IPETRONIK





"IPEmotion_PlugIn_X_V02_18_00 "

29. November 2022

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7	X-Plugi 7.1 Ett 7.2 CA 7.3 Op 7.4 Cc	n OPTIONS	· · · · ·	 	· · · · ·	· · · · · · · · · · · ·	· · · · · · ·	 	· · · · · · ·	97 97 99 100 103
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1 Important and general information

1.1 Important information

Please follow these instructions before and during the use and application on any IPETRONIK product!

1.1.1 Safety and Warning instructions

Please follow the instructions and information as contained in the user manual!

- 1. The user can **influence an electronic system by applying the IPETRONIK product**. This might cause risk of personal injury or property damages.
- 2. The use and application of the IPETRONIK product is permitted only to qualified professional staff, as well as, only in appropriate manner and in the designated use.
- 3. Before using an IPETRONIK measurement system in the vehicle it has to be verified that no function of the vehicle, which is relevant for secure operation, might be influenced:
 - by the installation of the IPETRONIK measurement system in the vehicle,
 - by an potential malfunction of the IPETRONIK system during the test drive.

In order to avoid possible danger or personal injury and property damages, appropriate actions are to be taken; such actions have to bring the entire system into a secured condition (e.g. by using a system for emergency stop, an emergency operation, monitoring of critical values).

Please check the following points to avoid errors:

- Adaption of sensors to components of the electrical system / electronics, brake system, engine and transmission control, chassis, body.
- Tap of one or several bus systems (CAN, LIN, ETHERNET) including the required electrical connection(s) for data acquisition.
- Communication with the vehicle's control units (ECUs), especially with such of the brake system and/or of the engine and transmission control (power train control system).
- Installation of components for remote data transmission (mobiles, GSM/GPRS modems, WiFi and Bluetooth components).



The products can be operated in extended temperature ranges greater $70 \,^{\circ}C$ and therefore the operator has to take safety measures to avoid any skin burnings on hot surfaces while touching the products.

- 4. Before directly or indirectly using the data acquired by an IPETRONIK measurement system to calibrate control units, please review the data regarding to plausibility.
- 5. With regard to the application of IPETRONIK products in vehicles during use on public roads the manufacturer and/or registered user of the vehicle has to ensure that all changes/modifications have no influence concerning the license of the vehicle or its license of operation.
- 6. User does agree to the instructions and regulations as mentioned above. In case the user does not agree with the instructions and regulations as mentioned above, he has to notify this expressly and immediately in writing to IPETRONIK before confirming the sales contract.

1.2 Terms and conditions

See IPETRONIK website for details: www.ipetronik.com

1.2.1 Legend of used icons

?	Тір	This icon indicates a useful tip that facilitates the application of the software.
i	Information	This icon indicates additional information for a better understan- ding.
\triangle	Attention!	This icon indicates important information to avoid potential error messages.

1.2.2 Support

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2 PlugIn overview

2.1 PlugIn description

With the IPETRONIK-X PlugIn you can configure analog and digital measurement modules from IPETRONIK. The two main module lines are CAN modules and Ethernet Modules. Therefore 2 configuration interfaces CAN and Ethernet are supported for the product lines. However, it is also possible to daisy chain CAN modules after the X-Modules. This setup is called X-LINK and will be explained too. The Modules can be operated with the IPEmotion PC software and on the IPEmotionRT data logger software.

2.2 PlugIn installation

In order to use the PlugIn together with IPEmotion you need to install it. The PlugIn is available for download from the IPETRONIK website: https://www.ipetronik.com/ When you have installed the PlugIn, you need to launch the IPEmotion software. Then you need to access the application menu and open the OPTIONS. In the OPTIONS you can activate the PlugIn as indicated below.

File		Recent project	ts list	а X		Activate Plu	ugli	n in OPTIONS	[1	1 X]
	New]	PEmotion options							×
	Open		Frequently used	Active		Title		Version	Description	Ма
	Save		Basic settings		2	CAETEC dataLog IPETRONIK X	٢	21.06.00 02.15.02	CAETEC data logger (ETHOS, ARCOS, an PETRONIK CAN and Ethernet devices (. CA
	Save as		View		<u></u>	IPETRONIK LOG		03.65.03	IPETRONIK Data logger (M-LOG, S-LOG,	IPE
	App-Export		Data manager		0	Video		01.04.00	Synchronic recording of video data for ca	. IPE
	Runtime version		Data service Import	>	at.	Protocols		03.01.00	Protocol acquisition with any CAN hardwa	. IPI
ō	Compare		Analysis Maps							
	Print I	8	Directories							
N	View 1	•	Units Hotkey					Dow	nload link to website	
	Administration)	<u>.</u>	User administration	•						•
۲	Options		PlugIns	Pluging	atting				Download	
6	About		User displays User operations	Specify ti The used automation	he plugin plugin c update	, is to be used. version can be changed wit is run at installing later plu	thin th ugin v	he list. If a version number versions.	is selected that ends with a '=' character, no	0
Ċ	Close			n					OK Cance	4

The PlugIn is supporting the following Windows operating systems:

- 32 bit
- 🕨 64 bit

2.3 System overview

The following diagram is indicating the two main systema architectures. You can operate the X-Modules based on an Ethernet communication via your LAN port of your computer. The other setup requires a CAN card interface from IPETRONIK like IPEcanPro FD or IPEhub2 or other supported vendors for the CAN modules.



Another system setup is to combine Ethernet and CAN modules in one days chain. This setup requires that the Ethernet modules are connected first to the PC and the CAN modules are following the Ethernet modules.



The most common and recommended hardware setups and the required cable sets will be explained in the following sections.

3 CAN Modules hardware setups

In the following the 3 main setups are explained. The required cable sets and lengths are depending on the physical installation environment. The cables are available in different lengths. The last 3 digits of the cable number are indicating the length. The required cable to interconnect the M-CAN modules is number: 620-560.xxx. The available lengths for the placeholder .xxx are for example:

- 002 = 15 centimeter
- 015 = 1.5 meter
- 030 = 3 meter
- 050 = 5 meter
- 100 = 10 meter

Every cable has a dedicated cable data sheet indicating the connectors and the cable pins and the color of the cable as indicated in the example below.



3.1 Example 1

In this setup the power supply is provided from the very end of the module chain. This is applicable when only a few modules are in the measurement setup and one source of supply 9-36 VDC is sufficient.



3.2 Example 2

In this setup the supply is provided through a SUBD 9 and Y-splitter cable at the beginning of the module chain. This setup is also practical in the case the power supply and CAN interface are located at the same end. This system works well for smaller mule chains where one supply is sufficient. It is important to finish the measurement system on the last module with a CAN bus termination plug.



3.3 Example 3

In this case you operate many modules in our measurement setup and the interconnection between the different modules might be also large which causes voltage drops along the modules. It is recommended to add a power feeder T-Junction to the system. Within very large systems is many be required to have several power feeder and to use additional power supply via the last module or the first modules, as indicated in the two scenarios above. However, it is important to consider a separate power supply cable when using the power feeder. This cable has no internal CAN bus termination. As a rule of thumb every 15 modules a power feeder should be considered.



4 X Modules hardware setups

In the following 4 main hardware configurations and cable sets are presented.

4.1 Example 1

In this setup the power supply is provided from the very end of the module chain. This is applicable when only a few modules are in the measurement setup and one source of supply 9-36 VDC is sufficient.



4.2 Example 2

In this setup many modules are involved and therefore intermediate power supply is needed. With the X-FEED power feeder the modules can get power feed into the middle of the measurement chain. As a rule of thumb 7 X-Modules can be supplied with one power feeder. If the system grows lager power supply from the very end or additional X-FEED modules can added to the system. As indicated the X-FEED provides power only to the X-Modles. The CAN-Modules require their own power supply either from the very end or using the M-CAN power feeder.



4.3 Example 3 - CAN Tunneling

Another system architecture can combine X- and CAN-Modules in one daisy chain. In this case a dedicated cable is required to link-up the Ethernet based X-Modules to the CAN based M-Modules. The architecture requires that the Ethernet modules come first and that the CAN modules are attached behind. It is not possible to add any Ethernet modules behind the CAN modules. In smaller setups one power feed from the very end can be sufficient. However, if the system grows lager, you can extend the power alimentation through adding X-FEED modules for the X-Modules and CAN POWER FEEDER to the CAN modules.



5 SIGNALS work space

The SIGNALS work space is dedicated to configure your PlugIns and take measurements. All configuration functions are explained in reference to the IPETRONIK X PlugIn.

File Project S	ignals	Ac	quisition	View	Data n	nanager	1	nalysis R	eporting	Scripting	Info	
IPETRONIK X Sys	sten Com	D.	ts Functions	Limport	Export C	heck A	 Adjust	Detect Initializ	e Stop	Details		
Hardware			Configu	ration				Acces	s	View		
V02.15.02			Name	Curre	ent value	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling
Name		Ŷ										
		•	59104791_1	0,00)2 V 🕺		V	-100,000	100,000	-100	100	1 Hz
- 🏥 X-1	12		59104791_2	-0,0	23 V	~	٧	-100,000	100,000	-100	100	1 Hz
59104791	4		59104791_3	-0,0	078 G	V	G	-10,0000	10,0000	-2	2	1 Hz
57811010	8		59104791_4	-0,0	14 Nm	~	Nm	-50,000	50,000	-10	10	1 Hz
⊿ 🏭 X-3	10		57811010_1	20,9	3°C	~	°C	-60,00	1370,00	-60	1370	1 Hz
91600337	4		57811010_2	23,0	7 °C	-	°C	-60,00	1370,00	-60	1370	1 Hz
91200143	6		57811010_3	23,5	5°C	~	°C	-60,00	1370,00	-60	1370	1 Hz
	100		57811010_4	23,9	96 °C	~	°C	-60,00	1370,00	-60	1370	1 Hz
			57911010 E	24.4	0.00	1	90	-60.00	1370.00	-60	1370	1.67

5.1 Ribbon main functions

When you start working with your analog measurement modules you need setup the hardware and cable sets as discussed above. A supported CAN card hardware and power supply is required. The easiest way to get started is to run the DETECT function as indicated below.



5.1.1 Hardware / PlugIn

Tip

Select the hardware / PlugIn you would like to use for your dry confoguration. The drop down list includes all PlugIns which were activated in OPTIONS >PlugIns. See chapter ?? for more details.



Sometimes users cannot access the list box and make manual configurations. In this case, in OPTIONS > Basic Settings the measurement configuration by MPC data base file was activated. See chapter ??.

If you select a PlugIn from the active hardware list, you will see the currently loaded PlugIn version. For changing the PlugIn version you need to go back to OPTIONS >PlugIns. There you can switch to previous versions. An equal sign (=) behind the PlugIn version indicates that you will always use this version even if a more recent PlugIn version has been installed. For more details see OPTIONS >PlugIn ??.

1 <u>1</u> <u>-</u> 2 2	- 品 - 3	6		a 🕒	XX	500	a 🛇 🛛) 🔊 🦫 -
File Project	Signals	A	cquisition	View	Data r	nanager	Analysis	Reporting
				1	† :	Ö.	16 1	
IPETRONIK X	System Com	pone	nts Functions	Import E	xport (Check Adjust	Detect Ini	tialize Display
Hardware			Conngu	iration			A	ccess
V02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min
Name		۴						
		•	59104791_1	~	V	-100,000	100,000	-100
🔺 🍰 X-1	12		59104791_2	~	V	-100,000	100,000	-100
5910479	1 4		59104791_3	~	G	-10,0000	10,0000	-2
57811010	8		59104791_4	~	Nm	-50,000	50,000	-10
Indication of Pluc	In version	load	hed	-				[SI 2

Indication of PlugIn version loaded

5.1.2 System

The system is the next level below the selected PlugIn. The system is basically the specific hardware or interface you are using to set up your data acquisition system. Each PlugIn consists at least of one system.

a 🔁 🔒 🔒 🗟 🎄 🗛	X D	Ĩb.	û 🎦	ВX	🕺 🖍	30 1	%
File Project Signals	Acqui	isition	Viev	/ Dat	a manag	er	Analysis
IPETRONIK X System	omponents	Func	tions Impo	rt Export	Check	Adjust	Detect
Hardware		(Configuration	Activ	/e Unit	Phys	s Min
Name 👻	Σ	Ŷ		[
		•	59104791_	1 5	< V	-100	0,000
🔺 🏯 X-3	10		59104791_	2 5	V	-100	0,000
91600337	4		59104791_	3	G	-10,	0000
91200143	6		59104791_	4 5	Nm	-50,	000
🔺 🏥 X-1	12		57811010_	1 5	✓ °C	-60,	00
59104791	4		57811010_	2	2° 2	-60,	00
57811010	8		57811010_	3	≥ °C	-60,	00

Example: 2 X-System nodes are detected

[SI 3]

Behind the system node you can add components provided the hardware is modular. In the example the components are grouped in different categories like Voltage, Temperature, Pressure, etc. measurement modules.

IPETRONIK X System Co Hardware	mponents	Fun	ctions Import	texport C	hedk A	Adjust Detect	Access	isplay Details	
V02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Ma
Name 👻	Σ	Ŷ							
		*	59104791_1	~	V	-100,000	100,000	-100	100
⊿ 盖 X-3	10		59104791_2	~	V	-100,000	100,000	-100	100
91600337	4		59104791_3	~	G	-10,0000	10,0000	-2	2
91200143	6		59104791_4	~	Nm	-50,000	50,000	-10	10
59104791		ompo hang unctio nport djust djust se as ut opy	nents e into xns TEDS default Ctrl+ Ctrl+	· · · · · · · · · · · · · · · · · · ·	Vo Te Pri Co	iltage mperature essure unter/frequence alti devices		Mx-STG2 6 Mx-SENS2 8 Mx-SENS2 4 Mx-SENS2 4 Mx-SENS2 4 M-SENS2	FAST

5.1.3 Firmware Update

With the firmware update function, you can update the module firmware directly from the PlugIn.

a 🔁 🖴 🗃 🛃	🛗 🔒 👌	(Ce	le B	£ [X	然 🖬	
File Project	Signals	Acqu	isition	View	Da	ta mana	iger A
	System Comp	onents	Functions	Impor	t Export	Check	Adjust
Hardware	E Up	date dev	ices	ration			
V02.15.02					Active	Unit	Phys Min
Name	Adj	just all ch	annels				
	- 1 <u>C-1C46</u>	-	101101121	1	~	V	-100,000
🔺 🏯 🛕 X-1	1	6	59104791_	2	¥	V	-100,000
59104791		4	59104791_	3	~	V	-100,000
57811010		8	59104791_	4	~	۷	-100,000
58700139		4	57811010	1	~	°C	-60,00
	1		57811010_	2	~	°C	-60,00
			57811010	3	~	°C	-60,00

Module firmware update function

[SI_4_1]

The update dialog will show you the current firmware the modules detected and will also indicate the latest firmware available on the computer. When the update process is started a progress bar will indicate the degree of completion.

Devices L	ibrary O	ptions	-	0
Update	U Exit			
Device a	Current ver	Target version	n Progress	
59104791	04.15.00	04.15.00		_
58700139	04.09.01	04.15.00	Update recommended	
57811010	04.13.00	04.13.00		

Module firmware update interface

[SI_4_2]

A progress bar will indicate the status of the update process.

PE X update			_ 🗆 ×
Devices L	brary Op	tions	۲
1	C		
Update	Exit		
Device 4	Exit 4		
Device name	Current ver	Target version	Progress
System: X-1			
59104791	04.15.00	04.15.00	
58700139	04.09.01	04.15.00	Downloading Application - 97,2%
🚔 57811010	04.13.00	04.13.00	
			07.00/
Progress		Updating devi	ces 97,0%

Module firmware update progress information [SI_4_3]

In the library work sheet of X-UPDATE software you can see detailed information about the firmware latest firmware version available on the computer. The firmware data base will be installed together with the IPETRONIK-X PlugIn the following default directory:

► C: \ProgramData\IPETRONIK \Firmware

Check for updates Library Library Exit Firmware type	Version	Please select the installation directories Programs Change
4 Device: 519 - SIM_STG		C:\Program Files\IPETRONIK
🔺 Main version: 04.10.00		
Application	04.10.00	Davies Firmurae anth
Config	01.02.00	Device Firmware path Change
Download kernel	01.20.03	C:\ProgramData\IPETRONIK\Firmware
FPGA	01.07.01	
FPGA download	01.06.00	
PIC	01.03.00	
PIC RAM download kernel	01.03.00	Installation of Plugin suggest default
RAM download kernel	01.20.03	firmware directory
Device: 557 - M_THERMO2_HV		in the order of the other
Device: 560 - M_THERMO		
Device: 561 - M_SENS		
Device: 562 - M_FRQ	Data from the	
Device: 563 - U_THERMO		
Device: 566 - M_THERMO_16	default library	
Device: 567 - M_SENS_8		
Device: 568 - M_SENS_8plus		

Import / update new firmware files

[SI_4_4]

Attention!

In the case you install an older IPETRONIK-X PlugIn version after a newer version was installed, the firmware folder will be overwritten by the latest installation. To prevent this from happening you may choose a different directory for the firmware folder of each PlugIn version. The you can import the firmware directories accordingly to your needs.

Configuration check 5.1.4

This function checks the configuration on consistency. However, this function does not work for all PlugIns. Messages are only returned if the PlugIn supports the check function. The configuration check function for example considering duplicate channel names across all active PlugIns across the SIGNALS and ACQUISITION work space. A comfortable function for message refresh and configuration error searching is implemented too.



Information about possible configuration issues / problems. [SI_5]

You can directly jump to the channel in the check window for the messages as indicated in the example below of the "Range-1" channel.

Setup		Name	Active	Color	Channel	Operation	Reference value top	Reference value bott
	Ŷ							
 Kol Calculations 2 		Range-1	~		Temp 2	Limit violation with		
f(x) Formulas 0			_					
Scalings 0	ſ	7						
J Variables 3		1						
Number 0		1						
Status 0		IPEmo	tion config	juration o	check			
T Text 0		Symbol	Type	Sour	ce	Reference Mes	sage	
⊿ 👹 Saving 1			Warning	Ran	ne-1	The	re is no reference value ton	defined
Storage group-1 0			Warning	Lineit	ye-1	The	e is no reference value top	defined:
4 Monitoring 2	1	-	warning	Limit	value-1	Ine	re is no reference value den	nea.
III Limit values 1		1.000						
👖 Ranges 🖌 1								
4 🖉 Analysis 2								
FFTs 0								
Classifications 0		Refrest	h E	xport				
4 👬 Control 5								
Double click on the message	in t	he chec	k win	dow	to reac	h the channe	Ι.	[SI_6]

Double click on the message in the check window to reach the channel.

You can update the configuration and correct errors while the check window is open. With the refresh button you can update the message list.

1	Name	Active	Color Channe	Operation	n Reference valu	e top Reference value bottom	Message type
	Range-1	Image: Second	Temp_2	2 Limit viola	ation withi 4	1	🔥 Warning
	🚔 IPEmo	tion config	uration check				
	Symbol	Type	Source	Reference	Message		
		Warning	Limit value-1				
		_					
	Refres	h E	xport				Close

Hit refresh button after the errors are corrected. > Message list is updated.

[SI_7]

5.2 Adjust functions

5.2.1 Database

If youuse sensors from the sensor data base and run the **Adjust Database** function, the software automatically retrieves the latest sensor configuration from the data base. With this process you can automatically update all sensors with the latest calibration data from the data base in one click. Details on the sensor data base are discussed in chapter 6.10.

5.2.2 TEDS

When a hardware detection is executed and TEDS (Transducer Electronic Data Sheet)sensors are connected to the analog inputs the TEDS data stored in the TEDS chep in teh sensor are transferred to teh channel scaling. If you add the symbol clolum to the channel grid you will also see the TEDS icon.

a 🗈 🔒 🛙 🛛	2 🍈 e			i i	1	X	* •	04) 🔏 💩 -	Ŧ
File Project	Signals	Ac	quisi	tion	View	Dat	a manag	jer	Analysis	Reporting	Scripting
IPETRONIK X	System	Componen	ts f	Functions	Import	Export	Check	 Adjust	Detect In	itialize Display	Details
V02.15.02				Name	diadon	Active	Unit	Symbol	Fnys Min	Phys Max	Sensor Min
Name		Σ	Ŷ								
			+	5910479	91_1	Z	V	. Al	-100,000	100,000	-100
🖌 🚔 X-1		12		5910479	91_2	~	V	N	-100,000	100,000	-100
5910479	1	4		5910479	91_3	~	G	A.	-10,0000	10,0000	-2
578110	.0	8		5910479	91_4	~	Nm	₩	-50,000	50,000	-10

Detect TEDS sensors.

[SI_9]

The following M- and X-module modules support TEDS:

- ▶ M-SENS2
- M-SENS2 DSP
- M-SENS2 250Hz
- M-SENS2 250Hz DSP
- M-SENS 8
- M-SENS 8 DSP
- M-SENS 8plus
- M-SENS 8plus DSP
- Mx-SENS(2)8
- Mx-SENS2-4
- Mx-STG2 6
- Mx-SENS2-4 FAST

TEDS sensor detection with automatic unit transformation

When you detect TEDS sensors you can define an automatic unit conversion. This function is needed when the unit defined for the sensor does not meet the unit format required for the measurement application. In order to activate this feature you have to add an additional entry in the **Settings.XML** file. In the example above the standard sensor was detected with the unit [G].

When you add the following code into the settings.XML file the unit are automatically converted to the preferred unit defined in the OPTIONS >Unit settings.

C:\ProgramData\IPETRONIK\IPEmotion 2022 R3\Settings.XML

The new entry in the XML file is defined as: <detectWithPreferredUnit>**True** </detectWithPreferredUnit>



Add new function for TEDS unit conversion to Settings.xml. [SI_11]

The default unit defined in the OPTIONS >Units is [m/s2].

requently used	Physical quantity	Unit	
asic settings	Power	w	
	Pressure	bar	
ppearance	Velocity	m/s	
ïew	Angular velocity	rpm	
	Mass flow rate	kg/s	
ata manager	Plane angle	rad	
ata service	Strain	µm/m	
moort	Symbol rate	Bd	
mport	Percent	%	
xport	Storage space	MB	
nalvsis	Acceleration	m/s²	Default
	Torque	m/s²	2 - 46 <u>.</u>
laps	Volume flow	G	
Virectories	Specific enthalpy	J/kg	
	Energy flux density	W/m²	
Inits	Bridge detuning	mV/V	
lotkey	Density	kg/m³	
	Relative humidity	RH	

TEDS adjust on channel level

All modules supporting the TEDS (Transducer Electronic Data Sheets) function support in the IPETRONIK X-PlugIn a TEDS adjustment on channel level. Rather than synchronizing your whole configuration across all TEDS channels you can focus on a dedicated channel to integrate the TEDS data from a connected sensor.

	Q,	Super-		Ļ	1		Adaust	K		
Hardware	*	(ionfigura	tion	- Coppere	Check	Hujust	-	Access	View
02.15.02		Na	me		Active	Unit	Symbol	Phys Min	Phys Max	k Sensor Mi
lame	Σ	۴								
		59	104791_	1	~	V	N	-100,000	100,000	-100
🚔 X-1	12	59	104791_	2	~	٧	N	-100,000	100,000	-100
59104791		59	104791_	3	2	m/s²	TEDS	-98 067	Euroctione	1
57811010	8	59	104791_	4	~	Nm	â	-50		
▲ X-3	10								Adjust TEDS	
91600337		TEDS	: Adii	ust d	on ch	anne	el leve		Compare TEL	15
91200143		LDC	, and the	aor			1010	. 8	Use as defau	lt
								0	Reset to defa	ault
								×	Cut	Ctrl+)
								ED	Сору	CAI+C
02.15.02				Nan	ne		Active	Unit	Symbol	Phys Min
lame	T	Σ	9							
			+	591	04791	1		v	N	-100,000
				501	04701	2	~	v	N	-100.000
- - V 1	1	🚔 X-1 12		371	04/91	<u> </u>				
🚔 X-1		12		591	04791	3	~	m/s2	A	-98.067

When the synchronization is finished the channel is updated with the TEDS data from the sensor including e.g. the preferred unit when defined in the Settings.xml file.

Compare TEDS sensor with configuration

When a channel is already scaled based on TEDS parameters, you can use from the context menu the TEDS compare function to update the TEDS data e.g. when a new sensor was connected to the input.

	1	l. 🚯	+	1	Ö,		Manufacturer: Name:	Manufacturer I	Manufacturer Id	127		
IPETRONIK X System	Compo	onents Functions	Import	Export	Check	Adju	Serial number:	91144	91144			
Hardware		Confi	puration					Sensor prope	erties	Configuration	TEDS	
/2.15.02		Name	Active	Unit	Symbol	Phy	Calibration				11111100	
me	4								Calibration	Valid	Valid	
			172	44.5					Calibration date	23.09.2021	23.09.20	21
59104791_1				V	/V	-10			Expiration date	23.09.2022	23.09.20	22
X-1 59104791_2			~	V	N	-10	-		Initials	PB	PB	
59 10 47 9 1	1	59104791 3		m/c2	A.7	-98	Physical v	sue	Dhusical usha	Annalasekine	Annalasak	-
57811010		59104; 🖻 Fu	nctions		•	-50			Physical value	Acceleration	Accelerat	Jon
± x-3		di Ad	just TEDS	<u>ş</u>					Minimum	-10 G	-10.6	
01600337		UT Co	moare TEC	ys.					Maximum	10 G	10 G	
- 01300143				-			Output siz	e	141-141-141		1,00,00	
91200143		🚳 Us	e as defau	it.					Output size	Electric voltage	Electric vo	oltage
		🔿 Re	set to defa	ault					Unit	v	٧	
									Minimum	-2 V	-2 V	
ontext menu: Cor	npa	are TEDS	on c	hanr	nel le	vel			Maximum	2 V	2 V	
	20						Sensor su	oply				
									Excitation min.	7,999 V	7,999 V	
									Excitation max.	30,001 V	30,001 V	
								Re	ference excitation	10 V	12 V	

When a TEDS sensor is detected the data is saved into a database file called **IPESensorDatabase.xmt**. In the section Scaling calulator is will be disccussed how to retrieve sensor data from the sensor data base.

► C:\Users\Public\Documents\IPETRONIK\IPEmotion\Database\IPESensorDatabase.xmt

5.2.3 Offset adjust

The offset adjustment is a very useful function to check and update the physical measurements to the configured measurement range. With a offset operation you can shift the current sensor signals on the analog inputs as your new base reference. The offset function can be performed during the online measurements of the system.

0	Online fset adjust	e meas	sureme	ents				Mear	suremen ange	t
Drag	a column hear	der het	roup by that	column					Ļ	
	Name	Current val	ue Group	Phys Min	Phys Max	Referen	Offset value	Available m	easurement r	Result
Ψ										
	59104791_1	0,002 V	None	-100,000	100,000	0,000	0,024		1	OK
	59104791_2	0,002 V	None	-100,000	100,000	0,000	0,024			OK
	59104791_3	0,0002 G	None	-10,0000	10,0000	0,0000	0,0016			OK.
	59104791_4	0,001 Nm	None	-50,000	50,000	0,000	0,003			OK
	91600337_1	0,011 V	None	-100,000	100,000	0,000	0,006			OK
	91600337_2	-0,002 V	None	-100,000	100,000	0,000	0,003			OK
	91600337 3	0.008 V	None	-100,000	100,000	0,000	-0.003		-	OK
٢	91600337_4	4,5864 V	1 1	- 0,0000	10,0000	0,0000	0,0000			ОК
1	91200143_1	NoValue	None	-7999,9	7999,74	3,48471	0,003810		-	OK
	Group name	1	Comment							
	1	1	Sensor Grou							
	2	- 17	Sensor Grou	p 2		Of	fset valu	Jes		
•	م مع	Offset adjust	·····	Original sig	inal set adjust)	de de geuelo de	ffset adjustmer vice, in order t ntrast to the c rmanent chang	nt is the adapt to remove sys alibration, an ge is required.	tion of a measur tematic deviation intervention car	emt Ins. In Using a
ect	ion: 1						* Sta	rt	Export	Close

The offset operation can be performed for all channels or only for dedicated groups. In this example 2 sensor groups are defined. Each channel can be rated to a group. In the example below one analog input (assigned to group 1) has already an input voltage of 4.5 Volt.

	Name	Current valu	e Group	Phys Min	Phys Max	Referen	Offset value	Available measurement r	Result	
r										-
	59104791_1	0,002 V	None	-100,000	100,000	0,000	0,024		OK	
	59104791_2	0,002 V	None	-100,000	100,000	0,000	0,024		OK	
	59104791_3	0,0002 G	None	-10,0000	10,0000	0,0000	0,0016		OK	
	59104791_4	0,001 Nm	None	-50,000	50,000	0,000	0,003		OK	
	91600337_1	0,011 V	None	-100,000	100,000	0,000	0,006		OK	
	91600337_2	-0,002 V	None	-100,000	100,000	0,000	0,003		OK	
	91600337_3	0,008 V	None	-100,000	100,000	0,000	-0,003		OK	
۲	91600337_	4,5864 V	1 .	-10,0000	10,0000	0,0000	0,0000		OK	
	91200143_1	NoValue	None	-7999,9	7999,74	3,48471	0,003810		OK	-
	Group name		Comment							
×	1		Sensor Gro							
	2		Sensor Gro	up 2						
le	ction: 1	Offset adjust	·	Original sign (without offs	val et adjust)	offs orde calib gr	et adjustment i r to remove sy ration, an inter ired.	s the adaption of a measurem stematic deviations. In contras vention causing a permanent of Start Export	t device, in st to the change is Close	~~~
	All Selected All group	l ved						Adjusting channels	1	

Offset operation organized by groups

After the offset operation the initial analog measurement of 4.5 Volt is considered as an offset value and the incoming signal of 4.5 Volt is reference as a new relative zero value. With the offset operation the zero line is shifted by 4.5 Volt. This is also graphically indicated by the available measurement range with is now reduced (red section).

	Name	Current value	e Group	Phys Min	Phys Max	Referen	Offset value	Available measurement r	Result
ŕ	102002								
	59104791_1	0,002 V	None	-100,000	100,000	0,000	0,024	1	OK
	59104791_2	0,002 V	None	-100,000	100,000	0,000	0,024		OK
	59104791_3	0,0002 G	None	-10,0000	10,0000	0,0000	0,0016	I	ОК
	59104791_4	0,001 Nm	None	-50,000	50,000	0,000	0,003		OK
	91600337_1	0,002 V	None	-100,000	100,000	0,000	0,006		OK
	91600337_2	0,005 V	None	-100,000	100,000	0,000	0,003		OK
	91600337_3	-0,008 V	None	-100,000	100,000	0,000	-0.003		ОК
•	91600337_4	0,0121 V	1 .	-10,0000		0,0000	-4,5731		ок
	91200143_1	NoValue	None	-7999,9	7999,74	3,48471	0,003810	1	OK
	Group name	C	omment						
0	1	s							
	2	S	ensor Grou	p 2					
		Offset adjust	·	Original sig	nal set adjust)	de de de de de de de	ffset adjustmer evice, in order t intrast to the c ermanent chang	it is the adaption of a measur o remove systematic deviation alibration, an intervention cau je is required.	emt ns. In sing a

The data of the offset dialog can be exported as TEXT file too.

*Offest.TXT - Editor					- 🗆 X
Datei Bearbeiten Format Ansicht Hilfe					
Name ;Current value	;Group	;Phys Min	;Phys Max	;Reference value	;Offset valu ^
59104791_1;0,002 V	;None	;-100,000	;100,000	;0,000	;0,024
59104791_2;0,0002 G	;None	;-10,0000	;10,0000	;0,0000	;0,1624
59104791_3;0,0002 G	;None	;-10,0000	;10,0000	;0,0000	;0,0016
59104791_4;0,001 Nm	;None	;-50,000	;50,000	;0,000	;0,003
91600337_1;0,020 V	;None	;-100,000	;100,000	;0,000	;0,006
91600337_2;-0,005 V	;None	;-100,000	;100,000	;0,000	;0,003
91600337_3;-0,002 V	;None	;-100,000	;100,000	;0,000	;0,006
91600337_4;-0,0119 V	;1	;-10,0000	;10,0000	;0,0000	;-4,5209
91200143_1;1,61898383490688 µm/m	;None	;-7999,98410	577899;7999,74575323	529;3,48471251854221E	-14;0,003830590
91200143_2;-0,000210285186767578	V;None	;-1	;1	;0	;0,449979573
91200143_3;NoValue	;None	;-1	;1	;0	;0
91200143_4;NoValue	;None	;-1	;1	;0	;0
91200143_5;NoValue	;None	;-1	;1	;0	;0
91200143_6;NoValue	;None	;-1	;1	;0	;0
Export Offset data to TXT fi	е				[SI_13_7]

5.2.4 Shunt Check

A strain gauge is used to measure structural load e.g. a chassis frame. During installation and test sensors can be overstretched or damaged. This overload or damage of the sensor is not visible without applying a shunt check. Those damages can result in wrong measurements. Shunt check is used to verify the installed sensor. Shunt checks are performed before and after a measurement. The step response of the shunt check must be the same before and after the test.

Name	Bridge type	Bridge Resi	Shunt resist	%	Quadrant 1	Quadrant 2	Quadrant 3	Quadran	Offset	Result
91200143_1	Quarter	120 Ω	100 kΩ	10 %]				
A	6	(3)	a		The Shun	t Calibration is t	he usual metho	de to verify t	he output	signals of a

Shunt check dialog for Strain sensors

When the shunt check is raised the bridge resistance is measured and the results are displayed

	unceneek											
	a column heade	r here to group	by that column	1								
1	Name	Bridge type	Bridge Resi	Shunt resist	%	Quadrant 1	Quadrant 2	Quadrant 3	Quadran	Offset	Result	
	91200143_1	Quarter	120 Ω	100 kΩ	10 %	614,7479	-601,8028	4,153246	3,9091	2,93254		0
									W			
						diana.		1			12000	ana.
i	unt che	ck resul	ts									[SI_

You can also execute the shunt check via a dedicated hot key command. The configuration of the hotkeys is explained. The shunt check can be also made visible in the online measurements like in the yt-chart as indicated below. During the shunt check operation the measurements are online updated in the Yt-chart. The shunt check data can be saved into the measurement file which makes it convenient to compare the shunt check before and after your test.

Fi	le	Project	Signals	Acquisi	tion	View	Data mar	nager Ana
				1				Cy.
)isp	lay St	ore Pau	se New	Page-1	Fix	Undo grid	Area	y-t chart
	Cor	trol	S	reens		Layout		Elements
Char	nnels			4		1		
Pa	ges	Channels	Display	600-		tin and the second second		
	Manage							
	Name			-				
Ŷ	Name			400-			В	iridge
Ŷ	591042	791_1		400-			B - re	iridge esponse of
۴	591047 591047	791_1 791_2		400-			B - re s	ridge esponse of hunt check
۴	591042 591042 591042	791_1 791_2 791_3		400-			B - re s	ridge esponse of hunt check
Ŷ	591042 591042 591042 591042	791_1 791_2 791_3 791_4	R	400-			B re s	ridge esponse of hunt check
Ŷ	591042 591042 591042 591042 591042 578110	791_1 791_2 791_3 791_4 010_1	ß	400			B re s	bridge esponse of hunt check
۴	591047 591047 591047 591047 591047 591047 578110	791_1 791_2 791_3 791_4 010_1 010_2	ß	400-			B re s	ridge esponse of hunt check
Ŷ	591042 591042 591042 591042 591042 591042 578110 578110	791_1 791_2 791_3 791_4 010_1 010_2 010_3	Ş	400-		5	B re s	bridge esponse of hunt check
Ŷ	591047 591047 591047 591047 591047 591047 578110 578110 578110	791_1 791_2 791_3 791_4 010_1 010_2 010_2 010_3 010_4	R	400-	1200143	5_1	- re s	iridge esponse of hunt check

Shunt check results – bridge response

[SI_14_2]

Hotkey operation: offset adjust and shunt check

With a hotkey you have access to functions without using the software user interface. For the offset adjust and shunt check operation and many other functions custom ho key can be configured in the options.

Frequently used		Command		Hotkey	Entry
Basic settings	+	Project-File-New	٣	Control +N	
		Signals-Access-Start/Stop displaying		F6	
Appearance		Acquisition-Control-Start/Stop storing		F7	
liew		Project-File-Save as		Control+Shift+S	
)ata manager		Info-Info-Help		F1	
)ata service		General-Print		Control+P	
		General-Full screen mode		F5	
mport		Acquisition-Storage group-Set marker		F8	Marker 1
Export	1	Signals-Offset adjust		Control+O	1
Analysis		Signals-Shunt check		Control+S	
Maps	*				
Directories					
Jnits					

Options dialog: List of Hotkeys

[SI_14_3]

When you add a new hot key function you need to select the required area fist. Within each area dedicated functions are implemented. In the example of shunt check or offset adjust you need to select the SIGNALS area. When the function is selected you define afterwards via your keyboard the hotkey combination

Command		D	escription
 Area: Acquisition Area: Analysis Area: Data manager Area: General Area: Info Area: Project Area: Reporting Area: Scripting Area: Signals Area: View Workspaces 	· · · · ·	Area: Info Area: Project Area: Reporting Area: Scripting Area: Signals Signals-Configuration-Check Signals-Configuration-Database Signals-Configuration-TEDS Signals-Configuration-Offset Signals-Configuration-Offset Signals-Access-Detect Signals-Access-Detect Signals-Access-Synchronize Signals-Access-Synchronize Signals-Access-Initialize	List of hotkey functions Check the actual configuration concerning validity Adjust the channel scalings to the current values in t Adjust channel scalings with currently connected TED Adjustment of channel offset de Shunt check of channels Create a new hardware configuration with the conner The current hardware configuration can be mapped The current hardware configuration will be synchroning The connected devices will be initialized with the para Initialization of the connected bardware with the definitialization of the connected bardware with the definitialized with the definition of the connected bardware with the definition
		Signals-View-Details	Show/hide the configuration dialogs.
		Signals-Offset adjust	Adjusts the offset of the channels assigned to the s

Hotkey functions of SIGNALS area

[SI_14_4]

5.3 Detect

When you start working with your analog measurement modules you need setup the hardware and cable sets as discussed above. A supported CAN card hardware and power supply is required. The easiest way to get started is to run the DETECT function as indicated below.

	e 📤 🖶 X 🖻	fh ß	Ð	B X ∦ ∽ ∩	a 🛇	2 10
File Project	Signals Acqu	uisition	Vie	W Data manager	Analysis	Reporting Scripting Info
		B	-	l 🕇 🖏 🛅	A	🕸 🕑 📃
IPETRONIK X	System Components	Functions	i: Im	oort Export Check Adjust	Detect	Initialize Detect
Hardware		Confi	igurat	an	10	Detect Create a new hardware configuration wit
V02.15.02				Name	A 8.8	in systems, but to all found hardware of a
Name		Σ	Ÿ		0.10	Mapping Mapping of the hardware to the configuration
					0	Synchronize Synchronization of the configuration and the hardware
Detect conne	cted modules	(CAN	car	d hardware and m	nodule	s) 🖡 [SI_15]
				X-2 : Scanning the	e CAN inte	Detecting hardware rface IPEcan PRO SN: 36400378 CAN-2 Baudrate: 1000 kBd
						Cancel

The DETECT function is a very convenient function to identify any hardware connected to IPEmotion. Not every PlugIn supports automatic hardware detection. Usually, USB device interfaces support automatic hardware detection. The DETECT function is applied to all active PlugIns. It is recommended to use the DETECT function only for the very first time when you start to set up your measurement configuration. If the hardware configuration is changing by adding or removing modules, you need to execute the SYNCHRONIZE function to update the complete hardware configuration in the device tree. The SYNCHRONIZE function is explained in detail in section 5.3.2.

🔺 🗅 🔒 😫 😫		8 %	CD.	lî:	<u><u> </u></u>	ð B	X	∦ ⊮	2 0	🗱 🔇	0	۰ 🍓	÷
File Project	Signa	als /	Acqui	sition	1	View	Dat	ta man	ager	Analysis	Rej	porting	Scrip
	Ga 1003 Ga 1203	locia		All and a	•	₽	1	Q		16			
IPETRONIK X	System	Compon	ents	Func	tions	Import	Export	Ched	k Adjust	Detect	Initialize	Display	Details
Hardware				(Configur	ation					Access		View
V02.15.02					Name				Active	Unit	Symbo	bl	Phys Min
Name			Σ	٩									
				+	a_X		٦		~	G	1	V	-4,0000
u 🍰 X-1			11		a_Y				~	G		V	-4,0000
5910479	1		3		a_Z				~	G		V	-4,0000
57811010			8		59104	4791_4	- F	Ac	tual co	nfigurat	ion of n	nodule	es o
	1	1910			Temp	_1			~	°C	1	<u>^/</u>	-60,00
1.144	of Mad	ulaa			Temp	_2			~	°C	1	A./	-60,00
LISU	JI IVIOD	ules			Temp	_3	L		~	°C		<u>^ /</u>	-60,00
List of detected M	/I-mod	ules wit	th ad	ctual	l conf	igura	tion						[SI_16]



Attention!

If you execute the DETECT function the complete configuration of SIGNALS of all connected devices is recreated. Additionally, all the configurations from the ACQUISITION work space are removed.

5.3.1 Mapping

The hardware MAPPING is a very convenient function for merging configuration (IWF) files to the currently connected hardware. If you execute the MAPPING function, the current configuration is compared to the currently connected hardware. IPEmotion is starting the hardware detection to identify all currently connected modules.

.onfiguration:		Hardware:	
Name	Parameter	Name	Parameter
4 🛲 👼 X-1	CAN driver type: IPEcan Port number: CAN-1	4 📠 👼 X-1	CAN driver type: IPEcan Port number: CAN-1 C.
न 👼 59104791	Device type: 591 Is DSP device: True Front n	🚔 👼 59104791	Device type: 591 Is DSP device: True Front nu
🚔 👼 57811010	Device type: 578 Front number: 11010	🚔 👼 57811010	Device type: 578 Front number: 11010
🔺 🏯 👼 X-3	CAN driver type: X Port number: CAN-1 CAN	🔺 🍰 📅 X-4	CAN driver type: X Port number: CAN-1 CAN d
🚔 📻 91600337	Device type: 916 Front number: 337	🚍 👼 91600337	Device type: 916 Front number: 337
📻 🥽 91200143	Device type: 912 Front number: 143	ब्लि 🚰 91200143	Device type: 912 Front number: 143
	Configuration (IWF) and the de	etected hardware are	the same.

The Mapping function compares the current configuration (IWF) to the currently detected hardware across all PlugIns. [SI_17]



Information

The MAPPING function is only supported for those PlugIns which support automatic hardware detection.

In the following you will see an example how to use the mapping function in practice. There are applications in which the same configuration is applied to different hardware setups. For example, each IPETRONIK module has an unique front number and using the mapping function, the actual hardware configuration can be matched to the configuration file. When the MAPPING ope process has detected one new module as indcated in the screenshot below.

Name	Parameter	Name	Parameter
4 🏯 👼 X-1	CAN driver type: IPEcan Port number: CAN	4 🚔 👼 X-1	CAN driver type: IPEcan Port number: CA
🚍 👼 59104791	Device type: 591 Is DSP device: True Front	59104791	Device type: 591 Is DSP device: True Fro
57811010	Device type: 578 Front number: 11010	58700139	Device type: 587 Is DSP device: True Fro
4 🚎 👼 X-3	CAN driver type: X Port number: CAN-1 CA	57811010	Device type: 578 Front number: 11010
🚔 🔂 91600337	Device type: 916 Front number: 337	🔺 🏯 👼 X-4	CAN driver type: X Port number: CAN-1 C
📾 👼 91200143	Device type: 912 Front number: 143	📻 👼 91600337	Device type: 916 Front number: 337
		91200143	Device type: 912 Front number: 143

Configuration (left) and the detected hardware (right) are different.

[SI_18]

In oder to performe the mapping you need to select the modules you like to map from the detected hardware to the corresponding configuration. The mapping process works basically from right to left. You can define several mapping relations by linking one module from right side to one module of the left side. With the arrow button to save the mapping between modules.

Name	Daramater	Name	Parameter
valle	CAN driver type: IPEran Port number: C		CAN driver type: TPEcan Port sumber: C
A He G X-1	Device type: 591 Is DSP dever True Fr	2 state (see X-1	Device type: 591 Is DSP device: True Fro.
57811010	Device type: 578 Front number: 11010		Device type: 587 Is DSP device: True Fro.
🔺 📠 👼 X-3	CAN driver type: X Port number: CAN-1	6 57811010	Device type: 578 Front number: 11010
91600337	Device type: 916 Front number: 337	🔺 🏯 👼 X-3	CAN driver type: X Port number: CAN-1
91200143	Device type: 912 Front number: 143	91600337	Device type: 916 Front number: 337
		91200143	Device type: 912 Front number: 143
	Clear <<-		OK Cancel

Step 2: Press the button $[\leftarrow]$ to execute the mapping process



Information

The Mapping function can be applied across different modules types. The system is not preventing you from mapping for example a M-SENS module to a M-THERMO module.

When you conform the MAPPING process via the OK button the new module type including the device serial number is updated. However, the channel configuration remains untouched.



5.3.2 Synchronize

The SYNCHRONIZE function is designed to update an initial configuration (IWF) with an updated hardware setup. This function is the counterpart of the DETECT function. As discussed above the DETECT function is creating your initial module setup. In practice the module setup can change where new modules are added or removed to the configuration. With the SYNCHRONIZE function you update your modules easily to your configuration.



i

Information

The SYNCHRONIZE function is not changing any configurations defined in the ACQUISITION work space.

If you make changes to your measurement hardware by adding new modules or removing modules it is recommended to use the synchronize function to reflect the hardware changes in your module tree. New modules are added to the tree. In the case that modules are removed a waring icon is presented in front of the module serial number.

9							
	58700139_1	~	V	-100,000	100,000	-100	100
	58700139_2	~	V	-100,000	100,000	-100	100
	58700139_3	~	V	-100,000	100,000	-100	100
	58700139_4	~	V	-100,000	100,000	-100	100
	After Syn	c: New	/ mod	lule dete	cted		
		58700139_2 58700139_3 58700139_4 After Syn	58700139_2 ✓ 58700139_3 ✓ 58700139_4 ✓ After Sync: New	58700139_2 ✓ V 58700139_3 ✓ V 58700139_4 ✓ V	\$8700139_2 ✓ V -100,000 \$8700139_3 ✓ V -100,000 \$8700139_4 ✓ V -100,000 After Sync: New module determined	\$8700139_2 V -100,000 100,000 \$8700139_3 V -100,000 100,000 \$8700139_4 V -100,000 100,000 After Sync: New module detected	\$8700139_2 V -100,000 100,000 -100 \$8700139_3 V -100,000 100,000 -100 \$8700139_4 V -100,000 100,000 -100 After Sync: New module detected V -100 -100

Synchronize function updates changes in the measurement hardware setup [SI_24]

5.4 Initialize

With the INITIALIZE function you can test the communication between your hardware and IPEmotion. If there are configuration errors or the hardware cannot be reached, messages are returned. Depending on the PlugIn version, error, info or warning icons are indicated.

Fle Project	Signals A	cquisi	tion View	Data	a manag	ler Ana	alysis Re	porting	Scripting	Info
IPETRONIK X	System Compone	nts F	Eunctions Import	Export	Check	Adjust D	etect Initialize	Display	Details	
Hardware			Configuration				00	Initialize	with the para	ameters of
02.15.02			Name	Active	Unit	Symbol	Phy	the current	hardware cor	figuration
ame	Σ	٩					(atta	Reset		
			59104791_1	~	V	N	-10	Initialization parameters	with the defa	sult
X-1	12		59104791_2	2	V	N	-100,000	100,000	-100	100
59104791	4		59104791_3	~	G	A	-10,0000	10,0000	-2	2
57811010	8	- >	59104791_4	~	Nm	₩				
🚔 X-3	5		57811010_1	~	°C	<u>A/</u>	-60,00	1370,00	-60	1370
91600337	4		57811010_2	~	°C	4	-60,00	1370,00	-60	1370
91200143	1		57811010_3	~	°C	<u>A</u>	-60,00	1370,00	-60	1370
100 pg			57044040 4	100	00	A./	60.00	1220.00	60	1220

The INITIALIZE function is also updating the hardware with the latest configuration parameters defined in IPEmotion. The configuration is downloaded to the devices. So when you run a hardware detection the latest configuration settings like channel name, scaling etc... are automatically retrieved from the module and displayed in IPEmotion. However, in many cases the hardware cannot store a configuration. In this case, the configuration is only on the PC side but is not transferred and stored in the hardware. The IPETRONIK modules store the following configuration settings internally:

- Channel name
- Physical units
- 2-Point scaling
- Free 2 point scaling
- Factor offset scaling
- Sensor measurement range
- STG mode
- Data type (format)
- Characterisitc curves (for X-modules only)(see section XXX)

The following configuration settings are not stored in the IPETRONIK modules internally *:

- Channel description
- No value
- V-TAB (see section 6.9.7)
- V-TAB range (see section 6.9.6)
- Multi point scaling (6.9.4)

5.4.1 Reset

The reset function is relevant for instruments which can store a configuration in the device. After reset, all configurations stored inside the device are set back to factory default.

		6	1			:0	104		
	8- - -	Distri) 🤸 1			11			
IPETRONIK X System C	Components	Funct	ions Import Exp	port Check	Adjust	Detect	Initialize	Display	Details
Hardware		C	onfiguration				100	Initialize	and the sta
V02.15.02			Name		Active	Unit	*	the current	hardwa
Name	Σ	٩					100	Reset	1414
			a_X		1	G		parameters	ו שונים מא
a 🎂 X-1	11		a_Y G						.0000
× 🛃 X-1	11		a_Y a_Z		D	G efault initia	alization	// 1-4	.0000
✓ ♣ X-1 ♣ 59104791	11 3		a_Y a_Z		D X-1:0	G efault initia levice 57811	alization 010 detected	// ⊥-4 d.	.0000
x-1 59104791 V02.15.02	11		a_Y a_Z Name		0 X-1:D	G efault initia evice 57811	alization 010 detected	∧/ -4 d.	.0000
x-1 59104791 V02.15.02 Name	11 3 Σ	9	a_Y a_Z Name		D X-1:D	G efault initia levice 57811 Cance	alization 010 detected	A/ -4	
x-1 59104791 V02.15.02 Name	11 3 Σ	9	a_Y a_Z Name 59104791_1		D X-1:D	G efault initis levice 57811 Cance -10	alization 010 detected	d. 100,00	00
x-1 59104791 V02, 15.02 Name X-1	11 3 Σ	9	a_Y a_Z Name 59104791_1 59104791_2		V	G efault initia levice 57811 Cance -10 -10	alization 010 detected 00,0000 00,0000	d. 100,00 100,00	000
X-1 S9104791 V02.15.02 Name X-1 S9104791	11 3 Σ 12 4	, ,	a_Y a_Z Name 59104791_1 59104791_2 59104791_3		V V	G efault initia levice 57811 Cance -10 -10	sization 010 detected 00,0000 00,0000	d. 100,00 100,00	000000000000000000000000000000000000000
 X-1 59104791 V02.15.02 Name X-1 S9104791 S9104791 S7811010 	11 3 Σ 12 4 8	9	a_Y a_Z Name 59104791_1 59104791_2 59104791_3 59104791_4		x-1:0 X-1:0 V V Factor	G efault initia levice 57811 -10 -10 y setti	alization 010 detected 00,0000 00,0000 00,0000	4. 100,00 100,00 100,00 100,00	000 00 00 00
X-1 S9104791 V02.15.02 Name X-1 S9104791 S9104791 S9104791 S7811010	11 3 Σ 12 4 8	9	a_Y a_Z Name 59104791_1 59104791_2 59104791_3 59104791_4 57811010_1		x-1:0 V V Factor	G efault initia levice 57811 -10 -10 -10 -10 -10 -10 -10 -10 -10 -	alization 0 10 detected 00,0000 00,0000 00,0000 ngs 0,00	4. 100,00 100,00 100,00 100,00 1370,0	000 00 00 00 00 00



Information

The RESET is applied to all PlugIns which support the RESET function. The function is implemented and used for IPETRONIK modules and data loggers as these instruments can store a configuration.

Display and Quick Analyzer 5.4.2

The Display button turns your configuration into measurement mode. Then you will see measurement values for all active channels.

File Project	Signals	Acq	uisi	tion	View	Data	a manag	er	Analysis	Repo	rting
		Ø.			Ļ	1	Ö		K	120 I	7
IPETRONIK X	System C	Component	s	Functions	Import	Export	Check	Adjust	Detect	Initialize	Stop
Hardware				Config	uration					Access	_
V02.15.02				Name	ſ	Current	value	Active	Unit	Phys Min	Phys
Name	1	Σ	9								
			۶	5910479	1_1	0,002 V	2	~	V	-100,000	100
🔺 🏯 X-1		12		5910479	1_2	-0,023	v 🗌	V	V	-100,000	100
5910479	1	4		5910479	1_3	-0,0078	G	~	G	-10,0000	10,0
57811010	D	8		5910479	1_4	-0,014	Nm	~	i Qu	ick Analy	zer
4 🏯 X-3		10		5781101	0_1	21,02 °	С	~	°C	-60,00	1370
9160033	7	4		5781101	0_2	23,14 °	C	~	°C	-60,00	1370
							-	1	-		1000

Display online measurements.

With the quick analyzer you get a direct preview to the channel signal. The analyzer performs auto scale and shows the current value. Within the instrument you can switch easily between channels of the same module. Some of the IPETRONIK X-Modules with the latest firmware support a fast setup functionality. With the fast setup, some channel properties can be changed without device initialization. These configuration elements are performed on the fly while measuring without interrupting the actual measurement. This fast setup functionalities is supported by the X-modules only and refers to software filter settings, offset adjust and shunt check.



The default time window or update rate of the quick analyzer scope window is 1000 ms (1 second). However, if you access the properties via a right click on the x (time axis), you can change the display time range from 0,001 ms (1 micro second) up to 2000 ms (2 seconds).



Quick Analyzer - Time range / update setting

In the quick analyzer dialog, you find also offset adjust and shunt check functions for the X-Modules and future M3 modules. The function shunt check is for strain gauge inputs. The offset adjustment is supported on all voltage inputs.



Quick Analyzer - Offest adjust & Shunt check

[SI_27_3]
5.4.3 Details

With the DETAILS button in the ribbon you can display or hide all tab sheets for systems, modules and channels configuration.

Ele Project Skopa		è auis	ition View	B X	🗼 🖍 a manac	er Anz	No Re	eortina	Scripting
IPETRONIK X Hardware	Componer	nts	Functions Impor	t Export	Check	Adjust De	etect Initialize	Display De	etails
V02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Ma
Name	Σ	9							
		×.	59104791_1	~	V	-100,000	100,000	-100	100
🖌 🚔 X-1	12		59104791_2	~	V	-100,000	100,000	-100	100
<u>59104791</u>	4		59104791_3	~	G	-10,0000	10,0000	-2	2
57811010	8		59104791_4	~	Nm	-50,000	50 000	-10	10
🛛 🟯 X-3	10								
91600337	4								
P1200143	6	G	eneral Extende	ed Info	mation	V	D	etails ena	bled
			Name:	59104791					
			Description:						
			Reference:	59104791	/X+1				
			Comment:						
			Sampling rate:	1 Hz		*			

Tab sheets to access configuration details of the system, module or channel [SI_28]

5.5 System Tree

5.5.1 Column chooser

In the system tree you can activate a column chooser. In the system tree you can activate a column chooser by right click on the column header. This is a very useful function to add additional properties to your devices and modules. The scope of functions in the column chooser depends on the scope of the implementation of the PlugIn.

🔺 🗅 🔒 🔒 🛯	2 🏔 🔒 📈 🛙		2	Customization	×
Flo Droject	Signale Ar	quicition	Mie	Automatic CAN-ID configuration	
File Filojece	Signals no	-	*14	Base type	
CONTROL OF				Bus load	
		En Franking		CAN bus	
	System Componen	its Functions	IW	CAN send rate	
Hardware		Config	urat	Clock	
				Com. ID	
V02.15.02		Name	-	Configuration version	
Name		9		Default send interval	
	ZI Sort A	scending		Device baud rate	
- 🏯 X-3	AU Sort D	escending		Device production date	
916003	37 2¥ Reset	sorting		Download kernel version	
912001	43 🎽 🛅 Colum	n Chooser		Firmware version	
- 👬 X-1	B Best F	-it	~	First CAN-ID	
591047	91 Beat 5			FPGA version	
578110	10 Destr	nt (all columns)		Front number	
	Q Show	Find Panel		Hardware version	
				High sampling rate	
				Index	
				Internal time synchronisation	
				IP address	
	IPETR	RONIK X		Last calibration date	
	Plualr	n support	s	License information:	
	custor	mizina inf	ins	Medium	
	odotoi	inizing ini	00	Network interface	
				No. devices	
				PIC-Firmware version	
				Serial number	
				Subconfig	
				Туре	
				Using 29-bit identifiers	
		[2]	301	X-Link load	
		[51_	30]		

In the example below 3 additional columns are added on device try to indicate the front number, the device type and the firmware version. You can filter and sort across all additional columns if required.

🔤 🎦 🖴 😫 🛃	* 6	4 X D	le B	£ 6	X	* •	0	۵ 🛇
File Project	Signal	s Acqu	isition	View	Dat	ta manag	jer	Analysi
	System	Components	Functions	J Import	1 Export	Check	 Adjust	Detec
Hardware		Colu	mns are	added	to the	tree.		
V02.15.02							-	
Name	v	Front numbe	r Type		Firmwa	are versio	n	Σ
4 🏯 X-3								10
91600337			337 Mx-SE	NS2 4	02.15	.03		4
91200143			143 Mx-ST	G2 6	02.15	.04		6
🎿 🏭 X-1								12
59104791		4	1791 M-SEN	S2 250	04.15	.00		4
57811010		11	1010 M-THE	RMO2	04.13	.00		8

Column chooser on module / device level

[SI_31]

5.5.2 Context menu

The context menu offers convenient functions for setting up your application. With right click to the system, module or channel you can access the context menu. The functions provided in the context menu depend on the PlugIn. Some PlugIns offer plenty of functions and other just provide some basic functions.



Components

You can add components if the PlugIn supports a modular hard-ware structure.



Components of X-PlugIn for "Temperature" modules [SI_35]

Change into

This function can convert a component/module to another type. Basically, if you build your configuration offline and you change the type of some modules without rebuilding the complete configuration, you switch modules with the "Change into" function. The change into function will also try to shift the software configuration to the new module provided the function are supported. The configuration between SENS modules is most likely compatible. When the configuration is transferred between modules types the sensor excitation is set to zero as modules support different sensor excitation types (unipolar or bipolar) and sometimes different voltage levels.



Function

Behind the "Function" you can do on CAN or ETH interface level a firmware update. However, on module level you can run an offset-adjust of all channel or different channel groups when those groups are defined.

🔤 🔁 🖴 🗃 🔛 🚵 🖶 📈 🖻 File Project Signals Acq) ا Juisit	tion	P Viev	(X 👯 Data ma	nager	🗱 🔇 Analys
System Components Functions Import Ex Configuration	port	Check	Adju	ist	Detect Init	ialize Disp	olay De
V02.15.02				Nar	ne	Active	Unit
Name	T	Σ	9	1			
				916	500337_1	~	V.
∡ 🚠 X-1	Î	10		916	500337_2	~	V
91600337			211	916	00337_3	~	V
91200143		Compone Change in	nts nto	+	00337_4	~	V
	8	Functions		K		liust all cha	annels
	÷	Import		÷		ajust un che	
	1	Export		•	Ac	ljust group	1
	ins,	Adjust TE	DS				
	3	Use as de	fault	l	Ac	ljust group	2
Function – Channel offset adjust	on	modul	e le	vel			[SI 37]

Function - Channel offset adjust on module level

Import / Export

This function refers to the same function as implemented in the main ribbon. There are plenty of different import and export functions available. It is mainly related to configuration files like A2L, CANdb, Autosar etc. They are discussed in the previous chapter **??**

The TEDS detect and adjust function is explained in detail in sec-

IPETRONIK

- Adjust TEDS
- Use as default

This function is useful for all users who need to create the same configuration several times. If you save your master configuration as DEFAULT, all systems are created with this order of modules, automatically. The default configuration is saved and can be deleted in the Application menu as discussed in detail in the OP-TIONS. You can only define one template for one interface. E.g. you cannot have different module configurations for IPETRONIK X.



tion 5.2.2.

- Cut With the cutting function you can cut out selected modules. After cutting components you can paste them in other sections of the system tree. There is a difference between "Paste" and "Paste behind"
 Paste Insert one module
 Paste behind Inserting all modules you have cut out and paste them behind a selected module
 Copy With the copying function you can duplicate the one module or a list of selected modules.
 Delete With "Delete" you permanently remove the items from this confi
 - gurationCleanThe "Clean" function only works on an interface or system level.
With this function you can remove all modules beneath the inter-
face.

Copy to file

With this function you can save module configurations in a separate file with the extension ITF. This ITF file can be imported, as well

Paste from file

Import ITF files. They include all selected modules, channels and configuration elements



Properties

If you select "Properties" from the context menu, another display opens up summarizing the tab sheets for configuration. The properties are context- sensitive. If you select a module you will get the context for module configuration. If you open the connext menu on channel level you will see all configuration tab sheets related to the channel.



Interface properties

[SI_41]

5.5.3 M3-module order

With the new M3 module generation the modules are ordered in the software accordingly to their physical location in the measurement chain. This has significant benefits compared to the older M2 and X-Module series. The user can better back trace in case of module problems or replacement activities where to search in the measurement chain.

📓 🖹 🔒 🔡 🔛		s e		÷ 🐴 🖪	k.	
File Project	Signals	Ac	quisition	View		
			B			
IPETRONIK X	System Comp	onen	ts Functio	ns Import		
Hardware			Con	figuration		
V02.18.00.31082 RC			Name			
Name		9				
		+	54099996	_1		
⊿ 🔜 X-1	64		54099996	_2		
54099999	16		54099996	_3		
54099998	16		54099996	_4		
a 54099997	16		54099996	_5		
 , 54099996	16		54099996	_6		
	-		54099996	_7		
			54099996	_8		
		1	99	98	97	96
IPEmotion PC			Same S	P mm Q		Come C
		-				

M3 Module – physical order is reflected in software

[SI_42_0]

Interface configuration 6

As discussed above for the IPETRONIK X PlugIn are 2 main module product lines available based either on CAN bus or Ethernet communication. Both interface settings are discussed below. There are also plenty of device-specific tab sheets which are individual to each PlugIn. Detailed descriptions about different settings are part of the individual PlugIn manuals.

6.1 **Interface General tab sheet**

V02.15.02				Name		Active	Unit	Phys Min	Phys Max	
Name		Σ	9							
				5910479	1_1	~	V.	-100,000	100,000	
- 👬 X	-1	12		5910479	1_2	~	V	-100,000	100,000	
	59104791 4			5910479	1_3	~	٧	-100,000	100,000	
	57811010	8		5910479	1_4	~	V	-100,000	100,000	
				5781101	0_1	~	°C	-60,00	1370,00	
				5781101	0_2	~	°C	-60,00	1370,00	
				57811010_3		~	✓ °C	-60,00 -60,00	1370,00 1370,00	
				5781101	57811010_4		°C			
				57811010_5		~	°C	-60,00	1370,00	
							ar	-60 00	1370.00	
			Ge	eneral	Etherne	et hardware CAN hardware Options				
			Active							
				N	Name:	X-1				
				Descri	ption:					
				Defer		0.47				
		Reference:		ence:	8-1					
				Com	ment:					
General	tab sheet								ISI 42 1	

- Active Here you can activate or deactivate the interface
- Name

- Here you define the name of the interface.
- Description Here you can define an individual description for the interface.
- Reference The reference is automatically generated and defined by the software.
- Comment Here you can define an individual comment.

6.2 Ethernet hardware tab sheet

General	Ethernet hardware CAN I	hardware Options		
	IP4 address range:	192.168.232.1	192,168,232,40	
	Network interface:	Ethernet 3		
	X-Link load:	0,9 %		
	Internal time synchronisation:	~		
	Default send interval:	×		
				191 42 21

Ethernet hardware tab sheet

[SI_42_2]

•	IP address range	The default IP address range for the X-modules is defined as 192.168.232.1 to 192.168.232.40. However, in some cases the company Ethernet network settings can require a different IP address range which can be modified in the PlugIn OPTIONS discussed in section 7.1.
•	Network interface	Here, the name of the network interface of the computer or data logger is indicated. This information is indicating on with Ethernet port the modules are connected. The fist X-Module is working as a DHCP server and assigns the right IP address matching to the module factory settings.
•	X-LINK load	This is a calculated statistical value indication how much data is running over the Ethernet interface.
► on	Internal time synchronizati-	The PTP time synchronization master is installed together with the PlugIn to synchronize the time between modules. However, in some cases external time synchronization might be required. 0.2cm
•	Default send interval	The Ethernet communication support block data transfer with is sending data every 10 ms which is equal to 100 Hz. However if higher block data transfer is required it can be deactivated. In this case the block data transfer is every 2 ms with is equal 500 Hz.

The X-module assign an IP-address to the LAN port of your computer. The X-module operate as a DHCP server. However, if your computer requires a different IP-address range because IT policies you can change the IP-address range of the modules in the X-PlugIn settings.

Allgemein	Netzwerkverbindungsdetails:
Verbindung IPv4-Konnektivität: Kein Internetzugriff IPv6-Konnektivität: Kein Netzwerkzugriff Medienstatus: Aktiviert Dauer: 00:02:29 Übertragungsrate: 100,0 MBit/s Details Aktivität	Eigenschaft Wert Verbindungsspezifisches Beschreibung ThinkPad USB-C Dock Ethemet #2 Physische Adresse 3C-E1-A1-46-18-FE DHCP-aktiviert Ja IPV4-Adresse 192.168.232.250 IPV4-Subnetzmaske 255.255.05 Lease ethalten Montag. 3. Januar 2022 08:53:39 Lease läuft ab Samstag. 21. Januar 2090 12:05:45 IPV4-Standardgateway IPV4-DNIS-Server 192.168.232.2
Gesendet — Empfangen Bytes: 60.295 256.904	IPv4-WINS-Server NetBIOS über TCPIP ak Ja First X-Module operates as DHCP server
Generation Generation Diagnose Schließen	Schließ

Computer Network settings

[0]_4Z_0]

6.3 CAN hardware tab sheet

General Ethernet hardware CAN	hardware	Options	IPEcan	-
Medium:	IPEcan	•	Vector CAN	-
Serial number:	36400378		IPEcan	
CAN bus:	CAN-1	*	ETH gateway	
Device baud rate:	500 kBd	-	Softing CAN	
Bus load:	<0,1%		TRAMA CAN	*
Baud rate initialization:	~			

CAN hardware tab sheet

DOM:	C	0	1.4.7
1.75	1 11	1	211
100	_		

- Medium

 Medium
 The automatic hardware detect function will identify all CAN interfaces implemented in the CAN server. A list of all supported CAN interfaces id provided below.

 Serial number
 The automatic CAN hardware detect process is also identifying the serial number of the CAN interface devices. In the cases you
- the serial number of the CAN interface devices. In the cases you start a dry configuration without any hardware available you can type in the serial number manually of the hardware which will be used.
- CAN bus When the device has more than one CAN interface the CAN server will identify on which CAN port number where the module are connected.
- Device baud rate
 The factory settings for the M-Modules have a CAN bus baud rate of 500 K Baud. However depending on cable length, the baud rate can be set to lower values. 0,2cm
 Bus load
 The bus load is a calculated statistical value by the CAN server, indication how much data is running over the CAN bus.
- Baud rate initialization Here you can define the if the Baud rate configured above will be initialized to the modules.

Additional CAN interface settings like supported CAN card vendors, scanning baud rates, CAN ID placing etc... can be configured in the PlugIn OPTIONS discussed in section 7.5.

6.4 Module health status channels

The M3 module generation is supporting internal health status information as separate channels. These channels can be activated as optional components from the module context menu.

			n 🖻 🔁 🖪 🗙 🛛	%	0 0	00	n 👌 -
File Project	Signals Acq	uisiti	on View Dat	a manager	Ana	alysis	Reporting
IPETRONIK X S	System Component	s Fi	Configuration	Check A	udjust De	etect Initial	ize Display
V02.18.00.31082 RC			Name	Active	Status	Unit	Phys Min
Name	<u>^Σ</u>	٩					
		*	54099999_1	~	0	°C	-270,00
4 🚔 X-1	16		54099999_2	~	•	°C	-270,00
		mpon	54099999 3	~	•	°C	-270,00
	EF C	ange		V Devic	e supply vo	ltage	270,00
	B. Fu	nction	15	/ Devic	e supely au	rrant	-270,00
internal mudul	e	port	(V Devic	e suppry cu	irent	-270,00
monnation	1 Ex	port		V Devic	e power co	nsumption	-270,00
		liust T	EDS				-270,00
			lafa dh	V Devic	e temperat	ure	-270,00
		e as u		A		lanual bases	-270,00
	β α Ba G	it i	CUI+X	Statu	s signai úno	er vortage	-270,00
	Pa	ste	Ctrl+V	Multip	le selection	h	-270,00

M3 Series – internal module information

[SI_42_5_1]

Device supply voltage
 Is indicatin

Is indicatind the level of supply voltage.

- Device supply current Is inidcating the supply current to the module.
- Device power consumption Is calcualting the power consumption of the individual module.
- Device temperature
- Status undervoltage
- Is indicating the internal temperature of the module.
 - Is providing 0 or 1 status when the module is operated in the under voltage range. The minimum voltage for operation is 6 Volt.

File Project	Signa	als Acqu	uisiti	on	View	Dat	a manag	er	Analysis
IPETRONIK X	System	Components	Fi	unctions Config	Import uration	t Export	Check	Adjust	Detect
V02.18.00.31082 RC				Name			Active	e Sta	tus Ur
Name		×Σ	9						
			۲	920999	999_1		~	1	V
4 🏥 X-1		24		920999	999_2		~		o v
92099999		8		920999	990_2		~		V
a 54099999		Components	_		\wedge	Status	signal un	dervoltag	ge 🗸
	₿ F	unctions		•	Ø	Multipl	e selectio	n	,
	÷ E	xport			9_8		~		o v

For the X-Modules only the Status undervoltage is implemented.

Status undervoltage Is providing 0 or 1 status when the module is operated in the under voltage range. The minimum voltage for operation is 6 Volt.

6.5 Options tab sheet

Automatic CAN ID pla	cina: v	/							
		-							
Start CAP	N ID:	• •				h			
Excluded CAN	IDs:								
		N	ames out of s	erial num	bers				
and the second sec									
File Project Signals	Acqui	Function	View	bata n	nanager Ö	Adjust	is R is R is R is R is R	eportin e Displ	y Scripting
File Project Signals File Project Comp IPETRONIK X Hardware V02.15.02	Acqui	Function	View View Ins Import I	Active	nanager De de	Analys Analys Adjust Deter	is R is R is R Acces er Lut A	eportin eportin e Displ s	s v Scripting Details View
File Project Signals File Project Comp IPETRONIK X Hardware V02.15.02 Vame	C C C C C C C C C C C C C C C C C C C	Function Remote Na Y	View View Import f	Active	nanager heck 4	Analys Analys Adjust CAN identifie	as R is R	eportin e Displ s	g Scripting g Details View Sort Ascending
File Project Signals File Project Comp IPETRONIK X Hardware V02.15.02 Name	C C C C C C C C C C C C C C C C C C C	Function Runction Runction Runction S59	View View Import t miguration me	Active	heok A	Analys Adjust Deter	ais R is R	eportin e Displ s	sort Descending
File Project Signals File Project Signals IPETRONIK X Hardware V02.15.02 Name	C C C C C C C C C C C C C C C C C C C	Function Punction Resolution Punction P		Active	theok P	Adjust Deter	ais R is R	eportin e Displ s	sort Descending Clear Sorting
File Project Signals	Acqui	Function Pun		Active	hanager heck Unit V V G	Adjust Deter	Acces	eportin e Displ s	sort Ascending Sort Ascending Column Chooser
File Project Signals File Project Signals IPETRONIK X Hardware V02.15.02 Name X41 S9104791 S7811010	Acqui	Function Function Range P SS SS SS SS SS		Active	nanager heck / Unit V V G Nm	Analys Adjust Deter	Access Access Access A A A A A A A A A A	eportin e Displ s	sort Ascending Column Chooser Best Fit

- Automatic CAN ID placing With this check box you can define where the software will assign automatically the CAN IDs starting from the CAN ID defined in the box below.
- Start CAN ID Here you define the first CAN ID to start the automatic placing. The start CAN ID can be displayed in a hex, decimal or in the binary format. The CAN ID range 640 ... 767 is used internally by the modules and will be skipped in the CAN ID placing routine. With the column chooser function you can the CAN IDs information to the channel grid to display the software assigned IDs.
- Excluded CAN IDs Here you can load a DBC file and exclude CAN IDs from the automatic generation process. This is particularly useful in the case the CAN measurement modules are integrated to another CAN bus data stream to ensure that there is no overlap of the CAN IDs from different CAN busses.
- Name out of Serial numbers With this function all channel names are generated automatically considering the module serial number followed by an incrementing index for the channel number.

6.6 CAN- and X-module configuration

The following CAN modules are supported in the IPETRONIK X PlugIn.

M-Module family	Base Type Number
M-THERMO3 16 (NEW)	540
M-SENS2	587
M-SENS2 DSP	587
M-SENS2 250Hz	591
M-SENS2 250Hz DSP	591
M-SENS	561
M-SENS DSP	561
M-SENS 8	567
M-SENS 8 DSP	567
M-SENS 8plus	568
M-SENS 8plus DSP	568
M-THERMO2	578
M-THERMO2 HV	557
M-THERMO2 u	579
M-RTD2	581
M-UNI2	584
 Mc-THERMO (EOL) 	573
M-THERMO	560
M-THERMO 16	566
M-THERMO T	569
M-THERMO 16T	575
μ-THERMO	563
M-CNT2	586
M-FRQ (EOL)	562
 CANpressure 	595
M-THERMO96 16	593
► SIM-STG	519
M-Flow	519

The following X modules are supported in the IPETRONIK X PlugIn.

X-N	Module family	Base Type Number
	Mx-SENS(2)8	911
	Sx-STG	920
	Mx-STG2 6	912
	Mx-SENS2-4	916
	Mx-SENS2-4 FAST	917

On CAN and X-module level the following configuration tab sheets are provided.

6.6.1 General tab sheet

V02.15.02			Name	Active	Unit	Phys Min	Phys Max
Name	Σ	۴					
			59104791_1	~	V	-100,000	100,000
⊿ 🏭 X-1	12		59104791_2	~	۷	-100,000	100,000
59104791	4		59104791_3	~	۷	-100,000	100,000
57811010	8		59104791_4	~	V	-100,000	100,000
		G	eneral Extende	ed Info	rmation		
		G	eneral Extende Active: Name:	ed Info 	rmation		
		G	eneral Extende Active: Name: Description:	ed Info 9 59104791	rmation L		
		G	eneral Extende Active: Name: Description: Reference:	ed Info 59104791 59104791	rmation		
		G	eneral Extende Active: Name: Description: Reference:	ed Info 59104791 59104791	rmation		
		G	eneral Extende Active: Name: Description: Reference: Comment:	ed Info 59104791 59104793	rmation		
		G	eneral Extende Active: Name: Description: Reference: Comment: Sampling rate:	ed Info 59104791 59104791 1Hz	rmation		

Active

Here you can activate or deactivate the module.

- Name Here you define the name of the module. The default name is based on the serial number.
- Description Here you can define an individual description for the module
- Reference
- Comment
- Sampling rate
- - The reference is automatically generated and defined by the software. 0,2cm
 - Here you can define an individual comment.
- In this drop down box, the sample rate for the module can be defined. The sample rate is set for the entire module. The lowest sample rate is 1 Hz and the fast sample rate is depending on the module type and can reach up to 5 kHz for the SIM STG module.

6.6.2 Extended tab sheet for CAN modules



- Front number
 In this field the device front number is displayed. When you run a detect function the front number is automatically detected and extracted from the serial number. The serial number is composed of the front number and the device type number.
 Clock
 The default configuration is the Freerunning mode. However, a
- Clock The default configuration is the Freerunning mode. However, a synchronized mode is supported too, where the first module operate as a Master and all the other modules as Slaves. The clock can only be changed in the PlugIn settings discussed in the section 7.3.
- CAN bus load This is a statical value calculated by the PlugIn. Higher sample rates will increase the bus load.
- 29-bit identifier
 With this check box you can activate the extended CAN identifier. The standard CAN identifier is 11 bit. 0,2cm

6.6.3 Extended tab sheet for X modules

	Front number:	337
E	Enable simulation signals:	
	CAN send rate:	100 Hz
	CAN bus load:	0,0 %
	X-Link load:	0,6 %

Front number In this field the device front number is displayed. When you run a detect function the front number is automatically detected and extracted from the serial number. The serial number is composed of the front number and the device type number. This check box will generate a sawtooth simulation signal, in the Enable simulation signals case on real sensor signal is received on the analog input. CAN send rate This function is only available when on channel level a CAN output is configured. This function will be discussed in section XXX. CAN bus load This is a statical value calculated by the PlugIn. Higher sample rates will increase the CAN bus load. This is a statical value calculated by the PlugIn. Higher sample X-Link load rates will increase the Ethernet bus load.

6.6.4 Information tab sheet

Extended Inf	formation				
Calibration date	: 21.09.2021				
Hardware version	: 03.20.00				
Firmware version	: 04,15.00				
License information	: TEDS				
	Extended In Calibration date Hardware version Firmware version License information				

- Calibration date
 In this field the last calibration date is indicated.
- Hardware version
 In this field the hardware version of is indicated.
 - Firmware version
 - License information

In this field the current firmware version is indicated. The firmware can be updated as discussed above in section 5.1.3.

Some modules support additional licensing functions like the TEDS functionality, additional DSP filters and the FAST sample rates. These licenses are delivered from the factory side as part of the order. However, it is also possible to update modules after purchase with new license. 0,2cm

Some modules have additional information. The SIM STG and all Ethernet X-modules provide information about the FPGA version. The MultiDAQ and M-SENS24 indicate a Cluster information with includes the serial number and the size of the cluster. On module level inside the cluster additional information about the cluster position and the sub-serial number of the individual device is indicated.

4 💼 5	7799999	MULTIdaq	General	Extended	Clus	ter Inf	formation	
	Channel_01_16	THERMO		Serial num	ber:	5779	9999	
	Channel_17_32	THERMO				• [4		
	Channel_33_40	SENS Maximum cluster siz						
📾 MultiDAQ 8	Channel_41_42 M-SENS24	FRQ	Device level		£	*****	Chuster	in formation
cluster info	ormation		Maxim	Serial number um cluster size Device positior	r: 57 e: 4 n: 1	799999	3]
			Module of the	e cluster	-			- [SI_42_10]

The M-FLOW device provides information about the M-FLOW signal conditioning unit and separate information about the flow turbine. A firmware updated is not supported via X-UPDATE function of the PlugIn.

-FLOW		Turbine	
Serial number:	70399999	Serial number:	0
Hardware version:	00.00.00	Calibration date:	Undefined date
Firmware version:	00.00.00		

6.6.5 Module license update

In order to perform a license update, you need to detect the module in the first place. After that you add the module specific license key into the IPEmotion license dialog. With the assign function in the license dialog the new license key is activated on the module. After a new hardware detection the new licenses information is displayed.

Produkt: M-SENS2 250 - TEDS Freischaltschlüssel: ASY1G-DS505-Z102Z-RHRCS-100GS-10004-E0000-00000-00000 Erstellt am: 2021-12-23 Serien-Nr.: 59104791 IPEmotion - Licensing × License key × ASY1G-DS505-Z102Z-RHRCS-100GS-10004-E0000-00000-00000 • Ucense information: × Professional-Edition: Calibration date: 1PEmotion 59104791: License key successfully applied. Active licenses: TEDS. The device has to be powered off and on again to activate the changes. Changes are displayed in the configuration after a hardware detection or synchronisation. OK OK Module license update [S]_4	NFORMATIO	N		Lice	ense key	from myIP	PE we	ebsite	
Erstellt am: 2021-12-23 Serien-Nr.: 59104791 IPEmotion - Licensing X License key X ASY 1G-DS505-21022-RHRCS-100GS-10004-E0000-000000 Image: Comparison of the second o	Produkt:	M-SENS2 250 - TEDS	Freischaltschlüssel: ASY1G-DS505-Z102Z-RHRC	S-100GS	-10004-E0	000-00000-0	0000	-00000	
IPEmotion - Licensing X icense key SY 1G-DS505-Z 102Z-RHRCS-100GS-10004-E0000-000000 ASY 1G-DS505-Z 102Z-RHRCS-100GS-10004-E0000-000000-000000 Calibration Ucense information: Professional-Edition: Calibration date: 21.09.2021 Hardware version: 03.20.00 Firmware version: 04.15.00 S9104791: License key successfully applied. License information: Active licenses: TEDS. The device has to be powered off and on again to activate the changes. License information: Changes are displayed in the configuration after a hardware detection or synchronisation. Module license update OK SI_4	rstellt am: erien-Nr.:	2021-12-23 59104791							
idense key ASY 1G-DS505-Z 102Z-RHRCS-1000GS-10004-E0000-000000-000000 Ucense information: Professional-Edition: IPEmotion 59104791: License key successfully applied. Active licenses: TEDS. The device has to be powered off and on again to activate the changes. Changes are displayed in the configuration after a hardware detection or synchronisation. OK	IPEmotion -	Licensing		×					
License information: Calibration date: 21.09.2021 Professional-Edition: Hardware version: 03.20.00 59104791: License key successfully applied. Firmware version: 04.15.00 Active licenses: TEDS. License information: TEDS The device has to be powered off and on again to activate the changes. Changes are displayed in the configuration after a hardware detection or synchronisation. Module license update [SI_4]	License key ASY 1G-DS505-7	1027-RHRCS-100GS-10004-E0000	-00000-00000-00000	-	General	Extended	Info	rmation	
Professional-Edition: Hardware version: 03.20.00 IPEmotion 59104791: License key successfully applied. Firmware version: 04.15.00 Active licenses: TEDS. License information: TEDS The device has to be powered off and on again to activate the changes. License information: TEDS Changes are displayed in the configuration after a hardware detection or synchronisation. Module license update [S]_4	License informat	ion:				Calibration	date:	21.09.2021	ġ
IPEmotion Firmware version: 04.15.00 59104791: License key successfully applied. License information: TeDS Active licenses: TEDS. License information: TEDS Changes are displayed in the configuration after a hardware detection or synchronisation. Module license update [SL_4]	Professional-Edit	Bon:				Hardware ve	rsion:	03.20.00	
59104791: License key successfully applied. Active licenses: TEDS. The device has to be powered off and on again to activate the changes. Changes are displayed in the configuration after a hardware detection or synchronisation. OK OK License information: TEDS Module license update [SI_4]	IPEmotion					Firmware ve	ersion:	04.15.00	
OK Module license update [S]_4	59104791: Lio Active licenses The device has Changes are d	ense key successfully applied. E <u>TEDS.</u> s to be powered off and on again displayed in the configuration after	to activate the changes. a hardware detection or synchronisation		•	License inform	ation:	TEDS	
		K			Module	e license u	pdate	e [SI_	42_

TABELLE Module mit Lizenzen

6.7 Channel configuration

6.7.1 Column chooser in the channel grid

In the channel grid head line you can access a context menu to add additional columns to your channel grid. The available columns are depending on the PlugIn.

File Project	Signals Ac Signals Ac	duis	tion View Functions Import Configuration	Dat	a man	ager k A	Adjust	Analysis Detect	Rep Rep Initialize Access	borting Display	÷ Scripting Details View	Info	
V02.15.02			Name	Active	Unit	s	wmbol	Phys M	in Phy	s Max	Key1	Key2	К
Name	Σ	۴				2+	Sort	Ascendin	9				
			91600337_1		V	A+	Sort	Descendi	ng	000	Info1	Info 2	
4 🏯 X-1	22		91600337_2 -		V	Ź¥	Clear	Sorting	_	000		Info 2.2	
91600337	4		CHANNEL C	~	V	間	Colun	nn Choos	er	000		1	
91200143	6		91600337_4	~	۷	-	Best	t.	Custom	ization			×
59104791	4						Best	t (al	Acquisitio	n range	limit		-
57811010	8					2	Clear	L	diustme	nt			
						9	Filter	Editor	Analog M	ax			
						Q	Show	Find F	Analog M	in			1
							Displa	ay line	Averagin	g			
						_			Bridge re	sistance	0		
							ISI 4	131	Bridge ty	pe			
									Bus type				
									CAN iden	tifier [he	ex]		1

You can add your own columns into your channel grid. In order to add individual columns you need to create in the installation directory a new xml file called: **Customize.XML.**

C:\Program Files\IPETRONIK\IPEmotion 2022 R3\Customize.xml



Customize.XML - User defined key fields.

[SI_45]

With the "readOnly" status (true/false) you define if the field can be edited though the channel grid. XML Code to be included in the **customize.xml** file:

<Settings Version="1"> <UserDefinedKeyValues> <UserDefinedKeyValue> <index>1</index> <name>testKey1</name> <caption>Key1</caption> <description>My own key 1</description> <readOnly>false</readOnly> </UserDefinedKeyValue> <UserDefinedKeyValue> <index>2</index> <name>testKey2</name> <caption>Key2</caption> <description>My own key 2</description> <readOnly>false</readOnly> </UserDefinedKeyValue> <UserDefinedKeyValue> <index>3</index> <name>testKey3</name> <caption>Key3</caption> <description>My own key 3</description> <readOnly>true</readOnly> </UserDefinedKeyValue> </UserDefinedKeyValues> </Settings>

The following screenshot shows a channel grid which includes 3 individually defined "KEY fields".

I [™] III III III III IIII IIII IIIIIIIIII	ition 🔒	Viev	G X v Da	🔣 🖬	n na iger	Analys	is I	Reporting	= Scripting	
IPETRONIK X System Components	Functions	Impo	ort Export	Check	Adjust	Deter	t Initial	ze Display	Details	
V02.15.02	Garrig		Name		Active	Unit	Symbol	Phys Min	Phys Max	Se
Name	Σ	٩						/	()	
 ✓ ▲ X-1 ● 91600337 ● 91200143 ● 9104791 ● 57811010 	22 4 6 4 8	*	9160033 9160033 9160033 9160033	7_1 + 7_2 7_3 7_4	Cuss Inde Info Info Inpu Key1 Key2 Key2 LSB	x tomiza x 1 2 t t 1 2 3 3	tion	300 0 p		×

Drag & drop key fields into the column grid. [SI_46]

The following list provides an overview of all additional column chooser fileds. Not all modules support all functions.

- Aliasing free
- App enabled
- Bit number
- Bus type
- ByteOrder
- CAN identifier hex
- Comment
- Conductor break detection
- Cyclic
- Data type
- Decimal places
- Default value
- Description
- Display Max
- Display Min
- Display name
- Factor
- Hardware filter
- Index
- Info 1
- Info 2
- Input
- LSB
- No value
- Offset
- Output
- Phys High
- Phys Low
- Port
- Reference
- Reference 1
- Reference 2
- Reference 3
- Sensor calibration
- Sensor excitation
- Sensor High

- Sensor Low
- Sensor Mode
- Sensor name
- Sensor serial
- Sensor unit
- Set start value
- Source
- Source type
- Start bit
- Start value
- Software filter cutoff freq.
- Software filter type
- Status
- Subconfig
- Symbol
- Transformation

6.7.2 General tab sheet

This tab sheet covers general channel settings

tive: 🗹 me: 91600337	4				
me: 91600337					
	_1				
ion: Analog acc	quisition inp	ut for voltage/c	urrent		
nce: 91600337	_1/////9160	00337/X-2			
ent:					
ate: 1 kHz		+			
	ion: Analog acc nce: 91600337 ent: ate: 1kHz	ion: Analog acquisition inpunce: 91600337_1/////9160 ent:ate: 1 kHz	ion: Analog acquisition input for voltage/c nce: 91600337_1/////91600337/X-2 ent: ate: 1 kHz •	ion: Analog acquisition input for voltage/current P1600337_1/////91600337/X-2 ent: ate: 1 kHz	ion: Analog acquisition input for voltage/current ince: 91600337_1/////91600337/X-2 ent: ate: 1 kHz

General channel tan sheet

Active Checkbox to activate or deactivate a channel Default name - can be changed to individual names Name Description Default description - can be changed to any individual description Reference Is automatically generated and very useful to check where the channel is linked to. Comment Enter a comment.

Sampling rate Select from drop down list the module sample rate.

6.7.3 Defining list box entries of channel names

For the channel name you can also define a pull down menu.



The entries of the pull down menu are stored in a CSV file with the name (ChannelNames.csv) in the following user settings directory.

C:\ProgramData\IPETRONIK\IPEmotion 2022 R3\UserSettings

6.7.4 Format tab sheet

The FORMAT tab sheet is only visible for users who activate this function in OPTIONS >Expert mode >Extended tabs in chapter **??**. In the Format tab sheet we can configure a couple of functions which are usually only relevant for expert users. The different configuration functions are explained below.



This refers to the data format (resolution) of the measurements. Depending on the module / instrument, sometimes different formats are supported. On most of the instruments, it is not possible to change the configuration of the data type. They always transmit data in the same format. For IPETRONIK modules the signed or unsigned format is important. The 8 bit format is still included because of historic reasons.

General	Format	Scaling	Display	CAN	Excitation	Filter	Adjustment	
Data type	e							
	Type:	16-Bit inte	ger signed			Task:	Default	-
NoValue	/ DefaultVa	lue						
	Value:	-FullScale			-	Deactivate	NoValue and use Default Value	
Channel	type							
	Input:	¥		O	utput:			
								[SI_50]

Some modules support a change in the data type format from a drop downlist as indicated below.

General	Format	Scaling	Display	CAN	Excitatio	
Data type	e					
	Type:	16-Bit integ	ger signed		7-	Comolous be
		16-Bit inte	ger signed			changed e g to
NoValue ,	/ DefaultVal	16-Bit inte	ger unsigne	d		incroase the
	Value:	8-Bit integ	er signed er unsigned			resolution

Change data type

Task

The task is a very special setting developed for some specific PlugIns

Task: GPS Recording The settings for a special task are needed for the GPS signals. This sensor sends the NMEA protocol in a special format and in order to convert this signal to a standard format which can be used by IPEmotion, the measurement channels need a task configuration for longitude, latitude etc... to get a correct data dispaly in the map instrument in the ANALYSIS works pace. A correct configuration of the task is also required when you would like to save or export data in the GPX format. The coordinats longitude, latitude and altitude are only correctly interpreted in the GPX export when the corresponding task is defined. See also GPX export in chapter DATA MANAGER ??.

General	Format	Scaling	Display	Thermo	Filter			
Data type	2							
	Type:	16-Bit integ	ger signed		-	Task:	Default	-
NoValue /	/ DefaultVa	lue					Default GPS longitude in degrees	-
	Value:	-FullScale			•	Deactivate	GPS longitude in NMEA raw format GPS latitude in degrees	
Channel t	type						GPS latitude in NMEA raw format GPS altitude	
	Input:	~		Outpu	ut:		GPS state	*

[SI_52]

Task: Audio Recording

When you like to record audio e.g. via an MX-SENS2 4 fast module or over the PC-Sound PlugIn you should check the setting of the Task which should configured to "Audio mono".

a 🗅 날 🗄 🗟		XBI	6 6 2		< %	. 0		2 🙆	and the second second	-	Carl Sector 111
File Project	Signals	Acquisiti	on Vie	w [)ata man	ager	Analysis	Reporting	Scripting	Info	
Sound	System Co	omponents I	mport Expo	rt Check	Adjust	Detect	Initialize Dis	splay Details			
Hardware		Co	nfiguration				Access	View			
V01.01.00.35137 RC		Name			Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling rate
Name	Σ	9									
		Sound	Input Channe	el			-32768	32767	-32768	32767	22,05 kHz
		General	Format	Scaling	Display	Channe	lsettings		for correct	audio reco	ording.
		Data type	Type: 16	5-Bit intege	er signed		Ŧ	Task: Audio	mono		•
		NoValue /	DefaultValue								
			Value: -F	ullScale			* D	eactivate NoValu	ue and use Defa	ult Value	
		Channel t	ype								
			Input: 🗹			Out	put:				

NoValue

This configuration is important for all users who would like to see a certain behavior when NO measurements received in IPEmotion. The default configuration is that No Values are recorded in the data file. They are indicated as NoValue in the DATA MANA-GER. In the Yt- chart in the ANALYSIS work space you will see missing data points in the graph. The software will always store No VALUE in the data file irrespectively what you select from the drop down box. In the data file NoValue is stored and in the diagrams you will see missing data points.

General	Format	Scaling	Display	CAN	Excitation	Filter	Adjustment	
Data type	e							
	Type:	8-Bit intege	er unsigned		-	Task:	Default	•
NoValue	/ DefaultVa	lue						
	Value:	FullScale			-	Deactivate	NoValue and use Default Value	
Channel	type	-FullScale +FullScale					,	
	Input:	¥		Ou	utput:			

Drop down selection has no impact when check box "Deactivate Novalue..." is deactivated. [SI_55]

DefaultValue

Another configuration option is a check box to enables the DefaultValue. With this check box you change the storage and display behavior when no measurements are received. With the check box you can show and store + FullScale, - FullScale or NULL as a numerical value. You can only select NULL if you have a signed +- measurement range) data format. An unsigned measurement is only covering positive measurements.

IPETRONIK

DATA MANAG	GER	ANALYSIS
🔍 🗈 😑 🗄 🛎 🛻 🎝 🖄 🖪 🖻	🔺 B 🗙 🗶 🍙 🗠 🖄 🍮 😰 🎵	🔁 📑 블 🖶 🚉 🚓 🙏 🛪 🔤 🖻 🖄 🎽 🏷 💥 🚿 🕋 🖓 😵 🤋 🕅 🛛 PEspeedDem. — 💷
File Project Signals Acquisition	View Data manager Analysis Repo	File Project Signals Acquisition View Data manager Analysis Reporting Scripting Info 🧿
Load Remove Export Excel		Image: Series Image: S
Files External View	Datalad lafe	Loaded measurement files
Loaded measurement hies	Time 1Hz 56001556 1 Temp	and loads make a
Name View	Index No Value0.iad No Value0.iad	Pages Lueue Display 25 -
	26 10.02.2014 14:57:47,916 23,88	Name
🖉 😫 No Value0.iad 🗹	27 10.02.2014 14:57:48,916 23,79	24
	28 10.02.2014 14:57:49,916 23,88	A B No Value0.lad
	29 10.02.2014 14:57:50,916 23,88	▲ 56001556_1 Temp
	30 10.02.2014 14:57:51,916 23,88	
	31 10.02.2014 14:57:52,916 23,88	
	32 10.02.2014 14:57:53,916 23,88	22-
	33 10.02.2014 14:57:54,916 23,88	
	34 10.02.2014 14:57:55,916 23,70	1
	35 10.02.2014 14:57:56,916 23,62	
	36 10.02.2014 14:57:57,916 23,62	
	37 10.02.2014 14:57:58,916 23,62	20-
	38 10.02.2014 14:57:59,916 23,53	
Descention	39 10.02.2014 14:58:00,916 23,44	14:57:45 14:57:55 14:58:05 14:58:15
Properties	40 10.02.2014 14:58:01,916 23,35	
General A	41 10.02.2014 14:58:02.916 23.35	
Type DataGroup	42 10.02.2014 14:58:03,916 NoValue	
Charged count 1	43 10.02.2014 14:58:04,916 NoValue	No data points are
Start Breat 10.02 2014 14:57:21	44 10.02.2014 14:58:05,916 NoValue	No/alus is stored in
Store time: 10.02.2014 14:58:16	45 10.02.2014 14:58:06,916 NoValue	displayed in the graph.
User-defined parameters	46 10.02.2014 14:58:07,916 NoValue	the data file.
Company IPETRONIK	47 10.02.2014 14:58:08,916 NoValue	
SerialNumber	48 10.02.2014 14:58:09,916 NoValue	
ManufacturerID	45 10.02.2014 14:58:10,916 NoValue	
Project IDEcound	51 10 02 2014 14-58-12 016 23 35	[SI_56]

The NoValue configuration also has an impact on the data display in the VIEW work area. As the screen shot below indicates. When the check box "Deactivate NoValue and use Default Value" is not activated the instrument will show always Novalue.

General	Format	Scaling	Display	CAN	Thermo				
Data type	2								
	Type:	16-Bit integ	er signed		-	Task:	Default		Ŧ
NoValue /	DefaultVa	lue							
	Value:	+FullScale			-	Deactivate	NoValue and use Defa	ult Value	
Channel t	ype								
	Toputs	1		0	itout.				

Filter has an impact when check box "Deactivate NoValue…" is activated. [SI_57] In this example +FullScale of the measurement range will be stored.

However if the check box "Deactivate NoValue and use Default Value" is activated you will enable the the list box entries and the instrument will show the selected values for:

- + Full Scale
- Full Scale
- Null

2 🗈 🔒 🗄 🖺 🦾 🗂 🗶 🖬 🖺 Ú	- a e ×	X 🖪 🗠	🍈 🔦 ? 🎵	212 2 8 2 6 3	🔏 🔓 l	i 🖻 🏝 🖥	K 🗶 🕋 (~ w 💊	? //	IPEspeedDem	- • ×
File Project Signals Acquisition Image: Signal state of the stat	View Data n	nanager Ana	lysis Reporting	File Project Signals	Acquisition	View Dat Undo grid Area Layout	a manager	Analysis	Reporting Back Syn Zoom	Scripting	nfo 🛞 🕜
Files External View		Detailed infor	mation on the loaded	Pages Loade Display	1400			7			
Name View	Index Time_1+ +FullSca	iz ale0.iad	56001556_1 Temp +FullScale0.iad	+FullScale0.tad	1200-		1				
→ 🖨 +FullScale0.iad	3 10.02.2 4 10.02.2	014 15:44:46,646	23,35	70 30001330_1 (emp	800-						
✓ 56001556_1 Temp	5 10.02.2 6 10.02.2 7 10.02.2 8 10.02.2 9 10.02.2 10 10.02.2 11 10.02.2 12 10.02.2	014 15:44:48,646 014 15:44:49,646 014 15:44:50,646 014 15:44:51,646 014 15:44:52,646 014 15:44:53,646 014 15:44:54,646 014 15:44:55,646	23,44 25,19 24,49 24,49 1370,00 1370,00 1370,00 1370,00	+FullScale is sto	600- 400- 200- 0- -200- 0- -200-				•••••		••••
Properties	13 10.02.2	014 15:44:56,646	1370,00	in the data file.							
General Type DataGroup Name +FullScale0.iad	14 10.02.2 15 10.02.2 16 10.02.2	014 15:44:57,646 014 15:44:58,646 014 15:44:59,646 014 15:45:00 646	1370,00 1370,00 1370,00		560	15:44:45 01556_1 Temp	15:45:	:00	15:45	:15	15:45:30
Channel count 1 Start time 10.02.2014 15:44:43 Stop time 10.02.2014 15:45:30	18 10.02.2 19 10.02.2	014 15:45:01,646 014 15:45:02,646	23,79 23,70		Data	points s	how +F	FullSc	ale (1	370 °C).	
User-defined parameters Company IPETRONIK	20 10.02.2 21 10.02.2	014 15:45:03,646 014 15:45:04,646	23,70 23,70	The value of +Fu	IIScal	le is depe	ending	on the	e conf	igured	[S] 581
CarialNumber	22 10.02.2	014 15:45:05,646	23,70	measurement rar	nge in	the scali	ng calc	ualtor			[200]

Default Value Null

The DefaultValue (NULL) is related to the Null value of the binary measurement range. If you select a signed 16bit ($2^{16} = 65536$) measurement range, the temperature signal for the IPE-TRONIK thermo module is split up between the values -65.536 and +65.536 as the graphic demonstrates below

		AUTO	× "B		<u> </u>	XS				IPEm	otion	
File	Project	Signals	Acquisi	tion	View	Data r	nanager Ai	nalysis	Reporting	Scripting	Info	6
Step	Store Pause		Page 1	Ev		Area	00:00	Tree]			
Stop	Store Pouse	TNEW	- age-1	114	ondo grid	-	Alphanumerica					
	Control	Scree	n pages		Layout		Elements	View				
Pages			те	mp 1 +	FS			'emp 2 -	FS		Temp 3	3 NULL
Pa	Ch Di		No	Va	lue		No	oVa	lue		NoV	alue
	Overview		Tomp 4	155 0	hackad		Tomp	5 55 6	hackad		Tomp 6 MU	LL checked
	Page-1		Temp 4	++5 0	пескей		Temp	5 -FS C	пескей		тетр о ко	
			13	70	,00		-6	0,0	00		655	5,01

[SI_59]

-



The binary NULL value of this measurement range is 655 °C. This value is then indicated to the online instruments and stored in the data file.

Data typ	e										
	Type:	16-Bit integer	r signed		-	Task:	Default				-
NoValue	/ DefaultVa	lue									
	Value:	Null			Ŧ	 Deactivate 	e NoValue ar	nd use Defaul	t Value		
Channel	type										
	Input:	¥		O	utput:						
											[SI 61
										_	
Signals Acquisition	n View Data manage	r Analysis Reporting Sc	Stimotion cripting Info	0	Fle	Project Sinnals	Acquistion View	Data manager	Analysis Per	anting .	Scripting
Signals Acquisto Signals Acquisto New Page 1 Sorten pages Sorten pages	Control of the second sec	Au Cl. C. 2 57 - T. Analysis Reporting Sc manufacture Despris Vice 56001556_1 Teep	Pimoten croting bilo	© 0	Fie Loaded mean	Project Signals Project Signals New Page-1 Screens surement files	Acquisition View Fix Undo grid Layout	Data manager Data manager Area y-t chart Elements	Analysis Rep Move Bar Zoo	corting corting ck Sync cm	Scripting 1 Coptinal Origina Scaling
en e la la la Sepuit Acquido Sepuit Acquido Sepuit Sepuit Participant Sepuit Sepuit Sepuit Sepuit Sepuit Sepuit Sepuit Sepuit Sepuid Se	Constant and a second sec	Andrew Reporting So Andrew Reporting So Reported To Statistical Tem 550555,	ours bi	© •	File Load Re Pages Name Name	Project Signals Project Signals move New Page-1 Screens surement files Loade Display ULLS.ind 50001556_1Temp	Po L L Acquisition View Pix Undo prid Pix Undo prid 200- 1 700- 1 500- 1 500- 1	Data manager	Analysis Reg Move Ba Zoo	xm	Scripting I Scripting I Optimal Origin Scaling
A CALL AND	Select NU ement Typ	500336.1 Ten 500336.1 Ten 500336.1 Ten 500336.1 Ten 500336.1 Ten	Value the w 655°C	• • • •	File Load d mea Pages Name	Project Signals Project Signals move New Page-1 Screens aurement files Loade Display ULL5.iad 50001556_17.emp	Pic Li Li Pix Undo grid Layout B00	Data manager Area Perents	Analyss Rep Move Ba Zoc	x Sync	IPErnotion IIII Scripting I

Data points for NULL show 655 °C. [SI_62]

The channel type indicates the data direction INPUT or OUT-PUT. Output channels can be updated through manual entries, through slide controllers or alphanumerical displays in the VIEW work area. Some PlugIns support channels which can be operated as input and output. In digital IOs you will also quite often find the option to change the channel direction input to output or vice a versa through this checkbox

	i in ii	36 E	Ē.	E 🎦	i X	X 🗗 🛛	10 3	2 🗖	IPI	EspeedDemo -	IPEmotion		
File Project	Signals	Acquisit	ion	Viev	v Data	manager	Analysi	s Repo	rting S	cripting	Info		
DATAFORTH MAQ ~	System O	omponents	Impor	t Expor	Check A	djust Det	t 🔅	Display	Details				
Hardware	*	C	onfigu	ration		*	* Access		View				
V01.00.01				Name		Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling	rate
Name		Σ	٩										
				DIN-5				0	1	0	1	1 Hz	
A NAQ20-1-CC	DM4	1		DOUT-6				0	1	0	1	1 Hz	
4 🚺 MAQ20-0	DIO	1	+	DOUT-7		~		0	1	0	1	1 Hz	
f(x) Time	r-11	0		DOUT-8				0	1	0	1	1 Hz	
/(x) Time	r-12	0	4	DOLT				0		0		411-	÷
			Ge	eneral	Format So	aling Out	put Displa	ay Default					
			D	ata type									
					Type: 1-8	t		Ŧ	Task:	Default			-
			N	oValue / D	efaultValue								
					Value: +Fu	llScale		-	Deactivate	NoValue and use	Default Value		
			d	hannel typ)e								
					Input: 🗹		c	Dutput: 🗹					

Operated as Input and Output at the same time.

[SI_63]

6.8 Channel scaling

IPEmotion Sensor Scaling - How do Analog Sensors Work: https://youtu.be/7uWNIrpTOAM

Sensor mo	de								
	Mode:	Voltage includ	ing sensor exc	itation		•	Scalir	ng calculator	
Sensor rar	nge								
	Min:	-100	•	Max:	100	~	Unit:	V	
Physical ra	ange								
	Min:	-100.000		Max:	100,000		Unit:	V	

The basic scaling operations can be defined directly in the scaling tab sheet. The scope of functions depends on PlugIn and IO module type. Some inputs, especially analog inputs, support many different functions and ranges and provide more scaling options.

6.8.1 Sensor mode

The sensor mode covers the main measurement type, for example Volt or Current, accelerometers (ICP). You select the sensor mode from your drop-down list. In this example, the analog input module supports many different measurements of thermo element, voltage or current. The supported sensor modes are defined by the PlugIn and you can only select the mode which is supported. Many modules only support one static sensor mode.

Sensor mode				
Mode:	Thermo element of type J	~	Scalin	g calculator
ensor range Min:	Thermo element of type T Thermo element of type E Thermo element of type R		Unit:	°C
	Thermo element of type S Thermo element of type B			
hysical range	Voltage Current	-		
Min	-		Unit:	°C

6.8.2 Sensor range

The next configuration option is the sensor measurement range. The range is related to the measurement mode. For thermo elements, the measurement range is redefined and cannot be changed. The available voltage and current measurement ranges depend on the functionality of the analog input. In the example below you can select ranges from 15 mV (0,015V) up to 2,5 Volt. The Unit is automatically linked to the selected measurement mode Voltage >V or current >A or temperature >C and cannot be changed manually. It is defined by the PlugIn developer.

6.8 Channel scaling

IPETRONIK

General Format	Julia	g Dispidy					
Sensor mode							
Mode:	Voltage				-	Scaling calculator	
Sensor range							
Min:	-0,015	-	Max:	0,015	-	Unit: V	
				0,015			
Physical range			0,05		Define the upper limit for the sensor ra		
Min: -0,015			Max:	0,1 0,5		Unit: V	
				1			
atus	R	aw file		2,5	_	Measurement file	
						[S] 66	

6.8.3 Physical range and engineering units

The physical range is related to your engineering units. Here you define into which unit (mm, bar, etc.) the electrical signal is converted.

cherdi Tormat	County	Dispidy			
Sensor mode					
Mode:	Voltage			Ŧ	Scaling calculator
Sensor range					
Min:	-1	Ŧ	Max: 1	*	Unit: V
Physical range					
Minu	-10		Max: 10		Unit: bar

6.9 Scaling calculator

For advanced scaling functions you can use the scaling calculator. This interface provides many different scaling functions which will be discussed later on.

Entry mod	de: 2-point scaling 🗸	Sensor	database	Channel settings	
10		Sensor range		Sensor mode: Voltage	-
8-		Min: -1	1	Sensor range: -1; 1V	Ŧ
6-		Max: 1	1	Min: 1	
4-		Physical range		Max: 1	
2-		Min: -10 b	ar	Unit: bar 🔻 🚪	
0-		Max: 10	ar	Measure value	
-2-		Linear equation: y = m	*x+b	1.0	
-4-		Factor: 10			
-6 -		Offset: 0]	
-8 -					
-10	/	_		0,0 1	_
-1,0	-0,5 0,0 0,5 Value [V]	1,0		Acquisition accuracy decimal places:	3 🗘
hysical rar	nge			Snapshot 👻	
Min:	-10 bar			Test acquisition	
Max:	10 bar				

- Sensor mode
- Sensor range
- Unit

is related to the type of measurement mode as discussed above

is related to the measurement range as discussed above

To simplify the conversion between engineering units you can use the change unit editor. Switching between units only works within the same engineering unit family like temperatures, pressures, weight, energy, etc.

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The main advantage is that the new engineering unit automatically converts the physical measurement range. As shown in the screenshot, **100 bar** are automatically converted to **0,1 kbar**. This conversion also works across different metric standards.

Changing for example:

Pressure	Bar >kbar >mbar >psi >etc.
Temperature	C >K >F

An overview of all supported engineering units can be found in the OPTIONS chapter ??.
6.9.1 2-point scaling

This is a classical scaling configuration using two points, usually the MIN and MAX value of the physical range of the sensor. The scaling information is included in the data sheet / calibration sheet of the sensor.



6.9.2 Free 2-point scaling

This scaling mode offers the possibility to scale the sensor range and the physical range (engineering units) at the same time.



6.9.3 Factor/Offset scaling

This scaling method uses the equation Physical value (y) = m *x + b (b= offset) with (m = slope factor). The m-factor influences the slope >1 steeper slope / <1 flatter slope. The offset-b shifts the physical value by a constant value.



6.9.4 Multipoint scaling

The multipoint scaling is a scaling method that allows to define a nonlinear scaling with as many data points as possible.





Attention!

The multipoint scaling parameters are only stored in IPEmotion. They are not transferred to the instrument unless the instrument is supporting this function. See chapter 5.4.

6.9.5 STG Strain gauge

In this interface, strain gauge bridge types like 1/4; 1/2 or full, etc. can be configured.

caling calculator: AIN-0							×
Entry mode: STG	•	Senso	database	Channel settings			
<u> </u>	Quarter bridge		-	Sensor mode:	Voltage		*
== 🗡 📉	Brid	ge factor:]	Sensor range:	-0,15;0,15V		-
4	Poiss	on's ratio:		Min:		-0,15 V	
		esistance: 350 •		Max:		0,15 V	
		xcitation: 10 V -	±5 V	Unit:		٧ -	
2 3	/ i	k-factor: 2,05	5				
$\sim \times \times$		Material: Constantan (0	Cu,Ni) ▼				
¥	SI	rain Max: 1.000,0	µm/m ▼				
Calculated values							
Strain Max: 29 Theor. resolution: 0,8	9,2682927 mm/m Sens 93197409 µm/m Cur	rent Max: 28,57	,125 mV .4286 mA				
	Ordinates in physical range	Physical range					
Ordinates in acquisition rang							
Min: 0 µm/m	Min: 0,000 V	Min: -29268,293	1				
Ordinates in acquisition rang Min: 0 µm/m Max: 1 µm/m	Min: 0,000 V Max: 1,000 V	Min: -29268,293	,				

6.9.6 VTAB range

This scaling method converts measurements of a specific range into a text message. If the measurement value is in a defined range you can see the corresponding text information on an alphanumerical instrument in the VIEW work area.





Attention!

The multipoint scaling parameters are only stored in IPEmotion. They are not transferred to the instrument unless the instrument is supporting this function. See chapter 5.4.

6.9.7 VTAB

In this mode you can relate a specific integer (1, 2, 3, 4, ..) value to a specific text display. You can display this text on the VIEW work area for example in an alphanumerical instrument.

Entry mode: VTAB *	Sensor database	Channel settings	
Value Text		Sensor mode:	Voltage including sensor excit 🔻
1 Info 1	Sensor range		100, 100,11
2 Info 2	Min: -100 V	Sensor range:	-100 ; 100 V +
3 Info 3	Max: 100 V	Min:	-100 V
4 Info 4	1007		
Ø.	Physical range	Max:	100 V
	Min: -100 V	Unit:	V -
VTAB – Verbal Table	Max: 100 V		
integer values	Linear equation: y = m * x + b		
	Factor: 1		
	Offset: 0		
	Dissoired space		
	Physical range		
	Min: -100 V		



Attention!

The multipoint scaling parameters are only stored in IPEmotion. They are not transferred to the instrument unless the instrument is supporting this function. See chapter 5.4.

6.9.8 Active Sensors

node: Active sensors] -	1.0	Sensor d	atabase	*	Channel setti	ings		
Sensitivity:	1000	mV - /	1	V -		Sensor mode:	Voltage including	sensor excitation	n +
Sansar Mini	-100	V V			1	Sensor range:	-100 ; 100 V		Ŧ
Sensor Maur	-100	,				Min:		-100 V	
Sensor Max:	100	v				Max:		100 V	
Offset:	U	mV				Unit:		۷ +	5 1
						Measure valu	ie		
						1,0 7			
						0.8 0.6 - - - - - - - - - - - - - - - - - - -			
Calculated values						Acquisition acc	uracy decimal plac	tes: 3 🗘	
Sensor range Max:	100 V Acquisition	n range Max:	1	00 V		Snapshot	*		
Sensor range Min:	-100 V Acquisitio	on range Min: r. resolution:	-1 0,003051757	00 V 181 V		Test acqu	isition		

6.9.9 Passive Sensors

mode: Passive sensors] -		Sensor databa	se 🔻	Channel sett	ings	
Sensitivity:	1000	mV/V × /	1	V +	Sensor mode:	Voltage including sensor excitation	*
Concor May	1	v v	-		Sensor range:	-1;1V	
Sensor Min.	1	v			Min:	-1 V	
Sensor Max:	-1	V			Max:	1 V	
Offset:	0	mV			Unit:	V -	5
Excitation:	±1V *						
					Measure valu	Je	
					0.8 0.6 0.6 0.4 0.2 0.0		
Sensor range May:	-1 V Acquisition	rance Max:	1.V		Acquisition acc	uracy decimal places: 3 💲	
Sensor range Min	1 V Acquisitio	n range Mini	.1.4		Snapshot	*	
Sensor range min.	Theo	r. resolution: 3,	-1 V ,05175781E-05 V		Test acqu	uisition	

6.9.10 Snapshot – Test Measurement

You can perform a test measurement within the scaling calculator to check your scaling and to see the actual measurements. Three different test measurements are supported:

- Snapshot
- Average over values
- Average over time



6.10 Sensor database

The scaling calculator supports a sensor database. In this database, the scaling parameters of many different sensors are included. If you select a sensor from the database, you have directly defined the measurement range and the physical range and, if needed, a sensor excitation.

E	ntry mode:	VTAB range	rs v		Sensor database	Channel settings	
	Lower limit	Upper limit	Text			Sensor mode:	Voltage including sensor excit
Ø.	1	2	Info 1	Sensor range		Sansar ranga	-100 + 100 V
	2	3	Info 2	Min:	-100 V	Sensor range.	-100 , 100 V
	3	4	Info 3	Max:	100 V	Min:	-100 V
			T-E-A	- Idati	1001		

In this example, you see a shunt for high current measurements. This shunt can measure +-10 Amperes and the output of the shunt is +-1 Volt. The sensor requires a 10 Volt sensor excitation.

	er nere to grou							Sensor	
lame	Manufacturer	Туре	Phys. range	Phys. range (User unit)	Output range	Sensor supply		Manufacturer	IPETRONIK
								Name	IPEshunt1 10A
V-Devider	IPETRONIK	Voltage transformer	-200 V +200 V	-200 V +200 V	-2 V +2 V	15 V		Sensor type	Shunt
V-Devider	IDETRONIK	Voltage transformer	-400 V +400 V	-400 V +400 V	-21 +21	15 V		Physical value	
N Davidar	IPETRONIK	Voltage transformer	-100 V 1100 V	-100 V +100 V	-2 V +2 V	15 V		Physical value	Electric current
W Devider	IPETRONIK	voltage transformer	-800 V +800 V	-000 V +000 V	-2 V +2 V	15 V		Minimum	-10 A
V-Devider	IPETRONIK	Voltage transformer	-1 kV +1 kV	-1 kV +1 kV	-2V +2V	15.0		Maximum	10 A
PEshunt1	IPETRONIK	Shunt	-10 A +10 A	-10 A +10 A	-1 V +1 V	10 V		Output size	-
PESNUNT1	IPETRONIK	Shuht	-30 A +30 A	-30 A +30 A	-1V +1V	10 V		Output size	Electric voltage
PEshunt2	IPETRONIK	Shunt	-30 A +30 A	-30 A +30 A	-1 V +1 V	10 V		Minimum	-1 V
PEshunt2	IPETRONIK	Shunt	-70 A +70 A	-70 A +70 A	-1 V +1 V	10 V		Maximum	1V
tromzange	IPETRONIK	Current transformer	-100 A +100 A	-100 A +100 A	-3 V +3 V	10 V		Sensor supply	10.1/
tromzange	IPETRONIK	Current transformer	-300 A +300 A	-300 A +300 A	-3 V +3 V	10 V		Maximum current	4 m 4
tromzange	IPETRONIK	Current transformer	-1 kA +1 kA	-1 kA +1 kA	-1 V +1 V	10 V		Further properties	TINA
TF20midi	GIGATRONIK	Shunt	0 A 20 A	0 A 20 A	0 V 2 V	6 V 15 V		tstemperaturbereich	-40 +85 °C
TF20midi	GIGATRONIK	Shunt	100 mA 19,8 A	100 mA 19,8 A	10 mV 1,98 V	6 V 15 V		Genauigkeit	± 1%
TF20midi	GIGATRONIK	Shunt	0 A 20 A	0 A 20 A	0 V 2 V	6 V 15 V			
TF30midi	GIGATRONIK	Shunt	0 A 30 A	0 A 30 A	0 V 2 V	6 V 15 V			
TF40midi	GIGATRONIK	Shunt	0 A 40 A	0 A 40 A	0 V 2 V	6 V 15 V			
TF 50 midi	GIGATRONIK	Shunt	0 A 50 A	0 A 50 A	0 V 2 V	6 V 15 V	*		

6.10.1 Adding new Sensors to DB

The sensor database (SDB.exe) is installed with each IPEmotion installation in the following directory:

C:\Program Files (x86)\IPETRONIK\IPEmotion 2022 R3\Tools

If you like to add your sensor to the existing standard database, it is recommended to import the standard sensor database. The database is installed in the following directory.

C:\ProgramData\IPETRONIK\IPEmotion 2022 R3\Database

You can also create your own sensor database XML file from scratch. If you like to use your own database file you have to store it in the right directory and give the file the correct name: **IPESensorDatabase.xml**

IPEmotion can only work with one database XML file.

You can add new sensor by means of the SensorDB editor. This tool is installed along with IPEmotion and entries can be made through the GUI.

IPTRONIK

IPE IPE-S	DBEditor - C:\Program	nData\JPETI	RONIK\IPEmotion V03.01	1.01\Database\Manufa	cturerNames.xml		RON	KIPEmotion	V03.01.01\Data	abase\Manufactur	rerNan
File Edit	t Help										
2	占 🔶 🗎		n 💦 🔁	ort existing da	ta base and a	dd new sensor.	\bigcirc	Serial nu	mber & ca	alibration da	ta.
	P924 400 bar absolut	^	Section Sectio	ected sensor: new Sens	or				selected se	nsor: new Sensor	
(±)	P924 600 bar absolut		general userproperties	specificsensors							
æ.	P925 0,1 bar relativ						oene	ral userprope	rties specificse	insors	
. œ⊷ .	P925 0,25 bar relativ		SensorName								
₽-	P925 0,5 bar relativ		Schoorvanic					necificSensor 1	V2		
÷-	P925 1 bar relativ		Release 2014 R1				1	peonesensor 1		1122	100
(€)	P925 2 bar relativ		anner Tree Id	Constructions	Consultant fortune			serialNum	ber	delete	
₽-	P925 3 bar relativ		sensoriypeta	SensorType	SensorManufacturer						
÷-	P925 4 bar relativ		VoltageTransformer 🔻	Volt	FOT			2014-02-11			
œ-	P925 5 bar relativ			al i he				CalibrationDat	e		- 1
•	P925 2 bar absolut		PhysicalUnitName	PhysicalMin	PhysicalMax			The substation			
•	P925 6 bar absolut		mm 🔻	0	100			V available			
	P925 10 bar absolut							Day M	onth Year		
•••	P925 16 bar absolut		OutputUnitName	OutputMin	OutputMax			1 -	- 2015	-	
•	P925 40 bar absolut		٧ 🗸	1	10						
.	P925 100 bar absolut										
•••	P925 200 bar absolut		SensorSupply					CalibrationValie	dDuration		- 1
•	P925 400 bar absolut			1	1			- available			
.	P925 600 bar absolut		SensorSupplyMin	SensorSupplyMax				V available	1		
.	RPT410V		10	20				days	months	years	
.	VF563AA			1		1		0	0	2	1
• •	VF563A		OutputProportionalTo	. ReferenceSensorSuppl	y SensorSupplySymetric	SensorSupplyCurrent		×	۲ ۰	-	
<u>+</u> -	VF5638		True	10	False	20	-				_
<u> </u>	VF563J			-				physically	tin (ohysicalMax	
	VESCOC							p.r.yarcar			
P	VF563C										
·	VF303F										
	Release 2014 R1	-						outputM	in	outputMax	
										121	821

If you save the new sensor and restart IPEmotion, the new sensor will be included in the database and can be selected for channel scaling. Serial numbers and calibration dates can be defined, as well.

	arder here to group by	v that column								Sensor type properties	Sensor specific
	suer nere to group bi									Sensor	
Name	Manufact	Туре	Serial number	Favo	. Phys. v	. Phys. range	Phys. rang	Output range	Sensor supply	Manufacturer F	от
	F									Name R	elease2014R1
alaaa 2014	DI FOT	Valta as baseformer		_	Length	0	0 - 100 -	1.1. 10.1	10.1/ 20.1/	Sensor type V	oltage transformer
kelease2014	FRI FUI	voltage transformer			Length	0 m 100 m	n 0 m 100 mm	1 V 10 V	10 V 20 V	Physical value	
Release 2014	IR1 FOT	Voltage transformer	2014-02-11		Length	0 m 100 mr	n 0 m 100 mm	1 V 10 V	10 V 20 V	Physical value L	ength
										Minimum 0	m
			N	low	Sense	oris inclu	Ided			Maximum 1	.00 mm
							laca			Output size	
		100 C		In	the s	ensor lis	t. –			Output size E	lectric voltage
										Minimum 1	V
										Maximum 1	0 V
										itation dependant T	rue
g calculato	r: 56199999_1	7	V						×	ference excitation 1	0 V
	2 paint conline	Delese 201	40 2014 02 1		Conner data	have				Sensor supply	
ry mode:	2-point scaling	* Release 201	4 K - 2014-02-1	1	sensor data	Dase Char	nnel settings			Excitation 1	0 V 20 V
00 -			1	_			Sensor mode: Ve	oltage including	sensor excit *	Maximum current 2	0 A
		/	Sensor r	ange							
1		/	Min:		0 V	S	ensor range: 0	; 10 V	*		
80 -			Max:		10 V		Min:		0 V	OK	Cance
							_				
			Physical	ange			Max:		10 V		
60 -		/		unge							
			Min:	-11,	,1111 mm		Unit:		mm 👻		
1		/				Mea	nure value				0
40-	/		Max:		100 mm	rica.	sure value			Sensor type properties	Sensor specifi
							1,0]			Sensor	
			Linear ed	uation:	y = m * x -	+ b	1			Serial number	2014-02-11
			Factor:	11,	1111	_	-			Calibration	
20 -	/					2				Calibration	Valid
			Offset:	-11,	1111	- P	0,5 -			Calibration data	01.01.2015
						Va	1			Calibration date	01.01.2015
0- /										Expiration date	01.01.2017
¥		· · · · ·					0,0 -				
0	2 4	6 8	10				Acquisitio	n accuracy decir	nal places: 3 🌲		
	Valu	e [V]									
ical range		1	lew Sen	sorie	s inclu	ded in th	e senso	r list			
			ten een		- Intertor		000000				
din:	-11,1111111 mm						Test acquisition				
	100										
iax:	100 mm										
										1	

However, you can import your own database from Excel using the import function of the SensorDB Editor. The import function is explained in the help manual of the SensorDB Editor.

6.10.2 The database format

The standard Excel template for importing sensors has the following structure:

- sensorName
- sensorTypeId (see next page for details)
- sensorType
- sensorManufacturer
- physicalUnitName
- physicalMin
- physicalMax
- outputUnitName
- outputMin
- outputMax
- sensorSupplyMin
- sensorSupplyMax
- outputProportionalToSupply
- referenceSensorSupply
- sensorSupplySymetric
- sensorSupplyCurrentMax
- propertyName1
- propertyValue1
- propertyName2
- propertyValue2
- propertyName3
- propertyValue3
- serialNumber
- calibrationDate
- calibrationValidMonths
- calibrationValidDays
- physicalMin
- physicalMax
- outputMin
- outputMax

The Sensor type ID

► 0 = UNKNOWN	// User-defined sensor
1 = DisplacementTransducer	// Displacement transducer
2 = LoadCell	// Load cell
► 3 = Shunt	// Shunt
4 = CurrentTransformer	// Current transformer
5 = VoltageTransformer	// Voltage transformer
▶ 6 = ForceTransducer	// Force transducer
7 = PressureTransmitter	// Pressure transmitter
8 = AbsolutePressureTransmitter	// Absolute pressure transmitter
9 = GaugePressureTransmitter	// Gauge pressure transmitter
10 = DifferentialPressureTransmitter	// Differential pressure transmitter
11 = FlowRateTurbine	// Flow rate turbine
12 = PistonFlowmeter	// Piston flow meter
13 = ScrewFlowmeter	// Screw flow meter
14 = VortexSheddingDevice	// Vortex shedding device
15 = Accelerometer	// Accelerometer
16 = TriAxialAccelerometer	// Triaxial accelerometer
17 = TorqueMeter	// Torque meter
► 18 = Counter	// Counter
19 = StrainGauge	// STG
▶ 20 = LVDT	// LVDT
21 = StrainGaugeBridge	// STG bridges (Strain)
22 = TemperatureSenso	// Temperature senso

If none of the predefined types meets your requirements, you can add user-defined types to the sensor database. The "sensorTypeld" value must be set to 0. A short description text should classify the corresponding sensor.

If you want to use sensors of the same type within the sensor database, use the "SpecificSensors" entry. Each one of the sensors must get a unique serial number ("serialNumber"). In addition, each one of these sensors can get a calibration date ("calibrationDate"), as well as a period of validity of the calibration ("CalibrationValidDuration") including the data "calibrationNalidYears", "calibrationValidMonths", and "calibrationValidDays". Furthermore, the values for "physicalMin", "physicalMax", "outputMin", and "outputMax", which can be found in the data sheet, can be overwritten by values, which are read at the calibration.

You can add non-relevant information for the functionality of the sensor data base like the working temperature range under the "UserProperties" entry. These are Key/Value pairs, which are used for displaying the information. Please note that these data are not used in any calculation. All the sensor data is stored in an XML file with the following structure.

The sensor names ("sensorName") must be unique!

```
<Sensor name=SSensor2">
<sensorName type=SString">Sensor2</sensorName>
<sensorTypeId type=Int32">7</sensorTypeId>
<sensorManufacturer type=SString">IPETRONIK</sensorManufacturer>
<physicalUnitName type=SString">bar</physicalUnitName>
<physicalMin type="Double">1</physicalMin>
<physicalMax type="Double">50</physicalMax>
<outputUnitName type=SString">V</outputUnitName>
<outputMin type="Double">-4</outputMin>
<outputMax type="Double">4</outputMax>
<sensorSupplyMin type="Double">-5</sensorSupplyMin>
<sensorSupplyMax type="Double">5</sensorSupplyMax>
<sensorSupplyCurrentMax type="Double">0.01</sensorSupplyCurrentMax>
<PreferedSensorModes>
<sensorMode />
</PreferedSensorModes>
<UserProperties>
<UserProperty>
<propertyName type=SString">Genauigkeit</propertyName>
<propertyValue type=SString">+- 4,7 %</propertyValue>
</UserProperty>
</UserProperties>
<SpecificSensors>
<SpecificSensor>
<serialNumber type=SString/>
</SpecificSensor>
<SpecificSensor>
<serialNumber type=SString">SN01277</serialNumber>
<calibrationDate type="Date">2012-04-04</calibrationDate>
<CalibrationValidDuration>
<calibrationValidYears type=Int32">1</calibrationValidYears>
<calibrationValidMonths type=Int32">6</calibrationValidMonths>
<calibrationValidDays type=Int32">0</calibrationValidDays>
</CalibrationValidDuration>
<outputMin type="Double">-3.895</outputMin>
<outputMax type="Double">4</outputMax>
</SpecificSensor>
</SpecificSensors>
</Sensor>
```

6.10.3 Multipoint linearization

The sensor data base is supporting sensor linearization functions. You can add for sensors multipoint linearization into sensor data base XML file. In the XML file you can add value pairs of "Physical reading / Sensor Output".





Information

The sensor specific linearization information can only be added through the XML file directly. The Sensor Database Editor and the corresponding CSV/Excel import function is **currently not supporting** this function. When you select a sensor with linearization values they are directly indicated in the sensor parameter overview. In this example the scaling is integrated to the "Sensor type properties".

a column header here to group	by that column					Sensor type properties S	ensor specific
		-		-	-	Sensor	
Name	Manufacturer	Туре	Serial number	Favo	Phys. v	Manufacture	IPETRONIK
					^	Name	Stromzange 200A RMS/10
Stromzange 200A RMS/1000	IPETRONIK	Current tra			lec	Sensor type	2 Current transformer
GTF2UMICI	GIGATRONIK	Snunt			Elec	Physical value	Electric oursent
GTF20midi	GIGATRONIK	Shunt	SN #1		Elec	Minimun	-1kA
GTF20midi	GIGATRONIK	Shunt	SN #2		Elec	Maximun	1 1kA
GTF30midi	GIGATRONIK	Shunt			Elec	Output size	
GTF40midi	GIGATRONIK	Shunt			Elec	Output size	Electric voltage
GTF50midi	GIGATRONIK	Shunt			Elec	Minimun	1 -10 V
GTF60midi	GIGATRONIK	Shunt			Elec	Maximun	10 V
GTF 70 midi	GIGATRONIK	Shunt			Elec	Sensor supply	10.11
GTF80midi	GIGATRONIK	Shunt			Elec	Linearization	1 10 V
GTF 100midi	GIGATRONIK	Shunt			Elec	Linearization	Multipoint linearization
GTF 125midi	GIGATRONIK	Shunt			Elec		-990 A = -10 V
GTF 150midi	GIGATRONIK	Shunt			Elec	1	1 -600 A = -5 V
GTE200midi	GIGATRONIK	Shunt			Flec		2 30 A = 0 V
CT 0. 1-P	LEM	Current tra			Fler	-	3 500 A = 3 V
CT 0.2-P	LEM	Current tra			Fler	T-theoremation	4 900 A = 10 V
CT 0.4-P	LEM	Current tra			Fler	ruruler properties	-20 +70 %
CT 0 1-TP	LEM	Current tra			Fler	Genauigkei	t 1% ±500mA
CT 0 2-TP	LEM	Current tra			Elec	Frequenzbereid	DC bis 1kHz
GT 0.2-1F	CLIM	current ud			LICY +		

[SI_85]

Linearization values are indicated.

The linearization values are imported from the sensor database into the multipoint scaling mode with a graphical presentation of the calibration curve.



Multi point scaling is directly integrated to the scaling calculator with a graphical presentation of the calibration curve.

You can integrate multi point scaling also to the "Sensor specific" properties.

		-	1		1		Sensor	
Name		Manufacturer	Туре	Serial number	Favo	Phys. va	Serial number	SN #1
						*	Calibration	N
Stromzange 3	A00	IPETRONIK	Current tra			Elect	Calibration	Invalid 43
Stromzange 2	00A RMS/1000	IPETRONIK	Current tra			Elect	Calibration date	01.10.2007
GTF20midi		GIGATRONIK	Shunt			Elect	Linearization	11.04.2008
GTF20midi		GIGATRONIK	Shunt	SN #1		Elect	Linearization	Multipoint linearization
GTF20midi		GIGATRONIK	Shunt	SN #2		Elect	0	0 A = 0,1 V
GTF30midi		GIGATRONIK	Shunt			Elect	1	5 A = 1 V
GTF40midi		GIGATRONIK	Shunt			Elect	2	17,5 A = 2 V
GTF 50 midi		GIGATRONIK	Shunt			Elect		
GTF60midi		GIGATRONIK	Shunt			Elect		
GTF70midi		GIGATRONIK	Shunt			Elect		
GTF80midi		GIGATRONIK	Shunt			Elect		
GTF 100 midi		GIGATRONIK	Shunt			Elect		
GTE125midi		GIGATRONIK	Shunt			Flect		
						•		

6.10.4 Adding new Sensors

The sensor data base is a powerful tool to simplify the channels scaling and reduce scaling error. You can now add your own sensor to the data base. All the settings defined in the sailing interface are saved to the data base. All scaling entry modes are supported to add individual sensors 6.9.



Sensor definition from the scaling calculator is the basis for the sensor.

[SI_88]

When the sensor parameters are defined you add the sensor header information by accessing the add button.

Sensor type:	Current transformer	Ŧ
anufacturer:	LEM	
nsor name:	Current Clamp	
ial number:	1301	
	ОК	Cancel

Define sensor header information.

After you have created the sensor in the data base you can search for your sensor. The example below shows the parameters as defined in the scaling calculator.

IPETRONIK

	a column head	er here to gr	oup by that colu	imn			- 1	Sensor type properties	Sensor specific
-			-		-	-1		Sensor	
	Name	Manufac	Туре	Serial nu *	Favo	Phys. range	Ph	Manufacturer	LEM
				13				Name	Current Clamp
	Current Cla	LEM	Current tra	1200		0 A 200 A	04	Sensor type	Current transformer
1	Current Cla	LEM	Current tra	1301		0 A 250 A		Physical value	
	concinc cia		concin us	1001	-	0 A 230 A		Physical value	Electric current
					,		- 1	Minimum	0 A 0
							- 1	Maximum	250 A
							- 1	Output size	
							- 1	Output size	Electric voltage
							- 1	Minimum	0 V
								Maximum	10 V
							-/		
*	Starts with ([S	erial number], '13')			Edit Fi	∕ (
									or

Sensor properties defined in the scaling calculator are displayed.

When a sensor was added to a user define sensor data base file it is saved in:

- ► C:\Users\Public\Documents\IPETRONIK\IPEmotion\Database\ IPESensorDatabase.xmu
- Extension u = user defined sensor data base.

If you like to modify a manually created sensor you need select the sensor from the sensor data base and you can modify settings in the scaling interface. With the function save sensor to data base the modifications are overwritten.



Information

Note: There is no possibility to delete a sensor from the sensor data base. If you need to remove a sensor permanently you need to delete it from the XML files.

6.11 Terminal tab sheet

In the Terminal tab sheet, you have information about the analog input and the circuit design. This function is only available for all X-Modules and the new M3 can based module generation. The graphic is indicating on which pin which signal is running. The graphic is aligned to the input configuration or measurement mode. Some modules support different modes in one module like the Sx-STG where IEPE, strain gauge, or voltage measurement can be configured.

		1	Sector Sector	-					The second second
File Project	Signals System Corr	Ac	ts Functions Import E	Data mar	dk Adjust	Analysis Detect	Report	isplay	Details
Hardware			Configuration				Access		View
02.18.00.31082 RC			Name	Active	Status	Unit	Phys Min		Phys Max
lame		9							
		0	92099999_1	~	۲	V	-5,0000		5,0000
X-1	24		92099999_2	~		V	-2,00000		2,00000
1 92099999	8		92099999_3	~	۲	V	-2,00000		2,00000
	16		92099999_4	~	•	V	-2,00000		2,00000
	1.00		92099999_5	4	۲	V	-2,00000		2,00000
		ļ	0000000 0	172		44.1	3 00000		0.00000
	Г	•••				0	Click on it	mage to	get an enlarg
						0	Click on it	mage to	get an enlarge
General Format	Scaling	Termin	te Addressessesses + 199	ation Filt		a output	Click on it	mage to	get an enlarge
General Format Sensor mode	Scaling	Termit	te hallonge exercence of 1935	tion Filt	er Dat	a output	Click on it	mage to	get an enlarge
General Format Sensor mode Mode:	Scaling IEPE sensor	Termit	hal Display Excita	ation Filt		a output	Click on it Click on it Character Scalin	mage to ristic cu ng calcul	get an enlarge rve ator
General Format Sensor mode Mode: Sensor range	Scaling IEPE sensor	Termit	hal Display Excita	ation Filt		a output	Click on it Click on it Character Scalin	mage to ristic cu ng calcul	get an enlarge rve lator
General Format Sensor mode Mode: Sensor range Min:	Scaling IEPE sensor -5	Termit	hal Display Excita	ation Filt		a output	Click on it Click on it Character Scalin Unit:	ristic cu ng calcul	get an enlarge rve lator
General Format Sensor mode Mode: Sensor range Min: Physical range	Scaling IEPE sensor -5	Termit	hal Display Excita	ation Filt		a output	Click on it Click on it Character Scalin Unit:	ristic cu ng calcul	get an enlarge rve lator

M3 and X-Modules support channel input overview on the Terminal tab sheet. [SI_90_1]

6.12 **Display tab sheet**

This tab sheet covers display settings for the online VIEW work area. The Display tab sheet is also relevant for formula channels and scaling channels ??. The main configuration elements are:

Covers the initial Y-axis scaling of the Yt-chart. **Display Area**



- Formatting
- (Display) Name

Covers the decimal places. The default setting is Automatic which will show as many decimal places as provided by the PlugIn

Covers the display name which can differ from the channel name. The display name is only relevant for the VIEW work area. The display name will not be used for formulas and other functions like limit or range monitoring. If you like to see the display name on the instruments, you will have to activate this function in **OPTIONS >VIEW ??**

General Format	Scaling Display	CAN Thermo	File Project	Signals Acquisit	in B ǎ B.	XXAAA	Reporting Se	Pemotion
Displaying area					P 🔳			
Min:	10,00	Max: 40,00	Stop Store Pause	New Page-1	Fix Undo grid	l Area Alphanumerical	Tree	
Formatting			Control	Screen pages	-> Layout	56001	556_1 Temp_XYZ	
Decimal places:	Automatic 👻		Pages Channels Name	Display	-			
Name			56101546_1 56101546_2	N				
Name:	56001556_1 Temp xy	2	56101546_3 56101546_4 > 56001556_1 Temp	N		21	79	2
Sho	w instruments d	isplay name rather	56001556_2 56001556_3	N		21	L, / (5
than	the channel na	me.	56001556_4 56001556_5	~				
			 56001556_6 56001556_7	Ň				
[SI_92]			Status-Storage gro.					

6.12.1 Define standard decimal templates on module level

When detecting modules, the default setting of the decimal paces is defined as Automatic. However, if you like to define a default setting for the number of decimal places you like to use you can add to the Settings.XML a new command line in order to use the template as default. The settings XML file is stored on the following directory:

C:\ProgramData\IPETRONIK\IPEmotion 2022 R3\Settings.xml

In the settings XML you have to add in the section "Common Settings" the following command line:

<detectWithTemplate>True <\detectWithTemplate>



Detect modules and consider the defined template.

[SI_95]

You can disable the function also by setting the command line to "False". <detectWithTemplate>False <\detectWithTemplate>

With this command line you can save a lot of time because all modules will be detected with the number of decimal places as defined in the template. The template is applied to all channels of the module.

IPETRONIK X System Compo Hardware	nequisition	toris	Inport Export Ch	nager	ust Detect	Initialize C	Display Del
02.05.01=			Name	Active	Unit	Phys Min	Phys Max
lame Type	Σ	9					
K-1 ₩: 91199998 Mx-55H52 8	8	,	91199998_1 91199998_2 91199998_3 91199998_4 91199998_5 91199998_6 91199998_7 91199998_8	XXXXXXXX		Adjust TR Adjust TR Use as d Cut Copy Paste Paste Copy Copy Copy Paste Copy	r Fault Ctrl+X Ctrl+C Ctrl+V Hind
		Ge	solve terrip splaying area Min: -100	olate aling 0 0,00	isplay	Copy to Paste fro	file m file alculator ference

Example: Template with 2 decimal places for the Mx-SENS2 8 is created.

[SI_96]

6.12.2 Output tab sheet for output channel

The output tab sheet is only visible for analog and digital output channels. Its main function is to define a start value. This value will be set to the output when you start the measurement. You can also define an output level. The output level is related to the user administration which is discussed in detail in OPTIONS >User administration **??**.

General	Format Scali	ng Output	Display	
	Set start value:	~		
	Start value:	0,0000		
	Output level:	1	-	
		1		
		2		
		3		121.01

6.12.3 Channel specific tab sheets

Each PlugIn can have channel-specific tab sheets to cover additional configuration functions. There are many individual functions which are discussed in the PlugIn manual in more detail. Some examples are shown below.

General Format	Scaling	Display	CAN The	ermo			
c	AN ID: 15						
	LSB: 0				Chann	el-specifc	
Motorola f	format:				tab she	eets	
Overf	ow bit:						
General Format	Scaling	Display	STG mode	Excitation	Filter	Data output	
Hardware filter							
Hardware filter:	Off		-				
Coffeena films							
Software filter							
Type:	Off		•				
Frequency:	16666,666	Hz	T				ISI 9

X-PlugIn OPTIONS 7

When you access the OPTIONS dialog of IPEmotion you have access to the advanced PlugIn settings and the manual. In this example the options settings of the IPETRONIK X PlugIn are discussed. However other PlugIns will have other settings which are explained in the dedicated PlugIn manuals

Frequently used	Active		Title	Version	Description	M
Basic settings		5	CAETEC dataLog	21.06.00	CAETEC data logger (ETHOS, ARCOS, an	c
Appearance		*	IPETRONIK X	02.15.02	IPETRONIK CAN and Ethernet devices	
		1011	IPETRONIK LOG	03.65.03	IPETRONIK Data logger (M-LOG, -LOG,	1
view		S.	GPS	01.05.00	Serial interface for GPS mouse	I
Data manager		2	Video	01.04.00	Synchronic recording of video data for ca	1
Data service		R.	Protocols	03.02.00.82617 RC	Protocol acquisition with any CAN hardwa	. D
Import		**	technikmedia Universal Mo	01.02.02	Universal Modbus PlugIn	1
Export		lag.	Demo	01.05.00	Generation of demo signals	1
Analysis Maps Directories Units		Оре	en option setting	s 🔓	Open manual	
Analysis Maps Directories Units Hotkey User administration		Оре	en option setting	s 🎝	Open manual	
Analysis Maps Directories Units Hotkey User administration IPEdoud	•	Оре	en option setting	s 🔓	Open manual	
Analysis Maps Directories Units Hotkey User administration IPEcloud PlugIns		Оре	en option setting	s 🔓	Open manual	
Analysis Maps Directories Units Hotkey User administration IPEcloud PlugIns Liser denlays	4 Plugin s	Ope	en option setting	5 🔓	Open manual	
Analysis Maps Directories Units Hotkey User administration IPEcloud IPEcloud Liser donlays User operations	4 Plugin s Specify ti The used automatis	Ope etting: he plugin plugin v c update	en option setting: s to be used. revision can be changed within it is is run at installing later plugin v	S	Open manual Download	

PlugIn Options

7.1 **Ethernet interface**

On the Ethernet interface tabs het you have configuration functions for the IP-address and the detection mode. The ethernet and IP-adress settings are relevant for the X-Modules only.

- Enable all Will perform the scan for module across all Ethernet interfaces of the PC. This can take more time.
- Disable all Will not allow any detection of the modules on an Ethernet port.
- Selected Here you will perform the scan only on a dedicated Ethernet port of the computer.

Ethernet interfaces CAN interfaces Options Components Ethernet hardware detection interfaces Detection mode: Enable all IP4 address range IP4 address range IP4.168.232.1 - 40 Ethernet 3 Address range I92.168.233.1 - 40 Not connected Address range I92.168.234.1 - 40 Not connected Address range I92.168.235.1 - 40 Not connected 	IPEmoti	on settings	- IPETRONIK X					
Ethernet hardware detection interfaces	Ethernet interfaces		CAN interfaces	CAN interfaces Options Components				
Detection mode: Enable all Enable IP4 address range I92.168.232.1 - 40 Ethernet 3 Address range Address range 192.168.233.1 - 40 Not connected Address range Address range 192.168.234.1 - 40 Not connected Address range Address range 192.168.235.1 - 40 Not connected			etection interfaces					
Enable IP4 address range Network interface I 192.168.232.1 - 40 Ethernet 3 Address range 192.168.233.1 - 40 Not connected Address range 192.168.234.1 - 40 Not connected Address range 192.168.235.1 - 40 Not connected Address range 192.168.235.1 - 40 Not connected Address range			Detection mode:	Enable all				
✓ 192.168.232.1 - 40 Ethernet 3 Address range 192.168.233.1 - 40 Not connected Address range 192.168.234.1 - 40 Not connected Address range 192.168.235.1 - 40 Not connected Address range 192.168.235.1 - 40 Not connected Address range	Enable		IP4 address range	Net	work interface			
192.168.233.1 - 40 Not connected Address range 192.168.234.1 - 40 Not connected Address range 192.168.235.1 - 40 Not connected Address range	4	192.168.23	82,1 - 40	Ethernet 3		Address range		
192.168.234.1 - 40 Not connected Address range 192.168.235.1 - 40 Not connected Address range		192.168.23	33.1 - 40	Not connected		Address range		
192.168.235.1 - 40 Not connected Address range		192.168.23	34.1 - 40	Not connected		Address range		
		192,168,23	35.1 - 40	Not connected		Address range		

Ethernet interface - detection mode

[SI_151]

If you define a selected Ethernet ports you have also access to an advanced configuration dialog to change the IP-address ranges of the modules. The setting in the advanced dialog should be handled with care a as it is has impact on the Ethernet interface of the computer and the address of the modules. If the address ranges are changed to match corporate IT network requirements is might be possible that the modules cannot be detected any more on another computer with different network settings.

Ethernet i	nterfaces	CAN interfaces	Options	Components			
Ethernet	hardware de	etection interfaces					
		Detection mode:	Only selected * Network interface		*		
Enable		IP4 address range					
~	192.168.2	192. 168. 232. 1 - 40		Ethernet 3		Address range	
	192.168.2	33.1 - 40	Not connected		Address range		
	192.168.2	34.1-40				Address range Address range	
	192.168.2	35.1 - 40					
			Set all IP	address rang	es		
		IP addr	ess range	/			
72		Netwo	rk: Ethernet	t 3 🔸	*		
addres	s range	S MA	C: P:	3C-E1-A1	-46-18-FE		
		Metho	d: DHCP		٣		
		X-Syste	m: 192.168.232.1 er: 192.168.232.250		68.232.1	1 192.168.232.4	
		DHCP serve			.232.250	192.168.232.25	
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 Jaco and				

When you make any changes you need to conform those and a message window is indicating the update of the modules.

i	ETH-1: 2 X devices respon ETH-2: Inactive ETH-3: Inactive ETH-4: Inactive	ided on the command for setting the IP address ranges.
	The devices have to be po	owered off and on again to activate the changes.
		OK

7.2 CAN interface

The CAN interface settings are relevant when you work with the CAN modules. With the setting in this dialog you have an impact on the detection process.

		ents	ptions Compon	erfaces	nterfaces CAN inte	Ethernet i
,	CAN hardware detection baud rates			aces	Iware detection interfa	CAN hard
1 MBd 🗹	1 MBd			Enable al	Detection mode:	
500 kBd 🗹	500 kBd	CAN bus	Serial		Medium	Enable
250 kBd 🗹	250 kBd		d CAN-1		IPEcan +	
125 kBd 🛄	125 kBd		d CAN-2		IPEcan +	4
100 kBd 🛄	100 kBd	+	d CAN-3		1PEcan 🔻	
50 kBd	50 kBd	*	d CAN-4		IPEcan 🔫	
	Automatic CAN ID placing					Disable
etection: 🗹	Activate Auto CAN ID after detection:				DrewTech *	
CAN ID: A h	Start CAN ID:			de	ce synchronisation mo	CAN devi
		*	s	Synchron	Mode:	

CAN interface settings

- Enable all Will perform the scan for module across all CAN interfaces detected by the PC The supported CAN interfaces are managed in the CAN server. A list of the vendors and devices is provided in section 7.5. The full scan will take more time. Disable all Will not allow any detection of the modules on a CAN card. Only Selected Here you will perform the module scan on a dedicated on the dedicated CAN card including the serial number and CAN port. This focused scan will speed up the detection process and avoid any detection of modules connected to other CAN interfaces.
- Exclude

Here you define which CAN hardware should be ignored durong the scan process.

IPEmoti Ethernet	ion settings - IPETR	ONIK X	Components		
CAN hard	dware detection interf	aces	1	CAN hardware detection baud rates	
	Detection mode:	Only selected	-	1 MBd 🖂	
Enable	Medium	Serial	CAN bus	500 kBd 🗹	- 2
~	IPEcan *	0 d	CAN-1 *	250 kBd 🗹	
~	[PEcan] +	b 0	CAN-2 *	125 kBd 🗔	
	IPEcan *	0 d	CAN-3 *	100 kBd 🛄	
	IPEcan *	0 d	CAN-4 *	50 kBd 🛄	
Disable				Automatic CAN ID placing	
	DrewTech *			Activate Auto CAN ID after detection: 🗹	
CAN devi	ice synchronisation mo	de		Start CAN ID: A	9
	Mode:	Synchronous	*		

Define CAN medium priority for detection

[SI_161]

With the check box for the baud rate settings you can control which baud rates should be considered for the scan process. If your modules run always on the same baud rate can focus the scan process on this dedicated rate to speed up the process.

7.3 Options

In the option settings different functions are grouped together.

IPEmotion seconds - IPET		1
Ethernet interfaces CAN interfaces Options Components		
Aliasing-free filter settings		
Aliasing-free filter sett	tings:	~
CSV import mode		
CSV import mode:	Default	*
Calibration interval		
Interval:	No control	
Warning:	30 days before expir	ration 🔹
TEDS sensors		
Live-Zero settings:		
Special measurement modes		
Frequency drop tolerance:	1,75	
Notifications		
Available firmware upd	ates:	~

Alias free measurement
This checkbox has an impact on the DSP and hardware software filter settings. The function is only supported for modules which have adjustable DSP and / or hardware filter. If aliasing-free filtering is active, the software filter frequency is automatically adjusted when the sampling rate changes. The frequency is changed so that the new value is always the maximum possible frequency, where aliasing free measurement is guaranteed. If the filter frequency previously had been changed to a lower value intentionally, the filter frequency has to be changed manually by the user after the sample rate has been changed. This also applies, if the sample rate is decreased. The automatic adaptation of the software filter frequency is not applied, in case that the aliasing free measurement is disabled.

Signal filtering

Filters of analog measuring amplifiers are used for avoiding interrupting frequencies (frequency spectra, which do not contribute to the signal and/or which cannot be processed by the system). A low pass filter, which reduces the amplitudes of the frequencies above a specific cut-off frequency, is usually used for avoiding negative effects to the useful signal. The threshold in the range of the cut-off frequency (the barrier between the useful and the unrequested signal) is continuous. Useful signals below the cut-off frequency are also damped. A damping of 3 dB at the cut-off frequency means a reduction of the initial signal of 30

The image above shows the result of two inputs with the same input signal of 4 V amplitude and 12.5 Hz frequency.



Impact of filter (signal shift)

- Channel 2: black curve without filter
- Channel 3: red curve with 30 Hz hardware filter (Bessel type). Channel 3 shows themain behaviours of filters like the damping, the phase shifting, and the start oscillation of the filtered signal.

[SI_171]

Hardware filters

Although today's microprocessors provide a high processing power, the use of hardware filters is still essential. Especially when users cannot exclude that (periodic) signals can pass the AD converter and software filter, which cannot process the signals. Every sampling system follows Shannon's sampling theorem whereby one must at least sample with twice the signal frequency. Otherwise, aliasing effects can occur, whereas the acquired frequency is considerably lower than the actual signal (see image below).

DSP software filters

The hardware filter at the input excludes a distortion by frequency spectra above the system limit with the maximum sampling rate. Depending on the application, it can be required to lower the cut-off frequency. Example: M-SENS devices provide a switchable hardware filter with 150 Hz cut-off frequency. If the cut-off frequency is e.g. 50 Hz, interrupting frequency spectra (of devices with additional software filter) in the range between 50 Hz and the hardware filter frequency can be filtered with DSP. The filter frequency can be configured in defined steps up to the hardware filter frequency.

Alising effect

Despite sophisticated measurement engineering, errors can occur due to wrong settings. If, for example, a 100 Hz signal is acquired with a sampling rate of 100 Hz system can independently acquire the correct signal, but the result is wrong because the sampling rate was set too low.



Components 7.4

In the components overview you can see all supported modules. With the priority setting you have an impact on the visibility. When a module is put into the status not used it will be made invisible in the module tree for selection during the try configuration.

Components	Options	CAN interfaces	Ethernet interfaces
	Priority		pe
	Normal		🚔 IPETRONIK X
	Normal		Sx-STG
	Normal		Mx-STG2 6
	Normal		Mx-SENS2 8
	Normal		Mx-SENS2 4
	Normal	ST	Mx-SENS2 4 FA
	Normal		M-SENS2
	Normal		M-SENS2 DSP
	Normal	Z	M-SENS2 250HZ
	Normal	Z DSP	M-SENS2 250HZ
	Normal		M-SENS
	Normal		M-SENS DSP
	Normal		M-SENS 8
	Normal		M-SENS 8 DSP
	Normal		🚔 M-SENS 8plus
	Normal	SP	🚔 M-SENS 8plus D
	Normal		SIM-STG
	Normal		R-THERMO2
	Normal	/	A-THERMO2 HV
	Normal		🚔 M-THERMO2 u
	Normal		M-RTD2
	Normal		🚔 M-UNI2
	Normal		M-TDC
	Normal		Mc-THERMO
Cancel	OK		

Components

7.5 CAN card hardware interfaces

List of supported CAN card interfaces

IPETRONIK	IPEhub2
IPETRONIK	IPEcan FD
IPETRONIK	IPEcan FD PRO
IPETRONIK	IPEcan
IPETRONIK	IPEcan PRO
IPETRONIK	M-WiFi
IPETRONIK	ETHgateway CLFD V1.1
IPETRONIK	ETHgateway CLFD V1.2
IPETRONIK	CAN FD Satellite
IPETRONIK	FlexRay Satellite
VECTOR	CANcardXLe
VECTOR	CANcardXL
VECTOR	CANcaseXL
VECTOR	CANboardXL
VECTOR	CANboardXLcompact
VECTOR	CANcardX
VECTOR	VN1610
VECTOR	VN1611
VECTOR	VN1630
VECTOR	VN1640
VECTOR	VN5610
VECTOR	VN5610A
VECTOR	VN7570
VECTOR	VN7572
VECTOR	VN7600
VECTOR	VN7610
VECTOR	VN8900
VECTOR	VN8950
VECTOR	VN8970
VECTOR	VN8972
VECTOR	VX0312
VECTOR	VX1121
VECTOR	VX1131
National Instruments	PCI-CAN
National Instruments	PXI-CAN
National Instruments	PCMCIA-CAN
National Instruments	AT-CAN
National Instruments	USB-CAN

IPETRONIK

Ver	ndor	CAN interface name
	Kvaser	LAPcan
	Kvaser	PCIEcan
	Kvaser	PCcan
	Kvaser	PCIcan
	Kvaser	PCIcan II
	Kvaser	USBcan II
	Kvaser	Leaf II
	Kvaser	Leaf
	Kvaser	PCIcanx II
	Kvaser	Memorator Professional II
	Kvaser	MemoratorPro
	Kvaser	Memorator Light
	Kvaser	USBcan Pro 5xHS
	Kvaser	USBcanPro
	Kvaser	USBcan Light
	Kvaser	BlackBird
	Kvaser	BlackBird V2
	Kvaser	Hybrid
	Softing	CANcard2
	Softing	EDICcardC
	Softing	EDICcard2
	Softing	CAN-Acx-PCI
	Softing	CAN-Acx-PCI/DN
	Softing	CANusb
	Softing	CAN-PROx-PCI
	Peak	PCAN-USB X6
	Peak	PCAN-PCI
	Peak	PCAN-PCIe
	Peak	PCAN-PCIe FD
	TRAMA	CW-ISUB
	ICS	ValueCAN
	ICS	ValueCAN3
	ICS	ValueCAN4
	ICS	ValueCAN4-4
		Mongoose
		Basic+24 XS
	EIAS	ES581
	EIAS	ES593
	EIAS	ES595

► EthernetSystems