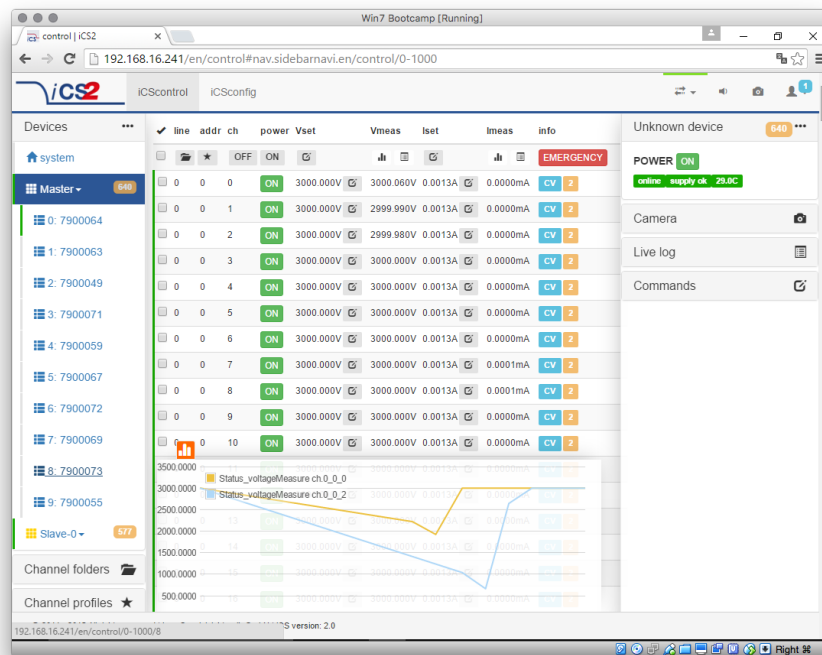
9. WiFi

The iCSmini2 is equipped with an internal WiFi access point. This feature can be enabled or disabled by software configuration.

The operation mode is indicated by the **LED WIFI** on the front panel.

For more information refer to the ICS section (see page 13).

iCS2 – iseg Communication Server 2



System description

The iseg Communication Server iCS is a software solution to control iseg high voltage hardware from multiple devices over wired or wireless network. iCS is a manufacturer specific Linux OS, which runs on iseg hardware, like iCSmini2 or CC2x crate controller series.

The iCS front end is based on browser technology to keep installation and maintenance effort low, to enable a quick start for configuration independently from the user's software platform, even on mobile devices.

iCS is equipped with an integrated role and user management, and delivers important software services right out of the box, like EPICS IOC, OPC server, SNMP interface, HTTP, SOAP and Webservices to give a quick access to iseg hardware.

iCS also delivers configuration utilities and straight forwarded tools for firmware upgrading process.

iCS software components	Description	Port / Protocol
iCSconfig	Configuration section for iCS software services, restorable hardware configurations, and firmware updates, documentation access and more...	TCP 80 / HTTP
iCScontrol	Multi-user browser based device control, surveillance cam support	TCP 80 / HTTP
iCSservice	Internal websocket based server, JSON notated payload objects, with clients	TCP 8080 / Websocket TCP 80 / HTTP API
iseqHALservice	iseq hardware abstraction layer service, simple hardware access	TCP 1454 / iseqHAL Socket
EPICS IOC	EPICS Input / Output controller, autoconfiguring to hardware setup, customizable by file upload	EPICS Base R3.14.12.4 TCP/UDP 5064,5065
OPC/UAservice	OPC / UA server – coming soon	coming soon

SOAPservice	Simple Object Access Protocol, JSON notated payload objects	TCP 80
SNMPservice	Simple Network Management Protocol	

How to connect via WiFi

1. Make sure to have the WiFi adapter onboard or external installed, all modules are plugged in and CAN connections if used attached. Start the crate or device.
2. Use your mobile device or computer to search for existing WiFi networks and select „iseq-iCS_XXXX“ (serial). Enter the factory default password (**password**).
3. Open a recommended web-browser³ and enter the factory default IP address (**192.168.1.1**)
4. Enter the factory default username (**admin**) and password (**password**)


How to connect via Ethernet

For Ethernet connections with the use of factory defaults, it is necessary to know the IP address of the iCS server first.

By default the iCS is configured to obtain the IP automatically by DHCP. To discover the IP address of the iCS, a small software application **iCSfinder** can be used. It scans the local network for running iCS services.

iCS also provides UPnP and Zeroconf/Bonjour messages, which can be discovered, e.g. in Windows using „Network“ environment.

INFORMATION



NOTE

To discover iCS installations on the local network, a small utility **iCSfinder** can be used
It can be downloaded here:
http://download.iseq-hv.com/SOFTWARE/iCS/iCSfinder/iCSfinder-1.0_win.zip
http://download.iseq-hv.com/SOFTWARE/iCS/iCSfinder/iCSfinder-1.0_mac.zip
http://download.iseq-hv.com/SOFTWARE/iCS/iCSfinder/iCSfinder-1.0_linux.zip

Note: If you wish to set a fixed address without preconnecting via DHCP, please use a (temporarily) WiFi connection to setup OR follow the instructions of (re)setting the ethernet settings (see chapter ethernet configuration)

Hint: If you experience problems using iCSfinder, please try using free software tools like “IP SCANNER” / MAC or “ADVANCED IP SCANNER” (Windows)

1. Make sure to have the network cable, all modules plugged in and all CAN connections if used attached. Start the crate.
2. Open a recommended web-browser and enter the current IP address (see preparations before)
3. Enter the factory default username (**admin**) and password (**password**)

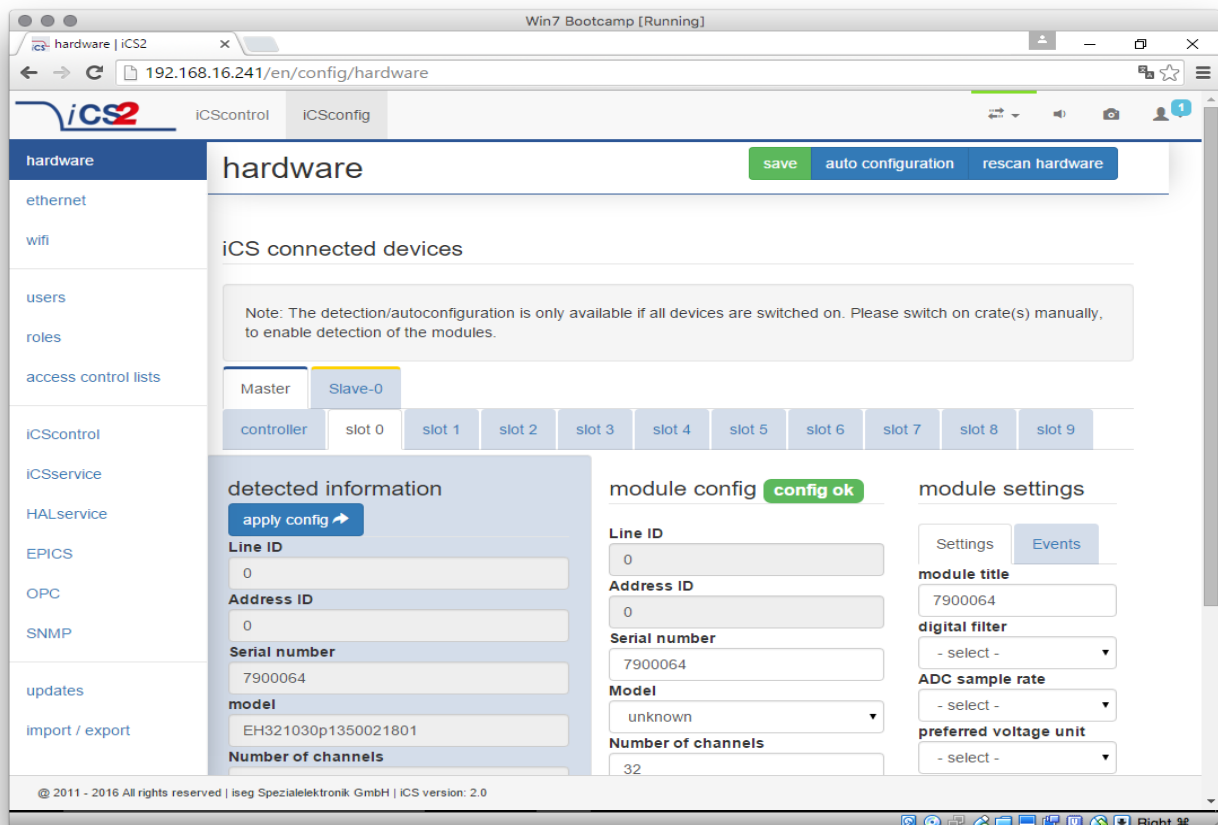
iCSconfig: manage hardware, service and preferences

iCS has a comprehensive set of configurable properties. All of them are stored in a XML file, to keep configuration flexible. This enables the possibility to have multiple configuration setups stored and restored using the import / export utility.

³ see technical specs – page 5

iCS config sections	
Hardware	Manage connected hardware, set configurations, auto configure, start firmware updates
Ethernet	Manage Ethernet port settings of the iCS
Wifi	Manage wireless access point of the iCS
users	Create / edit / delete iCS users
roles	Create / edit / delete iCS roles
access lists	Grant / deny rights on user / group / channel / item base
iCScontrol	Manage preferences of iCS web control application
iCSService	Configure iCSService API / HTTP API
EPICService	Configure the embedded EPICS Input/Output controller (IOC)
OPCService	Configure the embedded OPC server
SNMP	Configure the embedded SNMP server
Updates	Download updates (System, Product database, firmware) from internet
Import / Export	Save and restore complete iCS configuration to backup hardware setup

Hardware



In the **hardware section**, all iCS connected devices like connected crates, controllers and modules are listed and configurable. Each device is represented by a tab, modules and controllers are nested into their responding crates. The CAN lines of the crates are presented with a yellow or green upper tab border (corresponding to yellow or green CAN line), master crates and modules in legacy crates with a blue upper tab border.

The configuration is stored independently from the current hardware setup or connected states. This gives the opportunity to detect misconfigurations and recent hardware setups can easily be restored.

To apply the complete detected hardware state into the configuration use the „**auto configuration**“ button after triggering a rescan using the „**rescan hardware**“ button.

To apply the detected config of just one device (controller or module) use the „**apply config**“ button under each single tab.

The devices information is stored with the information of „module/device config“ column. Here the line and address ID are shown and a serial number can be entered (or applied by using auto configuration / apply). If the model of the hardware device could be detected automatically, a model is selected in the dropdown list, otherwise it should be selected manually.

HARDWARE TYPES	
Device	Standalone High Voltage Power Supply
Crate	Case / Bin for a modular HV-supply (module), which supplies power
Controller	Special controller card used in a crate to control, monitors and manages nested modules and Crate functions, like switch ON/OFF of Crate power supply, monitor temperatures, fans, UPS and more
Module	Modular High Voltage Power Supply, plugged in a slot of a crate, supplied by a CRATE, communication and management by CRATE CONTROLLER, no own POWER ON feature

Information in the row „module settings /device settings“ are module / device specific settings and are stored into the XML configuration file. These settings will get lost when using **auto-configuration** or **apply config** functionality.

Ethernet configuration

The ethernet settings of the iCS server hardware (CC2x Crate Controller, iCSmini) can be changed under the ethernet tab. By turning DHCP Client to enabled the iCS will try to obtain an IP address from the local networks DHCP server. Otherwise the IP can be set fixed. Therefore DHCP client must be disabled and IP v4.0 settings can be entered manually.

ETHERNET FACTORY DEFAULTS	
IP	DHCP
GATEWAY	empty
NAMESERVER	empty
DNS	empty
TIMESERVER	empty

(Re)set / ethernet configuration

You can reset the ethernet configuration and also set to fixed IP adress e.g. cause of problems with DHCP IP relay using the following procedure:

1. Shut down all modules/devices and turn off the iCS System by unplugging mains.
2. Create an empty file called “RESET_NET.txt” on a USB flash drive (FAT32 format)
3. Now edit the file. It should contain the following entries, separated by new lines.

CONTENT OF RESET_NET.txt			
LINE	PARAMETER	EXAMPLE	DEFAULT-VALUE
0	IP adress / DHCP	192.168.2.10	DHCP
1	NET MASK	255.255.255.0	255.255.255.0
2	GATEWAY	192.168.2.1	192.168.16.1
3	NAMESERVER	192.168.2.1	192.168.16.1

4. Plug USB flash drive into the USB slot at the front panel of the Crate-Controller / one USB slot of iCSmini2
5. Plug in mains

6. Please wait about 20 seconds until iCS has started completely
7. optional: Plug off the USB flash drive and check on a computer if the file created on point 2 is still there. Check if RESET_NET.txt was renamed into RESET_NET.txt.done on success.

WiFi configuration

The WiFi configuration can change configuration of the wireless network provided by the iCS hardware access point (optional). Generally the WiFi function can be disabled using the WiFi support switch. The IP address of the WiFi is fixed, so once connected with a iCS WiFi the IP stays always the same.

WIFI FACTORY DEFAULTS	
IP (fixed)	192.168.1.1
SSID	iseq-iCS2_[HARDWARE SERIAL-NUMBER]
Channel	5
Password	password


Users / roles configuration

Users of iCScontrol can be added, edited and removed in the users section. Users of iCScontrol can be added, edited and removed in the users section. Users can be assigned roles, such like admin, user etc. One or more users can be selected by editing a role.

USER DEFAULTS	
User	admin
Password	password
Role	admin

Access control lists (ACL)


With the access control list rights to grant or forbid control on special objects for principals (roles or users) is managed. This gives a powerful tool for very detailed right mechanism.

INFORMATION	
 NOTE	<p>Note: Users, roles and ACL are only applied for user authentication for applications and services, which are based on iCSservice. These are iCScontrol, iCSconfig, iseqControl, SOAP and HTTP API. iseqHAL based services should implement own security mechanisms .</p>

SSH access

The ICS2 Linux host system can be fully accessed as root user using a encrypted SSH shell access over port 22.

This enables user to install own services or freely configure, e.g.EPICS plugins etc.

INFORMATION	
 NOTE	<p>The local filesystem is divided into a system and a user data partition. To make changes on the readonly mounted system part use the following command: mount / -o remount,rw</p>

(Re)set SSH access

INFORMATION



NOTE

To protect your iCS system we strongly advice to change the standard factory password into a new userdefined one. Keep this password secret!

For security reasons this is only possible with direct hardware access using the following procedure:

1. Create a file RESET_SSH.txt with your new Root Passwort as content in the first line and save it to an USB flash memory (FAT32 format). Note: if the file is empty, the iCS root password will be reset to factory default
2. Plug the stick into iCS hardware and resboot iCS.
3. The iCS changes the password during the boot process. In case of success the file will be renamed into RESET_SSH.txt.done.

iCS Factory Reset Invocation

In case the user has forgotten his password or simply wants to get back to factory default configuration, it is possible to invoke a factory reset. For factory reset a USB flash drive (USB stick) with a FAT32/FAT16 partition is needed.

ATTENTION



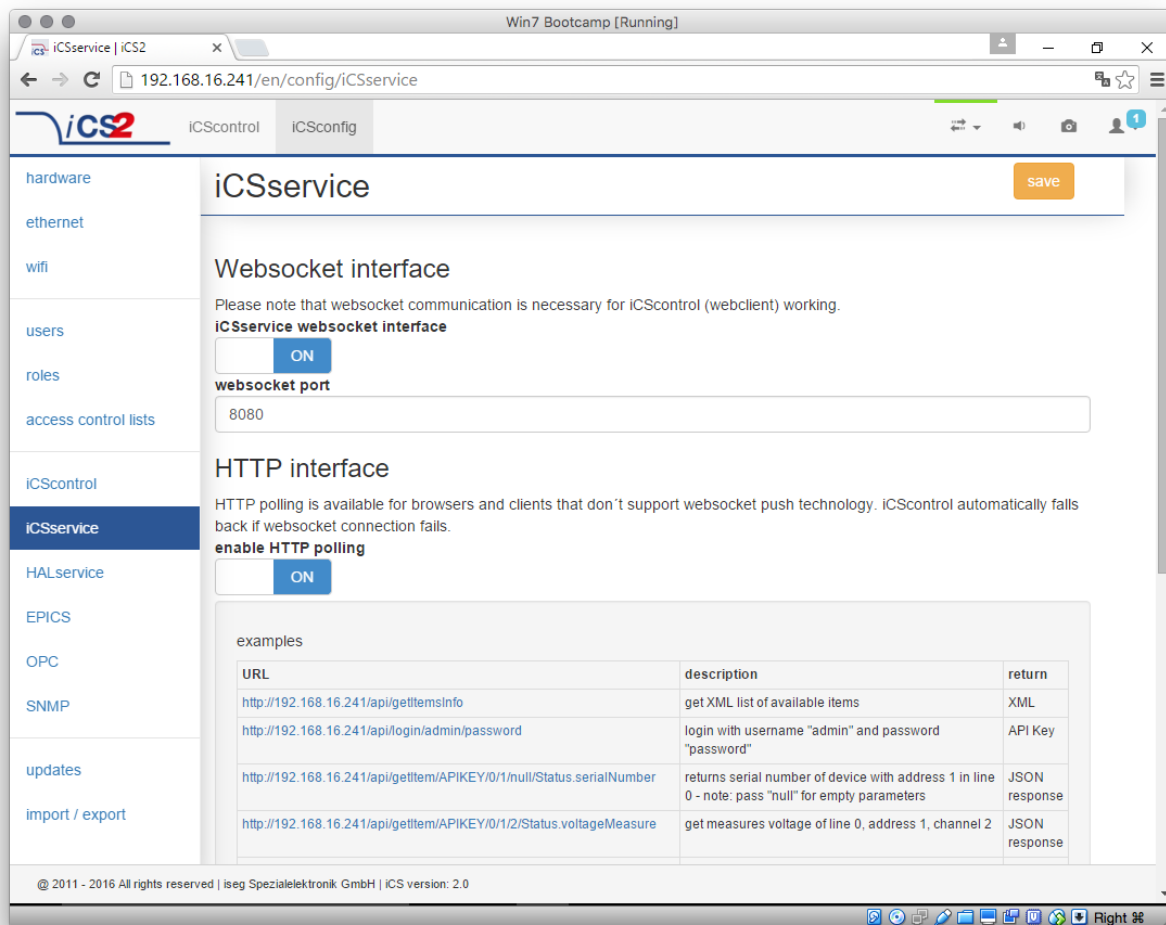
CAUTION

After factory reset all hardware configurations will get lost!

Instructions

1. Shut down all modules / devices and turn off the iCS System by unplugging mains.
2. On the USB flash drive create an empty file called "RESET_ICCS.txt"
3. Plug USB flash drive into the USB slot at the front panel of the Crate-Controller
4. Plug in mains
5. Please wait about 20 seconds until iCS has started completely
6. optional: Plug off the USB flash drive and check on a computer if the file created on point 2 is still there. If not, the factory reset was succesful.

iCSservice configuration



The iCSservice running on crate controller or iCSmini hardware provide two interfaces, a websocket push technology interface and a HTTP polling interface, which is fallback for browsers and clients, that do not support websocket technology. Both of them can be disabled, whereas at least one of them is necessary for the correct operation of iCScontrol.

iCSservice DEFAULTS	
Websocket Port	8080
HTTP port	80
HTTP URL BASE	<IP-of-iCSmini>/api/

HTTP interface

This interface gives quick access to iCSservice by simple HTTP queries.

iCSservice HTTP functions		
URL, Parameters with leading \$, params not mandatory [\$param]	Response	Description
http://<IP-of-iCSmini>/api/lgetItemsInfo	XML	XML with item object information
http://<IP-of-iCSmini>/api/login/\$username/\$password	API Key	Returns API Key to be identified for session

http://<IP-of-iCSmini>/api/logout/\$session-ID	TRUE / FALSE	
http://<IP-of-iCSmini>/api/getItem/\$apikey/\$line/\$address/\$channel/\$item	JSON Object	Returns state of a specific item of a hardware path \$line, \$address, \$channel and \$item can be set by wildcard '*'
http://<IP-of-iCSmini>/api/setItem/\$apikey/\$line/\$address/\$channel/\$item/\$value/[\$unit]	TRUE / FALSE	Sets state of a specific item of a hardware path \$line, \$address, \$channel can be set by wildcard '*'
http://<IP-of-iCSmini>/api/getUpdate/\$apikey/	JSON Object	returns all changes collected by iCSservice since last getUpdate call for this client session
<p>Use "*" as wildcard, e.g. to set or get items on multiple channels at once. Use "null" as empty set identifier, e.g. to obtain module specific objects without channel declaration.</p>		
EXAMPLES		
http://192.168.1.1/api/getItem/123456-321/0/1/0/Status.voltageMeasure	Returns voltage value, unit and timestamp of channel 0 of module with address 1 of line 0	
http://192.168.1.1/api/setItem/123456-321/0/1/*/Control.voltageSet/1/kV	Set set voltages of all channels of module 1 in line 0 to 1,000 Volt	
http://192.168.1.1/api/setItem/123456-321/0/null/null/Control.power/1	Switch controller of line 0 (master) on	

EPICS

For the use of iseg hardware with Experimental Physics and Industrial Control System (EPICS) the iCS comes with a preinstalled integrated Input-Output-Controller (IOC). This service can be enabled or disabled using the switch **enable EPICS input / output controller**. To keep things straight-forward the iCS can generate IOC configuration files (.db and .sub), using the current hardware configuration. Both files can be downloaded to the local computer, be edited manually, e.g. with a text editor and be uploaded again. This gives a quick start to run an IOC out of the box. To get an overview on all available process variables (PV), which are generated at the start of IOC, the PV list can be downloaded using the respective button. The IOC script combines a process variable definition file (.db) with a substitution file (.sub), which contains hardware setup information and placeholders to create all accessible process-variables at runtime.

File	Description	Sample content (extraction)
iseq_epics.db	Database file with definitions of PV	<pre>##### # ### Crate item values ### # ##### record(mbbiDirect, "ISEG:\${CONTROLLER_SN}:\${CAN_LINE}:\${ {DEVICE_ID}:StatusLow") { field(DESC, "Lower 16 bit of module status register") field(DTYP, "iseqHAL") field(INP, "@\${CAN_LINE}.\${{DEVICE_ID}:Status") field(NOBT, "16") field(SHFT, "0") field(TSE, "-2") } ...</pre>
iseq_epics.sub	Substitution file contains a pattern that will be substituted by the following lines for each corresponding channel	<pre>{CONTROLLER_SN,CAN_LINE,DEVICE_ID,MODULE_ID,CHANNEL_ID} {5230003,0,1000,0,0} {5230003,0,1000,0,1} {5230003,0,1000,0,2} ...</pre>
iseq_epics.pv	Text file with list of process variables generated	<pre>ISEG:5230003:0:0:0:CurrentMeasure ISEG:5230003:0:0:0:CurrentNominal</pre>

		ISEG:5230003:0:0:0:VoltageMeasure ISEG:5230003:0:0:0:VoltageNominal ...
--	--	-------------------------------------------------------------------------------

For more detailed information on EPICS, please visit: <http://www.aps.anl.gov/epics/>, for sample libraries and test scripts, please contact support@iseq-hv.de.

iseqHALService

The iseqHALService provides a secure sockets encrypted end-to-endpoint access to iseq Hardware layer running on crate Controller / iCSmini hardware. The iseqHALService API is similar to iseqHALapi with some specific extension. Please refer Appendix "iseqHAL" for details. For an easy start a simple example program iseqHalRemoteExample demonstrates the remote access. There are virtual instruments (VIs) which are based on the library "iseqHAL-remote" in order to control iseq hardware via LabVIEW⁴.

SNMPService

For backward compatibility of the iCS2 to SNMP controlled systems like WIENER mPOD iCS2 is able to communicate using the SNMP service.

The service can be enabled or disabled using the switch „enable SNMP interface“.

Using the current iCS2 hardware configuration a SNMP configuration can be automatically generated. To create a new SNMP configuration, which is compatible to WIENER Configuration file (.mib) please use button "generate configuration" under the SNMP tab in iCSconfig.

For user specific changes of configuration, the .mib (vendor specific definition of datapoints) and .sub (substitution information with list of hardware channels) files can be downloaded, locally modified and reuploaded.

Please note: local modifications will overwritten every time the "generate configuration" function will be used.

Software architecture of the iCS2 system

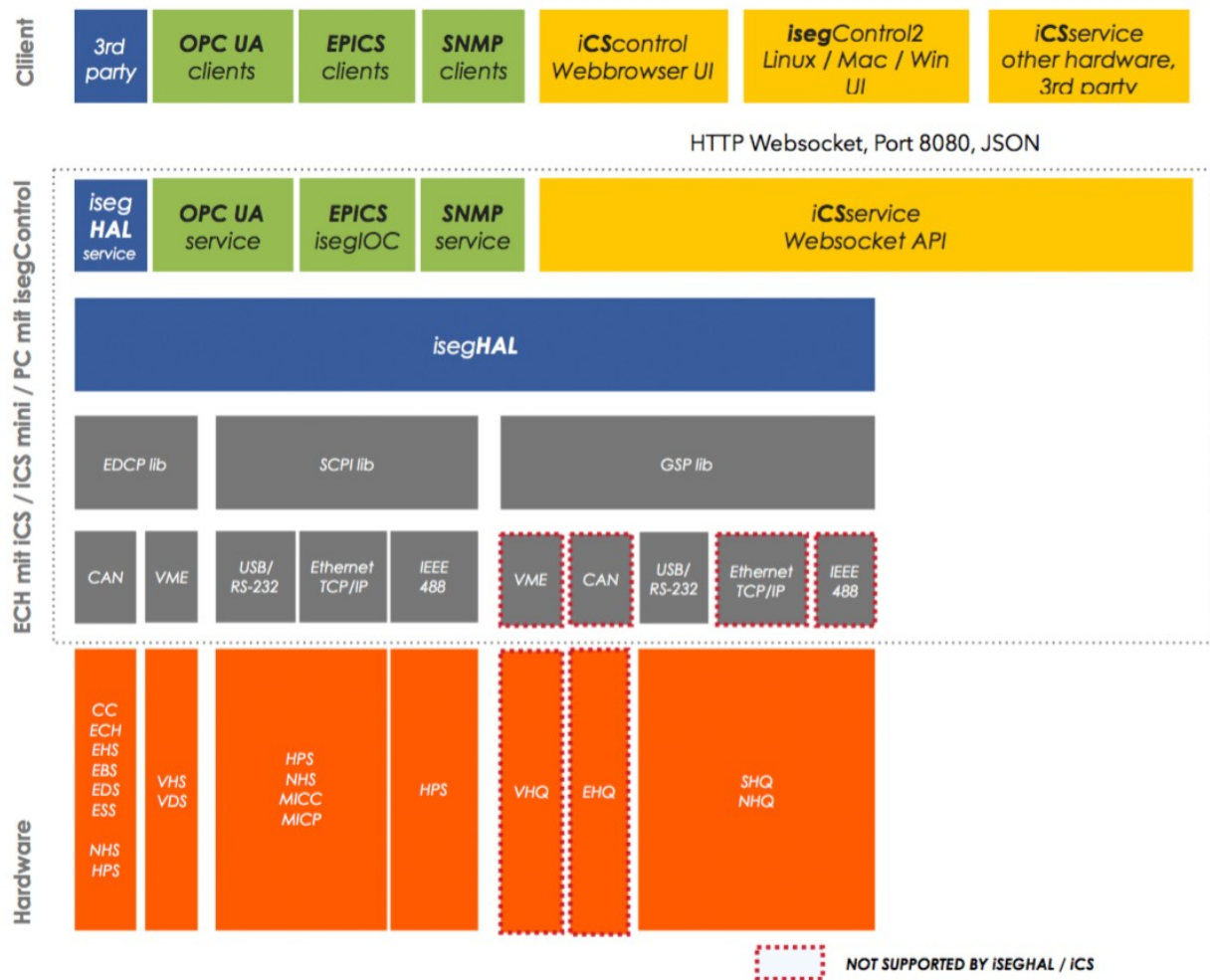


Figure: iCS2 software architecture / supported hardware

Updates

The following types of updates can be managed with iCS:

Type	Description
base	product database with information about iseg hardware specifications
system	update image of the iCS server operating system (CC, iCSmini)
firmware	firmware update files for iseg devices (like HV modules, crate controllers etc.)

All update files can be downloaded from iseg web repository using the **check online for updates** or using the **update upload** function to send a file from local computer to iCS server.

Once an update file is available on the iCS it can be installed using **install** or removed by using **delete** Buttons. After using install, follow the instructions shown on the screen.

Firmware files can be unzipped using **extract**. After extraction the available firmware files are shown in a list. By clicking **install** the iCS tries to apply the selected firmware to all connected devices, that are qualified for (matching item code, online, lower firmware version installed).

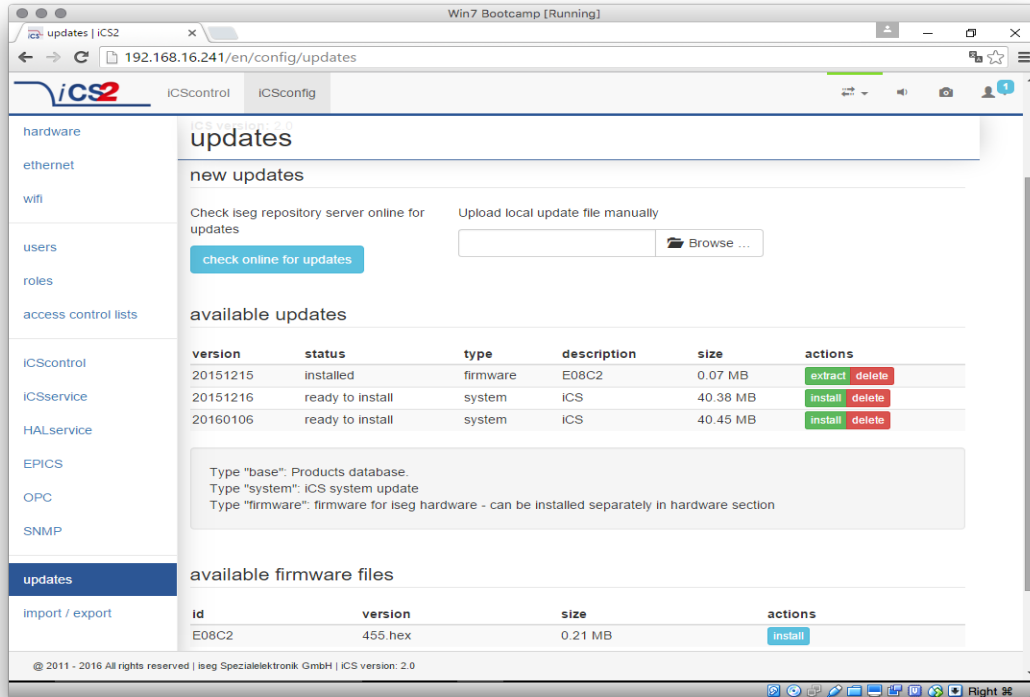
To update specific hardware devices please **extract** the firmware package first and then navigate in the **hardware section** to the corresponding device and use **firmware update** functionality individually.

INFORMATION



NOTE

Using the **“Check online for updates”** feature the iCS directly connects to iseg online software repository. All update files can also be downloaded from iseg website (<http://iseg-hv.com/en/support/downloads>) or directly on <http://download.iseg-hv.com/>



The screenshot shows the 'updates' page of the iCS2 configuration tool. The page is titled 'updates' and has a left sidebar with navigation options: hardware, ethernet, wifi, users, roles, access control lists, ICScontrol, ICSservice, HAL.service, EPICS, OPC, SNMP, updates (selected), and import / export.

The main content area is divided into several sections:

- new updates:** Contains a checkbox for 'Check iseg repository server online for updates' and a button 'check online for updates'. There is also an option to 'Upload local update file manually' with a 'Browse ...' button.
- available updates:** A table listing updates with columns for version, status, type, description, size, and actions.

version	status	type	description	size	actions
20151215	installed	firmware	E08C2	0.07 MB	extract delete
20151216	ready to install	system	ICS	40.38 MB	install delete
20160106	ready to install	system	ICS	40.45 MB	install delete
- Legend:** A box explaining update types: Type "base": Products database. Type "system": ICS system update. Type "firmware": firmware for Iseg hardware - can be installed separately in hardware section.
- available firmware files:** A table listing firmware files with columns for id, version, size, and actions.

id	version	size	actions
E08C2	455.hex	0.21 MB	install

At the bottom of the page, there is a footer: '@ 2011 - 2016 All rights reserved | iseg Spezialtechnik GmbH | ICS version: 2.0'.

iCControl – control and monitor web application

The user interface of iCControl software is divided into three bars.



Left bar: Hardware Explorer

The left column shows the configured hardware.

If connected with iseg CAN line management slaves are shown in yellow or green background, corresponding to the CAN line they are connected with. Every device has a colored left border showing the running state.

Crate/Device running states	
grey	one of the nested modules is ramping to the desired voltage
yellow	one channel of one of the nested channels is ramping to the desired voltage
red	the crate / device (or one of the nested modules/channels) has one or more errors (refer to the error/event badges)
green	the crate / device (and all of the nested modules) are in a good condition, at least one channel of a nested module is running high voltage

Module running states	
grey	not present, not connected or switched off

yellow	one channel of the module is ramping to the desired voltage
red	the module has one or more errors (refer to the error/event badges)
green	the device/module is in a good condition, at least one channel is running high voltage

Channel running states	
blurred / faded out	Module is not detected (probably switched off)
grey	not present (configured module to current module mismatch), or switched off
yellow	channel is ramping to the desired set voltage
red	channel has at least one error (please inspect error counter badge)
green	channel is in good condition and switched on

Left bar: Channel folders

Channel folders are shown in the section “channel folders” below the hardware section in the left application bar. Channel folders can be created and extended by selecting a set of channels and clicking the folders icon on top of the channel list.

Existing folders can be selected or removed in the folders section of the left bar.

Left bar: Channel profiles

Channel profiles store information about set values, On/off states, and Kill-Properties of channels. They can be created by selecting the channels that should be restored in the channel list and clicking the star-icon. Existing profiles can be selected, applied and removed in the channel profiles section of the left bar. A new option with the custom given title appears in the Select Box. By selecting a Channel profile and clicking the **apply button** the stored state of the channel will be adjusted.

Center bar: Channel list

Once a device or channel folder has been selected, the channel list will update and show only the corresponding channels, with

- The topological location (line, address, channel),
- The running state,
- Set and measured values,
- Channel infos, events and errors (displayed as clickable badges)

The list header has an **action row**, where all channels can be selected with one click for more actions.

Each action in this row is located in top of its respective column.

Some examples:

- To create a new channel folder of specific channels, select these channels and click the folder-icon.
- To store the current setup of the specific channels (running state, set-values, kill enable etc.), select them and click on the star-icon. To enable or disable all selected channels, click the ON / OFF icons.
- Change the set voltages of all selected channels, click the edit-icon which is located in the Vset column.
- To display a graph of measured voltages of all selected channels, click on the graph-icon located in the Vmeas column.
- To show a live log of measured voltages of all selected channels, click on the logtable-icon located in the Vmeas column.

Center bar: Chart

At the bottom of the center bar a floating chart window can be shown over the channel list by clicking the toggle button with the chart icon on the upper left of the chart bar. To show only specific channel information, please select the channels to display and select the Chart-Icon on top of the respective column of the action row, e.g. to display the voltages of the selected channels, select them and click on the Chart-Icon on top of Vmeas column. To show plots of all channels select or deselect all channels, and disable/re-enable the chart by clicking the chart icon twice.

Right bar: Device information

The device section gives information on the currently selected hardware device of the device explorer. Depending on the device type, hardware status information are given (temperature, error, safety loop states), the device can be enabled / disabled. Device specific parameters can be set (ramps, kill parameters ...). To get a quick help, hardware documentation can be downloaded directly.

Right bar: Camera

The camera tab shows the captured image of the configured camera. It can be directly connected with the iCS hardware or an IP-Cam URL, configured in **hardware / iCScontrol** section.

Right bar: Live log

The live log collects information of the current session. The log data is only available until a reload of the iCScontrol webpage occurs. The live log can be filtered to specific channels or value types, by selecting channels and clicking the corresponding log icon in the action row on top of the channel list. The log list shows the last value of an item. By clicking on it, previous log items are displayed.

All session log data can be **exported as CSV** file for ongoing work with Spreadsheet applications, eg. Microsoft® Excel.

Right bar: Commands

Commands can be send directly to connected devices. Quick commands are mass operations that can be sent to more devices at one time. The commands tab prefills the input fields according to the selected hardware device (device explorer).

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