IPETRONIK





IPEmotion_PlugIn_X_V02_15_02

10. Februar 2022

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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

e	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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Limited commercial partnership with its head office in Baden-Baden, registry court HRA No. 201313 IPETRONIK Verwaltungs-GmbH Baden-Baden is an individually liable society, registry court Mannheim HRB No. 202089 CEOs: A. Wocke, C. Buchholz

Technical support and product information e-mail: support@ipetronik.com

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.

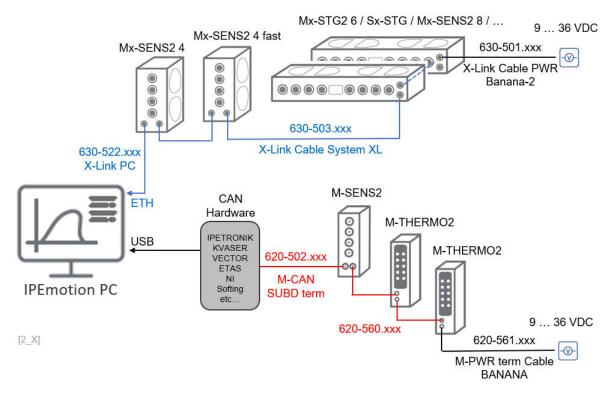
-	New	Recent proj	ects list			Activate F	Plugl	n in OPTIC	NS	[1_X
			IPEmotion options							
1	Open		Frequently used	Active		Title		Version	Description	M
	-		Basic settings		5	CAETEC dataLog		21.06.00	CAETEC data logger (ETHOS, ARCOS,	an C
	Save		Appearance			IPETRONIK X	٢	02.15.02	PETRONIK CAN and Ethernet devices	01
	Save as		View		000	IPETRONIK LOG		03.65.03	IPETRONIK Data logger (M-LOG, S-LOG	5, I
5	Save as		(118-52)) 		S	GPS		01.05.00	Serial interface for GPS mouse	IF
	App-Export		Data manager		0	Video		01.04.00	Synchronic recording of video data for	ca IF
-	App-Export		Data service	~	a.	Protocols		03.01.00	Protocol acquisition with any CAN hard	wa IF
A	Runtime version		Import							
жe			Export							
ลิ	Compare		Analysis							
			Maps							
	Print	•	Directories							
			Units							
1	View	•	10000						Download link to website	
E.			Hotkey						Jownload link to website	
	Administration	•	User administration	4						,
	-		IPEcloud						Down	bad
	Options		PlugIns						Dom	ilocia
~		Show/edit g	user displays	Plugin s		s ns to be used.				~
	About		User operations	The used	plugin v	version can be changed e is run at installing later			number is selected that ends with a '=' character	, no 🕠

The PlugIn is supporting the following Windows operating systems:

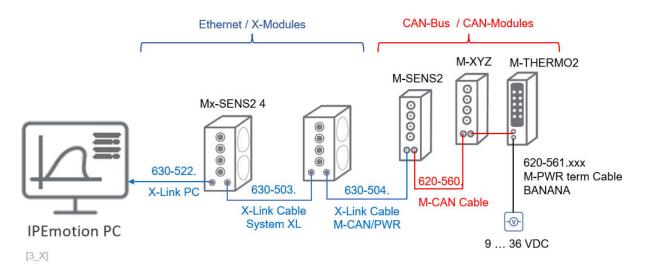
- 32 bit
- 🕨 64 bit

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.



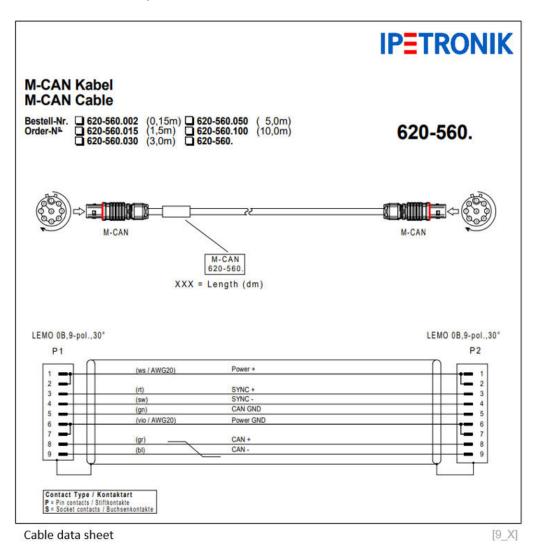
The most common and recommended hardware setups and the required cable sets will be explained in the following sections.

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:

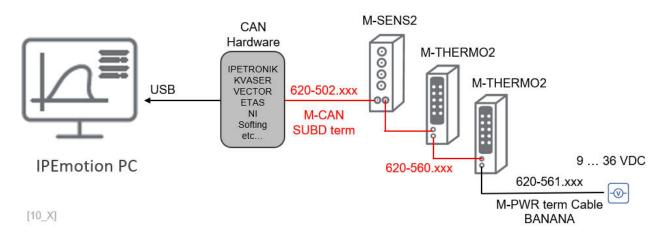
- 002 = 15 centimeter
- 015 = 1.5 meter
- 030 = 3 meter
- 050 = 5 meter
- 100 = 10 meter

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.



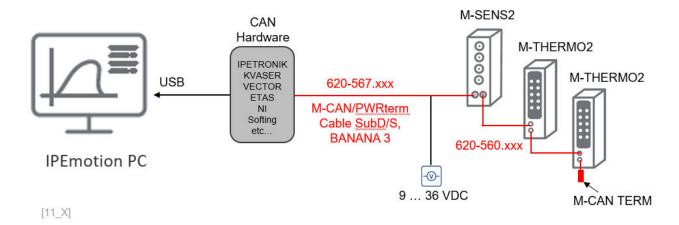
3.1 Example 1

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.



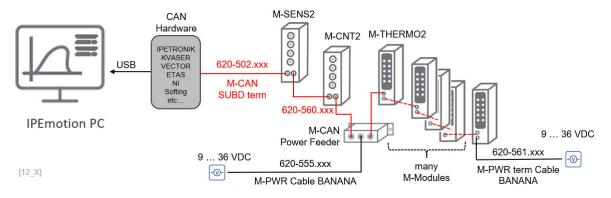
3.2 Example 2

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.

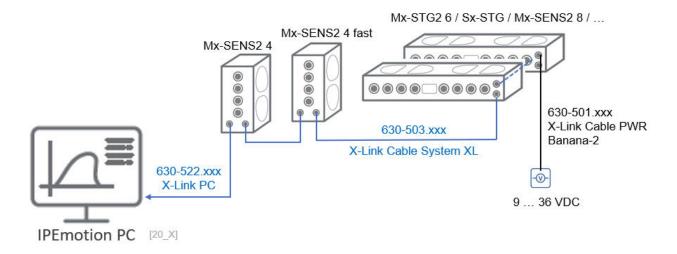


4 X Modules hardware setups

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

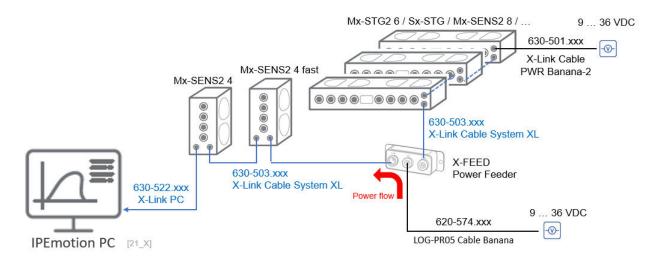
4.1 Example 1

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.



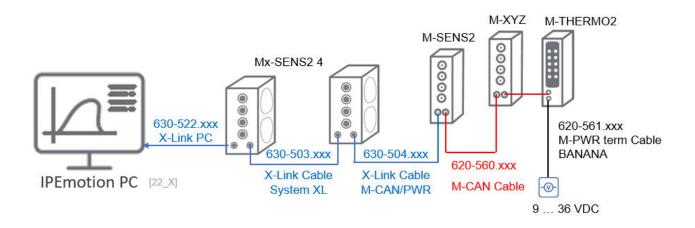
4.2 Example 2

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.



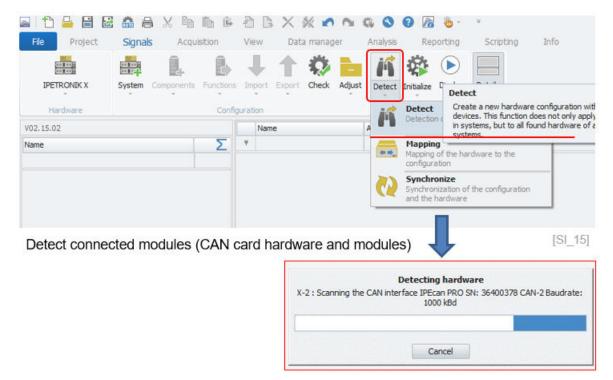
5 SIGNALS work space

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	Signals	A	cquisition	View Data n	nanager	Ar	nalysis Re	porting	Scripting	Info	
IPETRONIK X	System C	iompone	*		theck Ad	just (H Detect initialize	Stop	Details		
Hardware			Configu	ration			Access		View		
V02.15.02			Name	Current value	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling
Name		9									
			59104791_1	0,002 V 🕺		V	-100,000	100,000	-100	100	1 Hz
⊿ 🚓 X=1		12	59104791_2	-0,023 V	~	V	-100,000	100,000	-100	100	1 Hz
59104791	L I	4	59104791_3	-0,0078 G	4	G	-10,0000	10,0000	-2	2	1 Hz
57811010		8	59104791_4	-0,014 Nm	~	Nm	-50,000	50,000	-10	10	1 Hz
⊿ 🏯 X-3	1	10	57811010_1	20,93 °C	~	°C	-60,00	1370,00	-60	1370	1 Hz
91600337	,	4	57811010_2	23,07 °C	~	°C	-60,00	1370,00	-60	1370	1 Hz
91200143	3	6	57811010_3	23,55 °C	~	°C	-60,00	1370,00	-60	1370	1 Hz
	1		57811010_4	23,96 °C	~	°C	-60,00	1370,00	-60	1370	1 Hz
			57811010 5	24,49 °C	4	°C	-60,00	1370,00	-60	1370	1 Hz

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 ??.

File Project	Signals	A	cquisition	View	Data n	nanager	Analysis	Reporting
IPETRONIK X	System Con	pone	nts Functions Configur	-	port C	heck Adjust	Ψ.	tialize Display
/02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min
/02.15.02		Ŷ	Name	Active	Unit	Phys Min	Phys Max	Sensor Min
		9 •	Name 59104791_1		Unit V	Phys Min -100,000	Phys Max 100,000	Sensor Min
lame	12							
lame	12 791 4		59104791_1		v	-100,000	100,000	-100

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.

	ystem Con	Ê.	1	₽ ↓	11	2	iii 14
		1977 B	1				
and the second		ponents	Fun	ctions Import	Export C	heck A	djust Detec
		*		* *	*		т
Hardware	_			Configuration			
V02.15.02				Name	Active	Unit	Phys Min
Name	w	Σ	۴				
				59104791_1	~	V	-100,000
		10		59104791_2	~	V	-100,000
🔺 🏯 🛛 X-3					and the second se		
91600337		4		59104791_3	~	G	-10,0000
				59104791_3 59104791_4	>	G Nm	-10,0000
91600337		4		The state of the s			The second de
🚔 91600337		4		59104791_4	~	Nm	-50,000

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 Hardware	mponents		ctions Import I	Export C	neck 4	Adjust Detect	Access (isplay Details	
V02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max
Name 👻	Σ	Ŷ							
			59104791_1	~	V	-100,000	100,000	-100	100
⊿ 🚔 X-3	10		59104791_2	~	٧	-100,000	100,000	-100	100
91600337	4		59104791_3	~	G	-10,0000	10,0000	-2	2
91200143	6		59104791_4 57811010_1	>	Nm °C	-50,000	50,000	-10	10
X-1 59104791 57811010		hang unction mport xport djust	i.		Vo Te Pri Co	-60,00 Iltage . emperature essure punter/frequency ulti devices		Sx-STG Mx-STG2 6 Mx-SENS2 8 Mx-SENS2 4 Mx-SENS2 4	FAST

5.1.3 Firmware Update

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

		guisition Viev	B X	۱ 💥 ata man	
1000 COLUMN COLUMN	stem Componen		ort Expor	t Cheo	k Adjust
Hardware	Update of	levices ratio	n		
/02.15.02			Active	Unit	Phys Min
Name	Adjust al	l channels			
		1_107/01_1	~	V	-100,000
🔺 🏯 🛕 X-1	16	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
	×.	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.

X update	ibrary O	ptions	-	0
Update	U Exit			
evice name	Exit a Current ver	Target version	n Progress	
 System: X-1 59104791 	04.15.00	04.15.00		-
58700139	04.09.01	04.15.00	 Update recommended 	
57811010	04.13.00	04.13.00		
rogress		Device detect	Kon feished	

Module firmware update interface

[SI_4_2]

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

PE X update			_ 🗆 ×
Devices Li	brary Op	tions	۲
f	C		
Update	Exit		
Device 4	Exit 4		
Device name	Current ver	Target version	Progress
System: X-1			
59104791	04.15.00	04.15.00	
587001394	04.09.01	04.15.00	Downloading Application - 97,2%
57811010	04.13.00	04.13.00	
Progress		Updating device	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

PE X update Devices Check for updates		IPETRONIK Please select the installation directories
Library J Exit Firmware type J Device: 519 - SIM_STG	Version	Programs Change C:\Program Files\IPETRONIK
Main version: 04.10.00 Application Config Download kernel FPGA	04.10.00 01.02.00 01.20.03 01.07.01	Device Firmware path Change C:\ProgramData\IPETRONIK\Firmware
FPGA download PIC PIC RAM download kernel RAM download kernel Device: 557 - M_THERMO2_HV Device: 560 - M_THERMO	01.06.00 01.03.00 01.03.00 01.20.03	Installation of Plugin suggest default firmware directory
 Device: 560 - M_IHERMO Device: 561 - M_SENS Device: 562 - M_FRQ Device: 563 - U_THERMO Device: 566 - M_THERMO_16 Device: 567 - M_SENS 8 	Data from the default library	
Device: 568 - M_SEN5_8plus Device: 569 - M_THERMO_T	detection finished.	IPEmotion PlugIn IPETRONIK X V02.15.00 (x64)

Import / update new firmware files

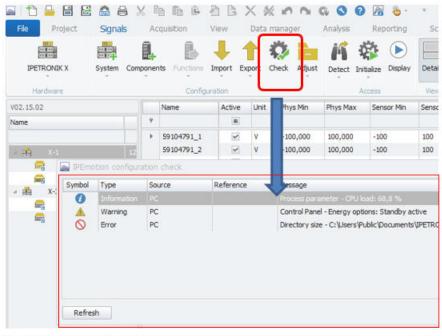
[SI_4_4]

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.

	Name	Active	Color	Channel	Operation	Reference value top	Reference value bo
Ŷ							
2	Range-1	~		Temp 2	Limit violation with		
		_					
	7						
3	1						
)	1						
)	IPEmo	tion config	uration c	neck			
)	Indowe	Type	Sour	e i	Reference Mess	age	
£			Rand	ve-1			defined.
1	-	warning	Limit	value-1	Iner	e is no reference value den	nea.
1							
)							
)	Refrest	n E	xport				
5							
		Y	Y	v III A Range-1 IPEmotion configuration cl IPEmotion configuration cl Smbol Type Source Warning Range Warning Limit Refresh Export	P Image: 1 IPEmotion configuration check Simbol Type Source Warning Range-1 Warning Limit value-1	P Image: 1 Temp_2 Limit violation within IPEmotion configuration check Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1 Image: 1	Range-1 Temp_2 Limit violation withi IPEmotion configuration check Simbol Type Source Reference Message Warning Range-1 There is no reference value top Warning Limit value-1 There is no reference value defi Refresh Export

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

Name	Active	Color C	Channel	Operation	Reference value top	Reference value bottom	Message type
Range-1	Z		Temp_2	Limit violation withi.	4	1	🔥 Warning
📄 IPEmo	tion config	uration che	ck				
Symbol	Type	Source	F	Reference Messa	0e		
	Warning	Limit val			is no reference value defir		
	warning	Citil Vo	06-1	mere	is no reference value della	icu.	
Refres		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 6.9.

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 1 <u>1</u> 🔒 🖻 🗟	* =		3	ĥ 🕯 🐴	ΒX	*	04		🔊 🎍 -	Ŧ
File Project	Signals	s Ac	quisi	tion Viev	v Dat	ta manag	ier -	Analysis	Reporting	Scripting
	System	Componen *	ts f	Functions Imp	ort Export	Check	Adjust	Detect Init	ialize Display	Details
Hardware				Configuratio	n			Ad	cess	View
V02.15.02				Name	Active	Unit	Symbol	Phys Min	Phys Max	Sensor Min
Name		Σ	٩							
				59104791_1	2	V	$\sim N$	-100,000	100,000	-100
∡ 🏯 X-1		12		59104791_2	~	V	N	-100,000	100,000	-100
59104791		4		59104791_3	~	G	A.	-10,0000	10,0000	-2
		8		59104791 4	~	Nm	A	-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

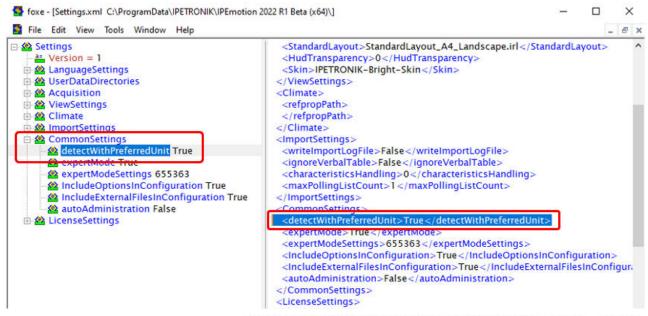
TEDS sensor detection with automatic unit transformation

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 R1\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].

Frequently used	Physical quantity	Unit				
Basic settings	Power	w				
	Pressure	bar				
Appearance	Velocity	m/s				
View	Angular velocity	rpm				
Data manager	Mass flow rate	kg/s				
Data manager	Plane angle	rad				
Data service	Strain	µm/m				
Import	Symbol rate	Bd				
Import	Percent	%				
Export	Storage space	MB				
Analysis	Acceleration	m/s²	Default			
	Torque	m/s²	2 dit			
Maps	Volume flow	G				
Directories	Specific enthalpy	J/kg				
	Energy flux density	W/m²				
Units	Bridge detuning	mV/V				
Hotkey	Density	kg/m³				
User administration	Relative humidity	RH				
User auministration	Frame rate	fos				

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.

File Project Signals	AC	quisitio	on /v	iew D	ata mana	ger i	Analysis	Reportin	g Scripti
IPETRONIK X System	Componer	its Fu	Configura	tion	rt Check	Adjust	-	itialize Displ	ay Details
/02.15.02		1	Name	Activ	e Unit	Symbol	Phys Min	Phys Max	
Name	Σ	9							
	-		59104791_	1 5	e v	N	-100,000	100,000	-100
/ 盖 X-1	12		59104791_	2 5	e v	N	-100,000	100,000	-100
59104791	59104791_	3	d m/s²	TEOS	-98 067	Functions	1		
57811010	59104791_	4 5	Nm	6	-50				
4 🏯 X-3							Adjust TEDS		
91600337		TED)S Adi	ust on o	channe	el leve	4	Compare TED	
91200143			i e i iaj				100	Use as defau Reset to defa	
							-		
							00	Cut	Ctrl+X
							49	Сору	CPI+C
/02.15.02				Name		Active	Unit	Symbol	Phys Min
Vame		5	9						
			•	5910479	91_1	~	v	N	-100,000
V V - market assessed to	-		12	5910479	91_2	~	v	N	-100,000
A 1 X-1		1		5910479	91 3	~	m/s²	A	-98,067
▲ ➡ X-1 59104791									

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	₿.			Manufacturer I 4421 1	Manufacturer Id	127		
IPETRONIK X System	Compo	anenta 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	0				
e									Calibration		Valid	
	59104791_1								Calibration date		23.09.203	
				V	N	-10			Expiration date		23.09.203	22
🚔 X-1		59104791_2		V	N	-10			Initials	PB	PB	
	•	59104791 3		m/g2	A.7	-98	Physical v	sue	Physical value	Acceleration	Accelerati	*
57811010		59104; 🖒 Fu	nctions		•	-50			Unit		G	Ion
畫 X-3		ditta Ad	iust TEDS	Ş					Minimum		-10 G	
91600337		UT Co	mpare TED)S					Maximum		10 G	
91200143		A CONTRACTOR OF THE OWNER		121			Output siz	e				
E 91200145		1.0	e as defau						Output size	Electric voltage	Electric vo	oltage
		O Re	set to defi	ault					Unit	v	٧	
									Minimum	-2 V	-2 V	
ontext menu: Cor	npa	are IEDS	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	
								Re	ference excitation		12 V	
									Maximum current		1,99526 n	

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	(fset adjust	e meas	sureme	ints				Measuremen range		
) Drag	a column hear	der het	roup by that	t column						
	Name	Current val	ue Group	Phys Min	Phys Max	Referen	Offset value	Available measurement r	Result	T
٣										1
	59104791_1	0,002 V	None	-100,000	100,000	0,000	0,024		OK	i
	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		CK	
	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	
•	91600337_4	4,5864 V	1 1	- 0,0000	10,0000	0,0000	0,0000	<u>⊢</u>	OK	
1	91200143_1	NoValue	None	-7999,9	7999,74	3,48471	0,003810		OK	
	Group name	1	Comment							1
	1									Í
	2	1	Sensor Grou	ip 2		Of	fset valu	les		1
-	مرمع	Offset adjust	S	Original sig	set adjust)	e de	evice, in order t	nt is the adaption of a measur to remove systematic deviatio albration, an intervention cau ge is required.	ns. In	
lect	ion: 1]					* Star	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	
									1	-
	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	100,000 100,000 10,0000	0,000	0,003		OK	
	91600337_3	0,008 V	None	-100,000		0,000	-0,003		OK	
	91600337_		1 .	-10,0000		0,0000	0,0000		OK	
	91200143_1	NoValue	None	-7999,9	7999,74	3,48471	0,003810		OK	-
	Group name	0	Comment							
	1		Sensor Grou	φl						
	2		Sensor Grou	ip 2						
	-									1.5
	J.	Offset adjust	·	Original sign (without offs) o orde	r to remove sys ration, an inter	s the adaption of a measurem stematic deviations. In contra vention causing a permanent	st to the	\$
ect	tion: 1							Start Export	Close	
	All						_			
	Selected All group							Adjusting channels	4	
	1						0.0	: Completing start of the mea		
	A									

IPEmotion_PlugIn_X_V02_15_02 IPETRONIK GmbH & Co. KG ipetronik.com

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 valu	e Group	Phys Min	Phys Max	Referen	Offset value	Available measurement r	Result	I
Ŷ	0.000									t
	59104791 1	0,002 V	None	-100,000	100,000	0,000	0.024		OK	ĺ
	59104791 2	0,002 V	None	-100,000	100,000	0,000	0,024		OK	l
	59104791 3	0,0002 G	None	-10,0000	10,0000	0,0000	0,0016		ОК	l
	59104791_4	0,001 Nm	None	-50,000	50,000	0,000	0,003		OK	l
	91600337_1	0,002 V	None	-100,000	100,000	0,000	0,006		OK	l
	91600337_2	0,005 V	None	-100,000	100,000	0,000	0,003		OK	l
	91600337_3	-0,008 V	None	-100,000	100,000	0,000	-0.003		ОК	l
*	91600337_4	0,0121 V	1 .	-10,0000	10,0000	0,0000	-4,5731		OK	
	91200143_1	NoValue	None	-7999,9	7999,74	3,48471	0,003810		OK	
	Group name	C	omment						_	Î
Þ	1	s								ĺ
	2	s	ensor Grou	p 2						1
Ì	م مرمر	Offset	·	Original sig	set adjust)) en de	evice, in order t	nt is the adaption of a measure to remove systematic deviation alibration, an intervention caus ge is required.	ns. In	

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

Datei Bearbeiten Format Ansicht H				
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
01600337_2;-0,005 V	;None ;-100,000	;100,000	;0,000	;0,003
01600337_3;-0,002 V	;None ;-100,000	;100,000	;0,000	;0,006
1600337_4;-0,0119 V	;1 ;-10,0000	;10,0000	;0,0000	;-4,5209
01200143_1;1,61898383490688 µ	um/m ;None ;-7999,984167	7899;7999,7457532	3529;3,48471251854221E	-14;0,003830590
91200143_2;-0,000210285186767	7578 V;None ;-1	;1	;0	;0,449979573
01200143 3;NoValue	;None ;-1	;1	;0	;0
91200143 4;NoValue	;None ;-1	;1	;0	;0
01200143 5;NoValue	;None ;-1	;1	;0	;0
91200143 6;NoValue	;None ;-1	:1	;0	;0

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.

9	Name	Bridge type	Bridge Resi	Shunt resist	%	Quadrant 1	Quadrant 2	Quadrant 3	Quadran	Offset	Result
	91200143_1	Quarter	120 Ω	100 kΩ	10 %		»				
	1	(2)	(3)	(4)		The Shun	t Calibration is I	he usual metho	de to verify t	he output	sionals of a

Shunt check dialog for Strain sensors

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

ra	g a column heade	r here to group	by that column									
	Name	Bridge type	Bridge Resi	Shunt resist	%	Quadrant 1	Quadrant 2	Quadrant 3	Quadran	Offset	Result	
2												
-	91200143_1	Quarter	120 Ω	100 kΩ	10 %	614,7479	-601,8028	4,153246	3,9091	2,93254		0
	-		//			1				1		

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.

Fil	e	Project	Signals	Acquisi	cion	View	Data ma	nager Anal
								Y
isp	lay	Store Paus		Page-1	Fix	Undo grid	Area	y-t chart
	C	Control	s	creens		Layout		Elements
har	nnels			ł		1		
Pa	ges	Channels	Display	600-		1988 - 1918 - 194		
	Pages Channels Display							
	Name	e		-				
Ŷ	Name	e		400-			— Е	Bridge
۴		e)4791_1		400-			- n	esponse of
۴	5910	77-0) 201-04-00-04-0		-			- n	
Ŷ	5910 5910	04791_1		400-			- n	esponse of
Ŷ	5910 5910 5910)4791_1)4791_2	R	200-			- n	esponse of
Ŷ	5910 5910 5910 5910	04791_1 04791_2 04791_3	¢	-			- n	esponse of
Ŷ	5910 5910 5910 5910 5910 5910	04791_1 04791_2 04791_3 04791_4	ß	200-			- n	esponse of hunt check
Ŷ	5910 5910 5910 5910 5910 5781 5781	04791_1 04791_2 04791_3 04791_4 11010_1	¢,	200-		5	- n	esponse of
٩	5910 5910 5910 5910 5781 5781	04791_1 04791_2 04791_3 04791_4 11010_1 11010_2	⊳	200-	1200143		- n	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	Control +N	
Appearance		Signals-Access-Start/Stop displaying	F6	
Appearance		Acquisition-Control-Start/Stop storing	F7	
View		Project-File-Save as	Control+Shift+S	
Data manager		Info-Info-Help	F1	
Data service		General-Print	Control+P	
		General-Full screen mode	F5	
Import		Acquisition-Storage group-Set marker	F8	Marker 1
Export	1	Signals-Offset adjust	Control+O	1
Analysis		Signals-Shunt check	Control+S	
Maps	*			
Directories				
Units				

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		Description
 Area: Acquisition Area: Analysis Area: Data manager Area: General 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-Otabas Signals-Configuration-Offset Signals-Configuration-Offset Signals-Access-Detect Signals-Access-Synchronize Signals-Access-Initialize 	Adjust channel scalings with currently connected TER Adjustment of channel offset Check Shunt check of channels Create a new hardware configuration with the connected The current hardware configuration can be mapped The current hardware configuration will be synchron The connected devices will be initialized with the part
	Signals-Access-Reset Signals-View-Details	Initialization of the connected hardware with the det 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.

File Project	🗄 🚵 🔒 📈 🖻	isition	A B	🗙 🎉 🖍 Data manag	er (analysis	🕜 🗖 Repo	💩 - 👻
IPETRONIK X	System Components	₿	+ -	port Check	Adjust	IN Detect	Initialize	Detect
Hardware		Confi	guration			iń	Detect Detection	Create a new hardware configuration with devices. This function does not only apply
V02.15.02			Name				Detection	in systems, but to all found hardware of a systems.
Name		Σ	9			0.00	Mapping Mapping o configurat	f the hardware to the
						0	Synchron Synchronic and the ha	zation of the configuration
Detect conne	cted modules	(CAN	card ha	rdware a	nd me	odule	s)	[SI_15]
				X-2 : Scan	ning the (Contraction of the second second	hardware n PRO SN: 36400378 CAN-2 Baudrate: kBd
							Car	ncel

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.

		3 X G	le.	🖻 🐴		% 🖌	0		0	b -	÷
File Project	Signal	s Acqui	sition	Viev	w Dat	a mana	ger	Analysis	Rep	orting	Scrip
		0000		6 1	۱	Ø		K	2		
IPETRONIK X	System	Components	Func	tions Imp	ort Export	Check	Adjust	Detect	Initialize	Display	Details
Hardware			C	Configuratio	n				Access		View
V02.15.02				Name			Active	Unit	Symbol		Phys Min
Name		Σ	٩								
			•	a_X	٦		~	G	1	V	-4,0000
🔺 🍰 X-1		11		a_Y			~	G	1	V	-4,0000
5910479	1	3		a_Z			~	G	1	V	-4,0000
57811010	0	8		5910479	1_4	Act	ual cor	figurati	on of m	odule	s o
	1			Temp_1			~	°C		4	-60,00
				Temp_2			~	°C	A	1	-60,00
List	of Modu	lies		Temp_3	L		~	°C	4	1	-60,00
List of detected M	//- modu	les with ac	tual	configu	ration						[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.

ionfiguration:		Hardware:	1
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.
🚔 👼 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
4 🚔 👼 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	📾 🥽 91200143	Device type: 912 Front number: 143
	Configuration (IWF) and the de	etected hardware are	the same.
		1	

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.

Configuration:	10	Hardware:	
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
		ang ing 1 91200143	Device type: 912 Front number: 143
PETRONIK X *	Clear		OK Cancel

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.

Configuration:		Hardware:	
Name	Parameter	Name	Parameter
🔺 📥 👼 X-1	CAN driver type: IPEcan Port number: C	4 📇 👼 X-1	CAN driver type: IPEcan Port number: C
🗖 👼 59104791	Device type: 591 Is DSP device: True Fr	🚍 👼 59104791	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	🚔 👼 57811010	Device type: 578 Front number: 11010
न 👼 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
IPETRONIK X +	Clear <<-	-]	OK Cancel

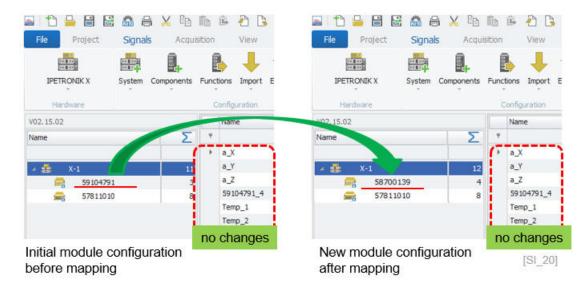
Step 2: Press the button $[\leftarrow]$ to execute the mapping process



Information

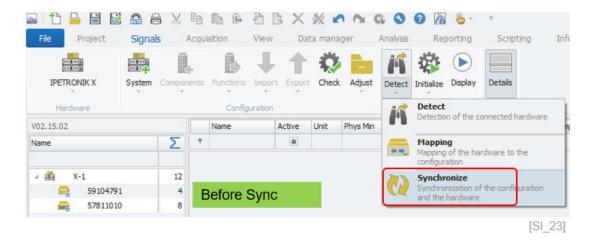
The Mapping function can be applied across different modules types. The system is not preventing you from mapping for example a M-SENS module to a M-THERMO module.

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.

V02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor M
Name	Σ	۴							
		٠	58700139_1	~	V	-100,000	100,000	-100	100
4 🚎 🛕 X-1	16		58700139_2	~	V	-100,000	100,000	-100	100
59104791	4		58700139_3	~	V	-100,000	100,000	-100	100
57811010	8		58700139_4	~	V	-100,000	100,000	-100	100
🚔 🛕 58700139			After Syr	C. New	mor	lule deter	cted		
			Aller Syr	ic. new	mou	iule dele	Lieu		

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	cquisit	tion View	Data	a manag	ier An	alysis	Ke	porting	Scripting	Info	
IPETRONIK X	System Compone	nts F	Eunctions Import	Export	Check	Adjust D	if Detect	Initialize	Display	Details		
Hardware			Configuration					10	Initialize Initialization with the parameters of			
V02.15.02			Name	Active	Unit	Symbol	Phy	*		t hardware cor		
Name	Σ	Ŷ						and a	Reset	10.05		
			59104791_1	~	V	N	-10	帝	Initializatio	n with the defa s	suit	
4 🏥 X-1	12		59104791_2	2	V	N	-10	0,000	100,000	-100	100	
59104791	4		59104791_3	~	G	A	-10	,0000	10,0000	-2	2	
57811010	8	->	59104791_4	~	Nm	₩						
4 🏯 X-3	5		57811010_1	~	°C	4	-60	,00	1370,00	-60	1370	
91600337	4		57811010_2	~	°C	4	-60	,00	1370,00	-60	1370	
91200143	1		57811010_3	~	°C	4	-60	,00	1370,00	-60	1370	
7.	11		57811010_4	~	°C	1	-60	.00	1370,00	-60	1370	

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 6.8.7)
- V-TAB range (see section 6.8.6)
- Multi point scaling (6.8.4)

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.

IPETRONIK X System Compo	-	Funct	y v u	Check	Adjust	Detect	Initialize	Display	Details
Hardware		C	onfiguration				57	Initialize	n with th
V02.15.02			Name		Active	Unit	-	the curren	t hardwa
Name	Σ	9					帝	Reset Initializatio	
			a_X		4	G		parameter	Contract Contract of the
- 🍰 X-1	1000				~	G	_		9.0000
59104791	11 3		a_Y a_Z		D	efault initia	alization 010 detected		1.0000
₩ 59104791 ¥02.15.02	3		a_Z Name		D	efault initia	010 detected		1.0000
59104791 V02.15.02		9	a_Z Name		D X-1:D	efault initia evice 57811 Cance	010 detecter	d.	
59104791 V02.15.02 Name	3 Σ	9	a_Z Name		V	efault initia evice 57811 Cance -10	010 detected		000
59104791 V02.15.02 Name X-1	3 Σ 12		a_Z Name 59104791_1	~	D X-1:D	efault initia evice 57811 Cance -10 -10	010 detected	100,00	000
Image: System of the syste	3 Σ		a_Z Name 59104791_1 59104791_2	~	D X-1:D	efault initia evice 57811 Cance -10	010 detected	i. 100,00 100,00	000
	3 Σ 12 4		a_Z Name 59104791_1 59104791_2 59104791_3	~	x-1:D V V Factor	efault initia evice 57811 Cance -10 -10 y setti	010 detected	100,00 100,00 100,00	000



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.

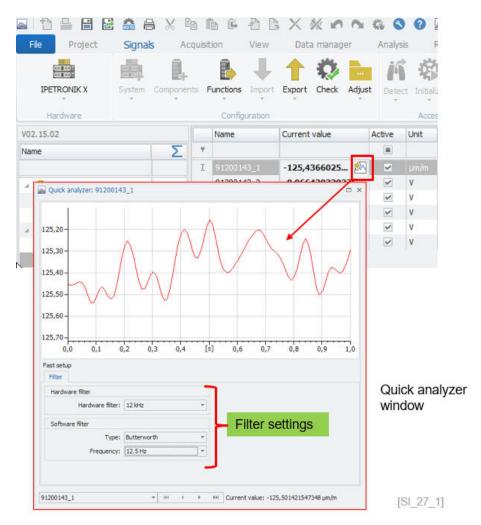
5.4.2 Display and Quick Analyzer

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

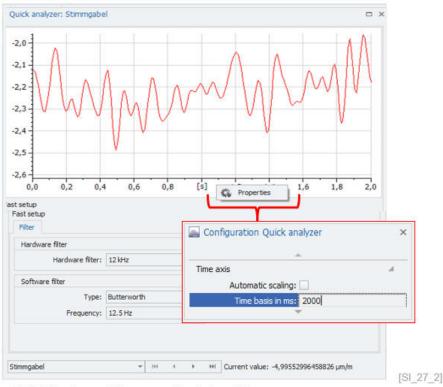
File Project	Signals	Acqu	isition	View	Data mana	aer	Analysis	Repor	ting
		<u>.</u>		1 1	Ö		K	53	6
IPETRONIK X		mponents		Import Exp	oort Check	Adjust	Detect	110	Stop
Hardware			Config	uration				Access	_
V02.15.02			Name	Curi	ent value	Active	Unit	Phys Min	Phys
Name	1	Σ	9						
			5910479	1_1 0,0	02 V 🕺	~	V	-100,000	100
🖌 🎂 X-1		12	5910479	1_2 -0,	023 V	V	V	-100,000	100
591047	91	4	5910479	1_3 -0,0	0078 G	~	G	-10,0000	10,
578110	10	8	5910479	1_4 -0,0	014 Nm	~	i Qu	ick Analy	zer
⊿ 🏯 X-3		10	5781101	0_1 21,	02 °C	~	°C	-60,00	137
-A photo A-D	37	4	5781101	0_2 23,	14 °C	~	°C	-60,00	137
916003	37								

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.



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

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.

IPETRONIK X System Hardware	Compone	nts	Functions Import	Export	Check	Adjust De	etect Initialize		etails
V02.15.02			Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max
Name	Σ	9						/	
		•	59104791_1	~	V	-100,000	100,000	-100	100
4 📥 X-1	12		59104791_2	~	V	-100,000	100,000	-100	100
<i>e</i> 59104791	4		59104791_3	~	G	-10,0000	10,0000	-2	2
57811010	8		59104791_4	~	Nm	-50,000	50,000	-10	10
4 📥 X-3	10						/		
91600337	4								
₽1200143	6	G	eneral Extende Active: Name: Description:		mation	Ľ	D	etails ena	bled
				59104791	/X+1.				
			Sampling rate:			*			

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.

🖬 🔁 🖴 🖪 I	2 🏯 🔒 📈 🛍 🛍 🗳 🐔	Customization ×
File Project	Signals Acquisition Vie	Automatic CAN-ID configuration
The Trojece	Signals Inclusion In	Base type
		Bus load
IPETRONIK X	System Components Functions Im	CAN bus
IPETRONIK A	system components Punctions Im	CAN send rate
Hardware	Configurat	Clock
	10	Com. ID
V02.15.02	Name	Configuration version
Name		Default send interval
	2↓ Sort Ascending	Device baud rate
4 🔜 X-3	Sort Descending	Device production date
916003	37 2* Reset sorting	Download kernel version
912001	43 🎽 🛅 Column Chooser	Firmware version
4 🍰 X-1	Best Fit	First CAN-ID
591047		FPGA version
578110	10	Front number
	Q Show Find Panel	Hardware version
		High sampling rate
		Index
		Internal time synchronisation
		IP address
	IPETRONIK X	Last calibration date
	PlugIn supports	License information:
	customizing infos	Medium
	odotornizing intoo	Network interface
		No. devices
		PIC-Firmware version
		Serial number
		Subconfig
		Туре
		Using 29-bit identifiers
	[SI 30]	X-Link load
	[0:_00]	L

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.

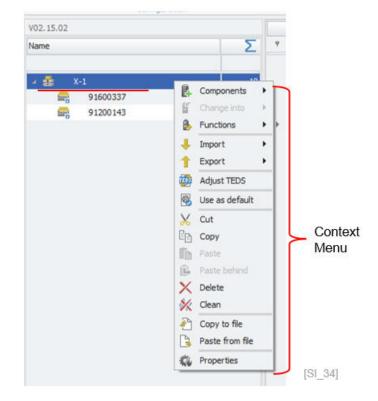
File Project	Signals			View	N 6 2 6	nanager	🖬 🦚 🔇 Analys
	System	Components		₽	1	Ø 🛛	just Deter
Hardware		Colun	nns are a	added t	to the tre	e.	
V02.15.02				ــــــــــــــــــــــــــــــــــــــ		_	
Name	~	Front number	Туре		Firmware	version	Σ
⊿ 🏯 X-3							10
91600337		3	37 Mx-SE	NS2 4	02.15.03		4
91200143		1	43 Mx-ST	G2 6	02.15.04		6
🔺 🏥 X-1							12
59104791		47	91 M-SEN	S2 250	04.15.00		4
57811010		110	010 M-THE	RMO2	04.13.00		8

Column chooser on module / device level

[SI_31]

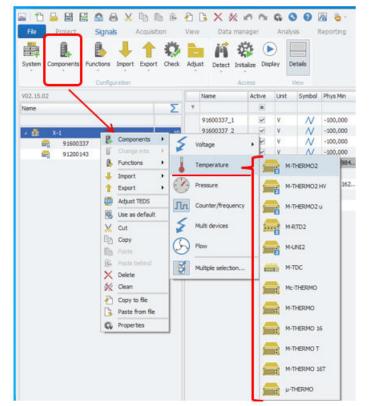
5.5.2 Context menu for system, modules and channels

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

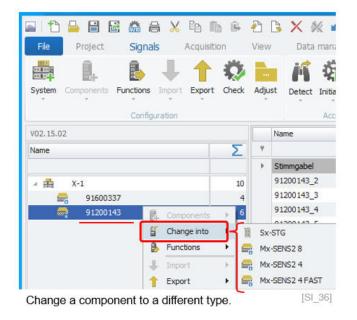
You can add components if the PlugIn supports a modular hard-ware structure.



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.

📫 🖡 🖡 🕂 ʻ	quisit	0	View Adju		Data mar		Analy Dlay
Configuration					Ac	cess	
V02.15.02				Nar	ne	Active	Unit
Name	1	Σ	9				
			+	916	500337_1	~	V
4 📅 X-1	T	10		916	500337_2		۷
91600337				916	00337_3	~	V
🚔 91200143		Compone Change in		-	00337_4	~	V
	8	Functions	5	Ъ	Ad	just all cha	annels
	1	Export		•	Ad	just group	1
	100 100	Adjust TE			Ad	just group	2

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 **??**

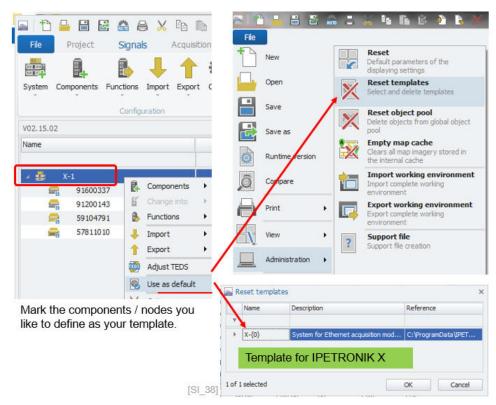
The TEDS detect and adjust function is explained in detail in sec-

IPETRONIK

- Adjust TEDS
- Use as default

Clean

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.

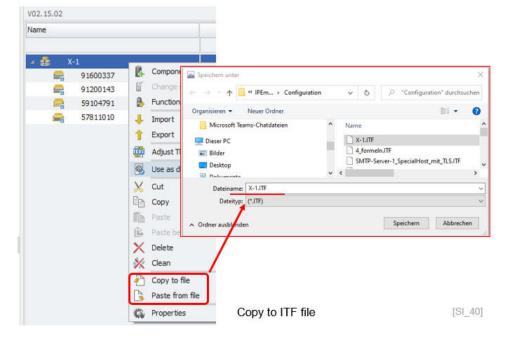
- Cut With the cutting function you can cut out selected modules. After cutting components you can paste them in other sections of the system tree. There is a difference between "Paste" and "Paste behind" Insert one module Paste Paste behind Inserting all modules you have cut out and paste them behind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

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

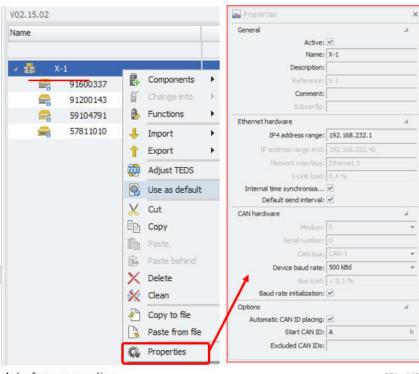
Paste from file

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]

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.

Interface – General tab sheet 6.1

V02.15.02			Name		Active	Unit	Phys Min	Phys Max
Name	Σ	۴						
			59104	791_1	~	V.	-100,000	100,000
∕ 式 X-1	12		59104	791_2	~	٧	-100,000	100,000
59104791	4		59104	791_3	~	۷	-100,000	100,000
57811010	8		59104	791_4	~	۷	-100,000	100,000
			57811	010_1	~	°C	-60,00	1370,00
			57811	010_2	~	°C	-60,00	1370,00
			57811	010_3	~	°C	-60,00	1370,00
			57811	010_4	~	°C	-60,00	1370,00
			57811	010_5	~	°C	-60,00	1370,00
			57811	010 6		or	-60.00	1370.00
		G	eneral	Etherne	t hardware	e CAI	N hardware	Options
				Active:	~			
				Name:	X-1			
			Des	cription:				
			Ref	erence:	X-1			
			Co	mment:				
General tab sheet								

- 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	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:	×			
				101	0.0

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 isuft 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
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		Kvaser CAN IPEcan	
CAN bus:	CAN-1	*	ETH gateway NI-CAN	
Device baud rate:	500 kBd	*	Softing CAN	
Bus load:	<0,1%		TRAMA CAN	*
Baud rate initialization:	~			

CAN hardware tab sheet

DOM:	C	0	47
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 Options tab sheet

General Ethernet hardwa	re CAN har	dware Option	ns					
Automatic CAN	ID placing: 🗹							
Sta	rt CAN ID: A			h				
Evdude	d CAN IDs:	×.			-			
EXOLUC	a chi 103.	\rightarrow	-		-			
		Names out o	f serial num	ibers				
Options tab sheet		$\langle \rangle$		[SI_42_5				
puons lab sheet				101_12_0				
			1.00		. A	0		÷
1 11 🔒 🗎 🗟 🦾 🖗		🗈 🕼 🦺 📑		00		0 h	- 🍈	*
			1			-		
File Project Signa	ls Acquisit		1	nanager	Analysis		porting	Scripting
			1	nanager				
File Project Signa	s Acquisit	tion View	bata n	nanager	Analysis		porting	
File Project Signa	s Acquisit	tion View	Rata n	0	Analysis	Re Re Initialize	porting Display	Scripting Details
File Project Signa IPETRONIK X System Hardware	s Acquisit	tion View	Export C	heck Adjus	Analysis t Detect	Re Re Initialize	porting Display	Scripting
File Project Signa IPETRONIK X System Hardware	S Acquisit	tion View Functions Configuration Name	Active	heck Adjus	Analysis	Re Re Initialize	porting Display	Scripting Details View
File Project Signa IPETRONIK X System Hardware	S Acquisit	tion View Functions Configuration Name	Active	heck Adjus	Analysis t Detect	Re Initialize Access	porting Display	Scripting Details View
File Project Signa IPETRONIK X System Hardware	S Acquisit	tion View Functions Import Configuration Name S9104791_1	Active	Unit CA	Analysis t Detect	Re Initialize Access	porting Display	Scripting Details View
File Project Signa IPETRONIK X System Hardware 102.15.02 Name	S Acquisit Components F	tion View Functions Functions Functions Functions Functions Function Function	Active	unit CA	Analysis t Detect	Re Initialize Access	porting Display yı A↓ S Z↓ S Z↓ S Z↓ S Z↓ S	Scripting Details View
File Project Signa IPETRONIK X System Hardware V02.15.02 Name	S Acquisit	tion View Functions Import Configuration Name S9104791_1	Active	Unit CA	Analysis t Detect	Re Initialize Access	porting Display YI 2↓ S Z↓ S Z↓ S Z↓ S Z↓ S Z↓ S Z↓ S Z↓ S	Scripting Details View ort Ascending ort Descending Jear Sorting

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.

6.5 CAN- and X-module configuration

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

•	M2 and M-Module	Base Type Number	Firmware
	M-SENS2	587	04.15.00
	M-SENS2 DSP	587	04.15.00
	M-SENS2 250Hz	591	04.15.00
	M-SENS2 250Hz DSP	591	04.15.00
	M-SENS	561	04.15.00
	M-SENS DSP	561	04.15.00
	M-SENS 8	567	04.15.00
	M-SENS 8 DSP	567	04.15.00
	M-SENS 8plus	568	04.15.00
•	M-SENS 8plus DSP	568	04.15.00
	M-THERMO2	578	04.13.00
	M-THERMO2 HV	557	04.13.00
•	M-THERMO2 u	579	04.13.00
	M-RTD2	581	04.10.03
	M-UNI2	584	04.13.00
	Mc-THERMO	573	04.09.03
	M-THERMO	560	04.09.51
	M-THERMO 16	566	04.09.50
	M-THERMO T	569	04.09.50
	M-THERMO 16T	575	04.09.50
	μ-THERMO	563	04.09.50
	M-CNT2	586	04.13.01
	M-FRQ	562	04.09.00
►	CANpressure	595	04.10.00
►	M-THERMO96 16	593	01.03.01
►	SIM-STG	519	04.10.00
►	M-Flow	519	04.10.00

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

X module	Base Type Number	Firmware
Mx-SENS(2)8	911	02.15.03
Mx-SENS2-4	916	02.15.03
► Sx-STG	920	02.15.06
Mx-STG2 6	912	02.15.04
Mx-SENS2-4 FAST	917	02.15.03

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

6.5.1 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	~	٧	-100,000	100,000
<u>59104791</u>	4		59104791_3	~	V	-100,000	100,000
57811010	8		59104791_4	~	V	-100,000	100,000
		G	eneral Extende		rmation		
		G	Active:	~			
		G	Active:				
		G	Active:	~			
		G	Active:	~			
		G	Active: Name: Description:	✓ 59104791			

General tab sheet

Active Here you can activate or deactivate the module.

ware. 0,2cm

- Name Here you define the name of the module. The default name is based on the serial number.
- Description
- Reference
- Comment
- Sampling rate

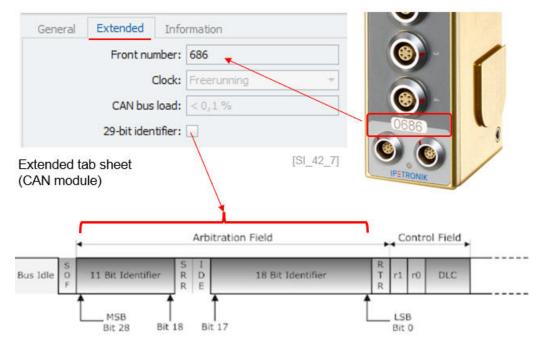
Leve you define the name of the module.

Here you can define an individual comment.

Here you can define an individual description for the module The reference is automatically generated and defined by the soft-

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.

6.5.2 Extended tab sheet – 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

6.5.3 Extended tab sheet – 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.

6.5.4 Information tab sheet

General	Extended	Information
	Calibration d	ate: 21.09.2021
	Hardware ver	sion: 03.20.00
	Firmware ver	sion: 04.15.00
3	License informa	tion: TEDS
Informatio	n tab sheet	[SI 42 9

- 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.

a 🗐 57799999	MULTIdaq	General Extended	Cluster Inf	ormation
Channel_01_16	THERMO	Serial numb	er: 57799	999
Channel_17_32	THERMO			
Channel_33_40	SENS	Maximum cluster s	ize: 4	
MultiDAQ & M-SENS24	FRQ	Device level	ormation	Cluster Information
cluster information		Serial number: Maximum cluster size:	57799999	
		Device position:	1	
		Module of the 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		

6.5.5 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.

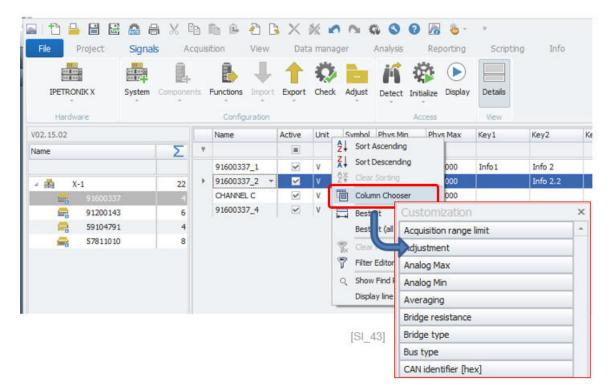
NFORMATIO	N		License key	from myIPE	website	
Produkt:	M-SENS2 250 - TEDS	Freischaltschlüssel: ASY1G-DS505-Z102Z-RHRCS-	100GS-10004-E0	000-00000-000	000-00000)
rstellt am: erien-Nr.:	2021-12-23 59104791					
IPEmotion -	Licensing		×			
License key ASY 1G-DS505-7	102Z-RHRCS-100GS-10004-E0000	-00000-00000-00000	General	Extended	Information	
License informat			-	Calibration da	te: 21.09.	2021
Professional-Edi	tion:		-	Hardware versi	on: 03.20.	00
IPEmotion				Firmware versi	on: 04.15.	00
Active license: The device ha	s to be powered off and on again	to activate the changes. a hardware detection or synchronisation.	•	License informati	on: TEDS	<u></u>
			Modul	e license upd	ate	[SI_42_
			-			
Assign	Read from dongle Read	from dipboard Close				

TABELLE Module mit Lizenzen

6.6 Channel configuration

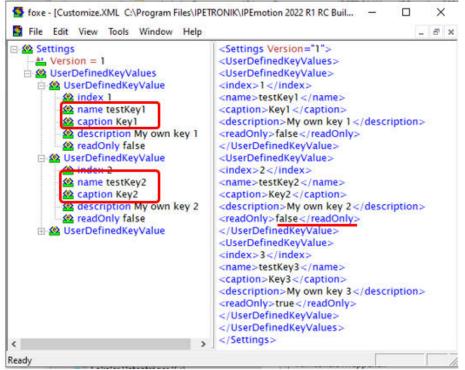
6.6.1 Column chooser in the channel grid

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.



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 R1\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".

File Project	Signal		lisition	Viev		a mana		Analys		neporting	* Scripting	6
	System	Components	Functions	Impo	÷	Check	Adjus	t Detec	t Initial		Details	
V02.15.02					Name		Active	Unit	Symbol	Phys Min	Phys Max	S
Name			Σ	٩						1		
				+	91600337	1 -	-	l.v	L AV	100.00	100.000	×
⊿ 🏯 X-1			22		91600337	_2	Inde	stomiza	DOUL	_/_		-
91600337	7		4		91600337		Info			/		
91200143	1		6		91600337	_4	Info		1			-
59104791			4				Inp		1			
57811010	1		8				Key	1	/			
							Key	2	-			ר
							Key	3				
							LSB					
							Mez	suring po	int number	or.		~

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

6.6.2 General tab sheet

This tab sheet covers general channel settings

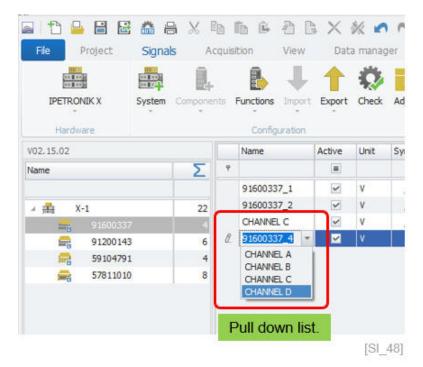
General Form	t Scaling Display Excitation Filter Data	a output Characteristic curve
Active	V	
Name	91600337_1	
Description	Analog acquisition input for voltage/current	
Reference	91600337_1/////91600337/X-2	
Comment		
Sampling rate	1 kHz *	

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.

6.6.3 Defining list box entries of channel names

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

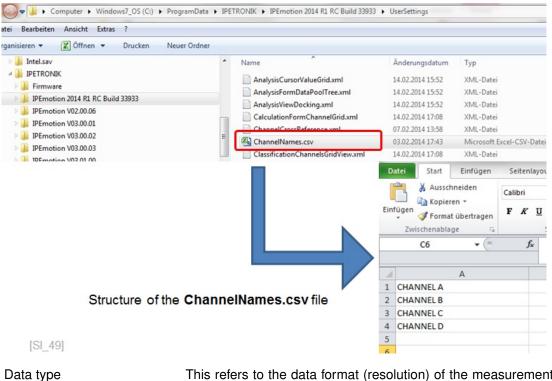


The entries of the pull down menu are stored in a CSV file with the name (ChannelNames.csv) in the following user settings directory.

C:\ProgramData\IPETRONIK\IPEmotion 2022 R1\UserSettings

6.6.4 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 typ	e							
	Type:	16-Bit inte	ger signed		•	Task:	Default	-
NoValue	/ DefaultVa	lue						
	Value:	-FullScale			-	Deactivate	NoValue and use Default Value	
Channel	type							
	Input:	¥		0	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 typ	e					
	Type:	16-Bit integ	ger signed		7-	Farmal and be
NoValue	/ DefaultVal	16-Bit inte	ger signed ger unsigne	d		Format can be changed e.g. to
	Value:	8-Bit integ				increase the 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	e.							
	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	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".

		X		46)	- *×						
File Project	Signals	Acc mponer	quisition	Export Check	Adjust	K	Analysis Initialize Access		Scripting	Info	
01.01.00.35137 RC		1	Name		Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling rate
lame	Σ	٩									
		+ 5	Sound Input C	nannel							
🤹 Sound system	0								Special tas for correct	sk "Audio r audio reco	
Sound system	0	Gen		t Scaling	Display	Channel	settings				
g Sound system	0		a type	t Scaling e: 16-Bit intege		Channel	settings	Task: Audio	for correct		
g Sound system	0	Dat	a type	e: 16-Bit intege		Channel			for correct		
g. Sound system	0	Dat	a type Typ /alue / Default	e: 16-Bit intege		Channel		Task: Audio	for correct	audio recc	
Souriu system	0	Dat No/	a type Typ /alue / Default	e: 16-Bit intege Value		Channel		Task: Audio	for correct	audio recc	
Souriu system	0	Dat No/	a type Typ Value / Default Valu annel type	e: 16-Bit intege Value				Task: Audio	for correct	audio recc	

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
Fée Project Signals Acquisition Image: Signals Acquisition Image: Signals Acquisition Image: Signals Acquisition Image: Signals Acquisition Image: Signals Acquisition Image: Signals Image: Signals Image: Signals Acquisition Image: Signals Image: Signals Image: Signals Image: Signals Acquisition Image: Signals Image: Signals Image: Signals Image: Signals Image: Signals Acquisition Image: Signals Image: Signals Image: Signals Image: Signals Image: Sign	View Data manager Analysis Repc View Data manager Analysis Repc Index Time_Hit Solit556_1 Temp No Value0.laid No Value0.laid No Value0.laid 26 10.02.2014 14:57:47,916 23,88 27 10.02.2014 14:57:59,916 23,88 29 10.02.2014 14:57:59,916 23,88 30 10.02.2014 14:57:59,916 23,88 31 10.02.2014 14:57:59,916 23,88 31 10.02.2014 14:57:59,916 23,88 31 10.02.2014 14:57:59,916 23,88 31 10.02.2014 14:57:59,916 23,88 31 10.02.2014 14:57:59,916 23,88 31 10.02.2014 14:57:59,916 23,62 35 10.02.2014 14:57:59,916 23,62 36 10.02.2014 14:57:59,916 23,62 36 10.02.2014 14:57:59,916 23,62 36 10.02.2014 14:57:59,916 23,62 37 10.02.2014 14:57:59,916 23,62 38 10.0	File Project Signals Acquisition View Data manager Analysis Reporting Scripting Info Load Remove New Page New Page New Page New New
Properties General	40 10.02.2014 14:58:01,916 23,35	14:57:45 14:57:55 14:58:05 14:58:15
Name No Value0.lad Charnel count I Start time 10.02.2014 14:57:21 Stop time 10.02.2014 14:57:21 User-defined parameters • Company IPETRCNIK SeriaNumber Manufacture1D Project IPEspeed	42 10.02.2014 14:58:03,916 NoVabe 43 10.02.2014 14:58:04,916 NoVabe 44 10.02.2014 14:58:05,916 NoVabe 45 10.02.2014 14:58:05,916 NoVabe 46 10.02.2014 14:58:05,916 NoVabe 47 10.02.2014 14:58:05,916 NoVabe 48 10.02.2014 14:58:09,916 NoVabe 49 10.02.2014 14:58:09,916 NoVabe 49 10.02.2014 14:58:10,916 NoVabe 49 10.02.2014 14:58:10,916 NoVabe 49 10.02.2014 14:58:10,916 NoVabe 40 10.02.2014 NoVabe 40 10.02.2014 NoVabe 40 10.02.2014 NoVabe 40 10.02.2014 NoVab	NoValue is stored in the data file. [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 typ	e							
	Type:	16-Bit integ	ger signed		*	Task:	Default	Ŧ
NoValue	/ DefaultVa	lue						
	Value:	+FullScale				Deactivate	e NoValue and use Default Valu	Je
Channel	type							

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 🗈 🔒 🗄 🛍 🛲 🗄 🗶 🏗 🛍	È 🎝	B × 🗶 🖬 🗠	🍈 🌯 🔋 🌆		🔏 🖪 li	i E 🌢 🖡	× % •	~ ~	8 8 M	IPEspeedDem.	- • ×
File Project Signals Acquisition	View	Data manager Ana	alysis Reporting	File Project Signals	Acquisition	View D	ata manager	Analysis	Reporting	Scripting	Into 💮 🔮
8 🖓 🦓 🖫 🔲				Load Remove New Page-	-1 Fix	Undo grid Area	y-t chart	Move	Back Syn	c Optimal Origi	inal 1 Cursor
Load Remove Export Excel Tree				Files Screens		Layout	Elements		Zoom	Scaling	
				Loaded measurement files	1600						
Files External View				Pages Loade Display							
Loaded measurement files		Detailed info	rmation on the loaded	Name	1400-			•			
Name View	Index	Time_1Hz +FullScale0.iad	56001556_1 Temp +FullScale0.iad	+ FullScale0.iad	1200-		1				
		3 10.02.2014 15:44:46,646	23.35	✓ 56001556_1 Temp							
🛪 😫 +FullScale0.iad 🔽		4 10.02.2014 15:44:47,646			800-						
✓ 56001556_1 Temp		5 10.02.2014 15:44:48,646	23,44		600-			-			
		6 10.02.2014 15:44:49,646	25,19		400-			-			
		7 10.02.2014 15:44:50,646	24,49		200-						
		8 10.02.2014 15:44:51,646	24,49		0						
		9 10.02.2014 15:44:52,646	1370,00								
	1	0 10.02.2014 15:44:53,646	1370,00		-200 -						
	1	1 10.02.2014 15:44:54,646	1370,00								
	1	2 10.02.2014 15:44:55,646	1370,00	+FullScale is sto	pred						
Properties		3 10.02.2014 15:44:56,646		in the data file.							
General A		4 10.02.2014 15:44:57,646				_					
Type DataGroup	1	5 10.02.2014 15:44:58,646				15:44:45	15:4	5:00	15:45	:15	15:45:30
Name +FullScale0.iad		6 10.02.2014 15:44:59,646			- 560	01556_1 Temp					
Channel count 1	_	7 10.02.2014 15:45:00,646									
Start time 10.02.2014 15:44:43		8 10.02.2014 15:45:01,646			Data	points	show +	FullSo	cale (1	370 °C)	
Stop time 10.02.2014 15:45:30		9 10.02.2014 15:45:02,646									
User-defined parameters *		0 10.02.2014 15:45:03,646		The value of +Fu	liscal	e is der	ending	on th	e conf	iaured	
Company IPETRONIK		1 10.02.2014 15:45:04,646					-			9	[SI_58]
CariaMumbar	2	2 10.02.2014 15:45:05,646	23,70	measurement ran	ige in	me sca	ing cal	cualto	1.		

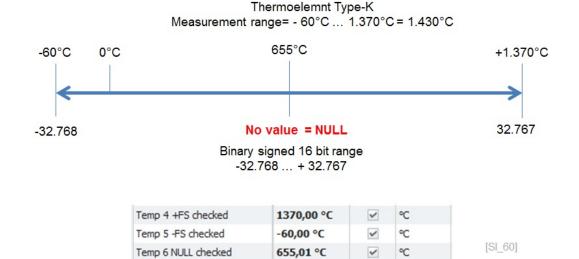
Default Value Null

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

	🛲 🗄 🔏 🛍	i C <u>è</u>	× %		à	IPEmotion	
File Project	Signals Acquisit	ion View	Data manager	Analysis Re	eporting Scrip	ting Info	1
			00	:00			
Stop Store Pause	New Page-1	Fix Undo grid	Area Alphan	umerical Tree			
Control	Screen pages	Layout	Elem	ents View			
Pages	Ten	np 1 +FS		Temp 2 -FS		Temp 3	NULL
Pa Ch Di	No	Value	1	VoValu	Je	NoVa	alue
Overview Page-1	Temp 4	+FS checked		Temp 5 -FS che	cked	Temp 6 NULI	L checked
	137	70,00		-60,0	0	655	,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 type	e									
	Type:	16-Bit intege	er signed		-	Task:	Default			-
NoValue /	/ DefaultVa	lue								
	Value:	Null			* 🗸	Deactivate	e NoValue and	use Default Value	•	
Channel t	type									
	Input:	~		OL	itput:					
										[SI_61
New Page-1 F	Fix Undo grid Area Alg	thanumerical Tree			File Project	ct Signals	Acquisition View	Data manager Analysis	Reporting	Scripting I
			,01		Load Remove Files Loaded measureme Pages Load Name	New Page-1 Screens ant files e Display	_	- 🚰 👋	Reporting Back Sync Zoom	

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

IPEmotion_PlugIn_X_V02_15_02

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

S 🗋 블 🗄 🛍 🚛 📇 📈	^e s lis	ie 👌 🔓 🗙 🕺	10 0	1 160 3	? 🗖	= IF	EspeedDemo -	IPEmotion		X
File Project Signals A	cquisition	View Data m	anager	Analysis	Repor	ting :	Scripting	Info	(f)	(
DATAFORTH MAQ - System Compon Hardware	ents Impo Configu	· ·	st Dete	ct Initialize		etails View				
/01.00.01		Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling rate	
Name	Σ۴									
		DIN-5			0	1	0	1	1 Hz	
MAQ20-1-COM4	1	DOUT-6			0	1	0	1	1 Hz	
🔺 🚺 MAQ20-DIO	1 +	DOUT-7	~		0	1	0	1	1 Hz	
f(x) Timer-11	0	DOUT-8			0	1	0	1	1 Hz	
f(x) Timer-12	0 4	DOLT			-	•	0		410-	Þ
	G	eneral Format Scalin	ig Out	out Displa	ay Default					
	D	ata type								
		Type: 1-Bit			Ŧ	Task:	Default		*	
	N	loValue / DefaultValue								
		Value: +FullSc	ale		-	Deactivate	NoValue and use	Default Value		
		hannel type								
		Input: 🗹		c	Dutput: 🗹					

Operated as Input and Output at the same time.

[SI_63]

6.7 Channel Scaling – defining ranges and engineering units

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

Sensor mo	de								
	Mode:	Voltage inclu	uding sensor	excitation		•	Scalin	ng calculator	
Sensor rar	nge								
	Min:	-100	-	Max:	100	Ŧ	Unit:	V	
Physical ra	inge								
	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.

6.7.1 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	*	Scaling calculator
	Thermo element of type T	^	
Sensor range	Thermo element of type E		
Min:	Thermo element of type R		Unit: C
1.11.	Thermo element of type S		onic.
	Thermo element of type B		
Physical range	Voltage		
Mint	Current	-	
Min	-		Unit: °C

6.7.2 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.

	Scaling Display				
Sensor mode					
Mode: Vo	ltage			-	Scaling calculator
Sensor range					
Min: -0	,015 -	Max:	0,015	Ŧ	Unit: V
			0,015		
Physical range			0,05	Defin	e the upper limit for the sensor range
			0,1		
Min: -0	,015	Max:	0,5		Unit: V
_	,015	Max:			Unit: V

6.7.3 Physical range – 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.

Sensor mode			
Mode:	Voltage	•	Scaling calculator
Sensor range			
Min:	-1 🔻	Max: 1 T	Unit: V
Physical range			
Min:	-10	Max: 10	Unit: bar

6.8 Scaling calculator – for advanced scaling functions

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

intry mode: 2-po	oint scaling	Sensor	latabase	Channel settings	
10		Sensor range		Sensor mode: Voltage	*
8-		Min: -1V		Sensor range: -1; 1 V	-
6-		Max: 1V		Min: -1 \	
4		Physical range		Max: 1	
2-		Min: -10 ba	ar	Unit: bar 🔻	
0-		Max: 10 b	ar	Measure value	
2- 0- -2-		Linear equation: y = m	* x + b	1,0	
-4-		Factor: 10			
-6-		Offset: 0		Aalue [V]	
-8-					
				0,0	_
-10 -1,0	-0,5 0,0 0,5 Value [V]	1,0		Acquisition accuracy decimal places:	3 ‡
ysical range				Snapshot 👻	
Min:	-10 bar			Test acquisition	
Max:	10 bar				

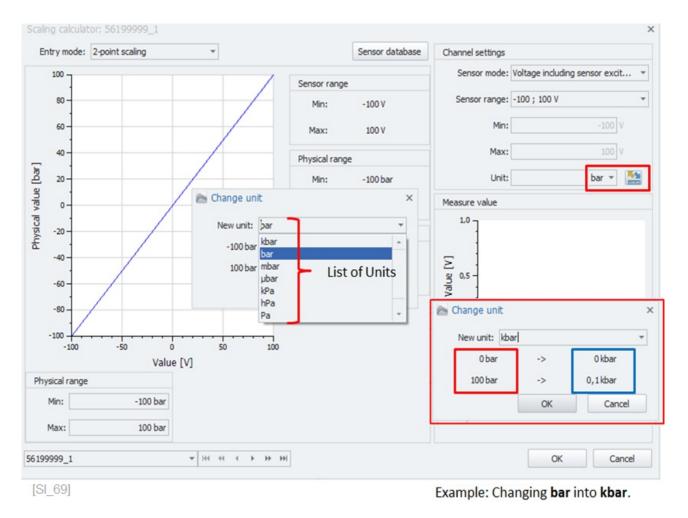
- Sensor mode
- Sensor range
- Unit

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.

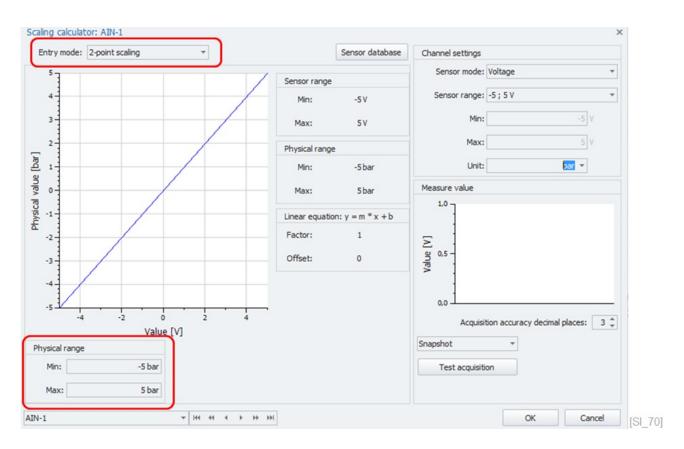
Changing for example:

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

An overview of all supported engineering units can be found in the OPTIONS chapter ??.

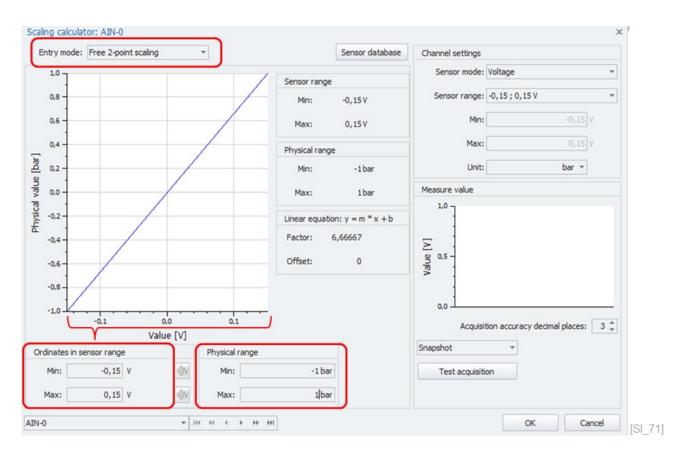
6.8.1 2-point scaling

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.



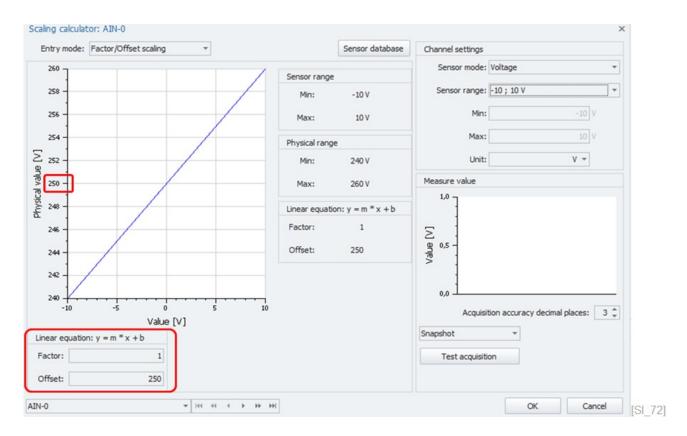
6.8.2 Free 2-point scaling

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



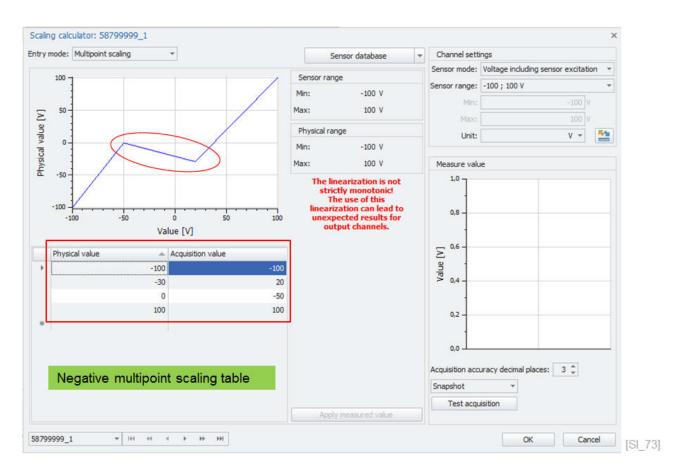
6.8.3 Factor/Offset scaling

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.



6.8.4 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.

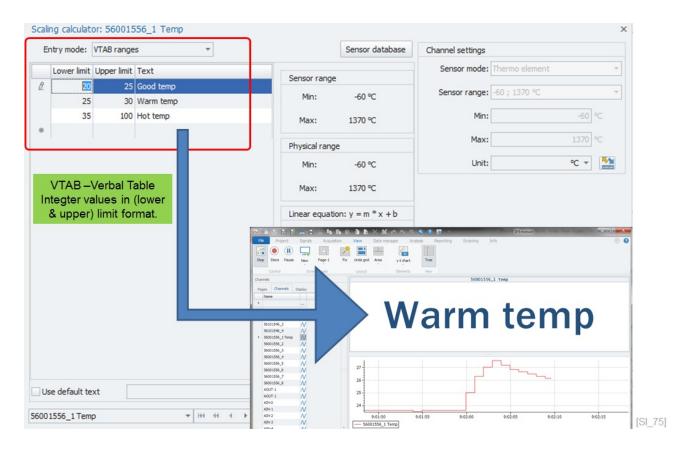
6.8.5 STG Strain gauge

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	~		Sensor databas	e	Channel settings			
<u> </u>	Quarter bridge			-	Sensor mode:	Voltage		*
	Brid	ge factor:	1		Sensor range:	-0,15;0,15V		-
	Poiss	on's ratio:	0		Min:		-0,15 V	
	$\sum_{V_{Exci}}$ Bridge re	esistance:	350 -		Max:		0,15 V	
	/	Excitation:	10 V 👻 ±5 V		Unit:		۷ 🔻	
2 /3/	/ î	k-factor:	2,05					
$\times \times$		Material: Cons	tantan (Cu,Ni)	-				
¥	Si	train Max:	1.000,0 µm/m	-				
Calculated values								
		sor range: rent Max:	± 5,125 mV 28,5714286 mA					
		cal range Physical range		_				
Ordinates in acquisition rang	Ordinates in physical range	Physical ran	ge					
	Ordinates in physical range Min: 0,000 V	Physical ran Min: -292						
Ordinates in acquisition rang			268,293 V					20 20

6.8.6 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.

6.8.7 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.

Lind y mouc	·· VTAB ···	Sensor databa	se Channel settings	
Value	Text		Sensor mode: N	/oltage including sensor excit 🔻
	1 Info 1	Sensor range		100 : 100 V
	2 Info 2	Min: -100 V	Sensor range: -	-100;100v +
	3 Info 3	Max: 100 V	Min:	-100 V
	4 Info 4			
Ø.		Physical range	Max:	100 V
		Min: -100 V	Unit:	V 👻 🍢
	VTAB – Verbal Table	Max: 100 V		
	Integer values	1007		
		Linear equation: y = m * x + b		
		Factor: 1		
		Offset: 0		
		onset: 0		
		Physical range		
		Min: -10	D 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.

6.8.8 Active Sensors

mode: Active sensors] -		Sensor data	ase 🔻	Channel setti	ings		
Sensitivity:	1000	mV - /	1	۷ -	Sensor mode:	Voltage including s	ensor excitatio	n 🔻
Sensor Min:	-100	·			Sensor range:	-100 ; 100 V		
					Min:		-100 V	
Sensor Max:	100				Max:		100 V	
Offset:	0	mV			Unit:		۷ +	51
					Measure valu	Je		
					1,0 -			
Calculated values								
Sensor range Max:	100 V Acquisition	n range Max:	100	u		uracy decimal place	s: 3 Ç	
Sensor range Min:		n range Min:	-100		Snapshot	*		
Sensor range min:			0,00305175781		Test acqu	uisition		

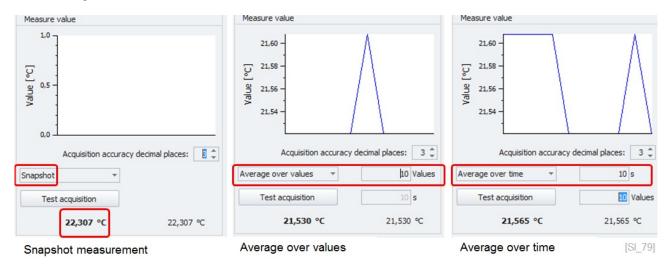
6.8.9 Passive Sensors

ry mode: Passive sensors	T		Sensor database	*	Channel sett	200		
Sensitivity:	1000	mV/V - /	1	۷ *		Voltage including s	ensor excitation	on 🔻
Sensor Min:	1	v			Sensor range:	-1;1V		*
Sensor Max:	-1	v			Min:		-1 V	
Offset:	0	mV			Max:		1 V	-
Excitation:	±1V *				Unit:		۷ -	
					Measure valu	ie.		
					1,0 -	100		
					0.8 - - - - - - - - - - - - - - - - - - -			
Calculated values					Acquisition acc	uracy decimal place	s: 3 ‡	
Sensor range Max: 🛕		range Max:	1 V		Snapshot	*		
Sensor range Min:		n range Min: •. resolution: 3,0	-1 V 05175781E-05 V		Test acqu	uisition		

6.8.10 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



6.9 Sensor database in the scaling calculator

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.

Er	ntry mode:	VTAB ranges 👻		Sensor database	Channel settings		
	Lower limit	Upper limit Text			Sensor mode:	Voltage including sensor excit	Ŧ
0.	1	2 Info 1	Sensor range		Sensor range:	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	
	4	5 T=6- A		100.			

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.

								_	Sensor		
	Name	Manufacturer	Туре	Phys. range	Phys. range (User unit)	Output range	Sensor supply		Manufacturer 1		
9										IPEshunt1 10A	
	HV-Devider	IPETRONIK	Voltage transformer	-200 V +200 V	-200 V +200 V	-2 V +2 V	15 V		Sensor type	Shunt	
	HV-Devider	IPETRONIK	Voltage transformer	-400 V +400 V	-400 V +400 V	-2 V +2 V	15 V		Physical value	-	
	HV-Devider	IPETRONIK	Voltage transformer	-800 V +800 V	-800 V +800 V	-2 V +2 V	15 V		Physical value I Minimum		
	HV-Devider	IPETRONIK	Voltage transformer		-1 kV +1 kV	-2V +2V	15 V		Maximum		
	IPEshunt1	IPETRONIK	Shunt	-10 A +10 A	-10 A +10 A	-1 V +1 V	10 V		Output size	IO A	
	IPESNUNCI		shunt	-30 A +30 A	-30 A +30 A	-1 V +1 V	10 V			Electric voltage	
	IPEshunt2		Shunt	-30 A +30 A	-30 A +30 A	-1 V +1 V	10 V		Minimum	-1 V	
	IPEshunt2		Shunt	-70 A +70 A	-70 A +70 A	-1 V +1 V	10 V		Maximum	1 V	
									Sensor supply		
	Stromzange		Current transformer	-100 A +100 A	-100 A +100 A	-3 V +3 V	10 V		Excitation	10 V	
	Stromzange		Current transformer	-300 A +300 A	-300 A +300 A	-3 V +3 V	10 V		Maximum current	4 mA	
	Stromzange		Current transformer	-1 kA +1 kA	-1 kA +1 kA	-1 V +1 V	10 V		Further properties		
	GTF20midi	GIGATRONIK	Shunt	0 A 20 A	0 A 20 A	0 V 2 V	6 V 15 V		tstemperaturbereich		
	GTF20midi	GIGATRONIK	Shunt	100 mA 19,8 A	100 mA 19,8 A	10 mV 1,98 V	6 V 15 V		Genauigkeit	± 1%	
	GTF20midi	GIGATRONIK	Shunt	0 A 20 A	0 A 20 A	0 V 2 V	6 V 15 V				-
	GTF30midi	GIGATRONIK	Shunt	0 A 30 A	0 A 30 A	0 V 2 V	6 V 15 V				
	GTF40midi	GIGATRONIK	Shunt	0 A 40 A	0 A 40 A	0 V 2 V	6 V 15 V				
	GTF 50 midi	GIGATRONIK	Shunt	0 A 50 A	0 A 50 A	0 V 2 V	6 V 15 V	*			

6.9.1 Adding new Sensors - Sensor Database Editor

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

C:\Program Files (x86)\IPETRONIK\IPEmotion 2022 R1\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 R1\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.

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IPE IPE-S	DBEditor - C:\ProgramDa	ta\IPETF	RONIK\IPEmotion V03.03	1.01\Database\Manufa	cturerNames.xml		TRONIK	VIPEmotion V03.0	01.01\Database\ManufacturerNa
File Edit	t Help	_							
•			🏹 💽 🚺 Imp	ort existing da	ata base and a	idd new sensor.	\mathbf{i}	Serial numb	er & calibration data.
	P924 400 bar absolut P924 400 bar absolut P924 600 bar absolut P925 0,1 bar relativ		general userproperties	elected sensor: new Sens	sor		genera	al userproperties	selected sensor: new Sensor specificsensors
⊕ ⊕ ⊕	P925 0,25 bar relativ P925 0,5 bar relativ P925 1 bar relativ P925 2 bar relativ		SensorName Release2014 R1	J		1		ecificSensor 1	delete
÷.	P925 3 bar relativ P925 4 bar relativ P925 5 bar relativ		sensorTypeId VoltageTransformer	SensorType Volt	SensorManufacturer FOT			014-02-11	
	P925 2 bar absolut P925 6 bar absolut P925 10 bar absolut		PhysicalUnitName mm -	PhysicalMin 0	PhysicalMax 100			CalibrationDate — Z available	
	P925 10 bar absolut P925 16 bar absolut P925 40 bar absolut P925 100 bar absolut		OutputUnitName	OutputMin 1	OutputMax 10			Day Month	Year 2015 •
	P925 100 bar absolut P925 200 bar absolut P925 400 bar absolut P925 600 bar absolut		SensorSupply SensorSupplyMin	SensorSupplyMax	1			CalibrationValidDura	ation
	RPT410V VF563AA		10	20				days 0	months years
⊕ ⊕ ⊕	VF563A VF563B VF563J			ReferenceSensorSupp 10		SensorSupplyCurrent 20		physicalMin	physicalMax
	VF563K VF563C VF563F							prysical-an	priyskamax
÷	Release 2014 R1	•						outputMin	outputMax

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.

	neader here to group by	that column								Sensor type properties	Sensor specific
										Sensor	
Vame	Manufact	Туре	Serial number	Favo	. Phys. v	. Phys. range	Phys. rang	Output range	Sensor supply	Manufacturer F	от
	F									Name R	telease2014R1
Release 20	14R1 FOT	Voltage transformer			Length	0	n 0 m 100 mm	1.1. 10.1	10 V 20 V	Sensor type V	loltage transformer
					-					Physical value	
Release 20	14R1 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 Le	ength
										Minimum 0	m
			L.	Jow	Sense	or is inclu	Ided			Maximum 1	.00 mm
										Output size	
		0.0		In	the s	ensor lis	t. –			Output size E	lectric voltage
										Minimum 1	V
										Maximum 1	0 V
_					_					itation dependant T	
g calculat	tor: 56199999_1	X	V						×	ference excitation 1	
	2-point scaling	▼ Release 201	+R - 2014-02-1		Sensor data	have the	and a strength			Sensor supply	
ry mode:	2-point scaling	release201	+R - 2014-02-1		sensor data	sbase Char	nnel settings			Excitation 1	0 V 20 V
00 -			1	-			Sensor mode: Ve	oltage including	sensor excit *	Maximum current 2	
		/	Sensor r	ange							
1			Min:		0 V	5	Sensor range: 0	; 10 V	*		
80 -			Max:		10 V		Min:		0 V	OK	Cance
							_				
			Physical	range			Max:		10 V		
60 -											
			Min:	-11,	,1111 mm		Unit:		mm 👻 🎦		
1		/				Mon	sure value				0
40 -	/		Max:		100 mm					Sensor type properties	Sensor specifi
							1,0]			Sensor	
			Linear ed	quation:	y = m * x ·	+ b	1			Serial number	2014-02-11
			Factor:	11,	1111					Calibration	
20 -						2				Calibration	Valid
			Offset:	-11,	1111	Value [V]	0,5 -			Calibration date	01 01 2015
						Va	1				
0-										Expiration date	01.01.2017
K	· · · · ·						0,0				
0	2 4	6 8	10				Acquisitio	n accuracy decir	nal places: 3 🌲		
	Value	e [V]									
ical range		N	lew Sen	sorie	s inclu	ded in th	e senso	r list			
_			ion oon		- Interto	abanna					
fin:	-11,1111111 mm						Test acquisition				
	100										
lax:	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.

6.9.2 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.

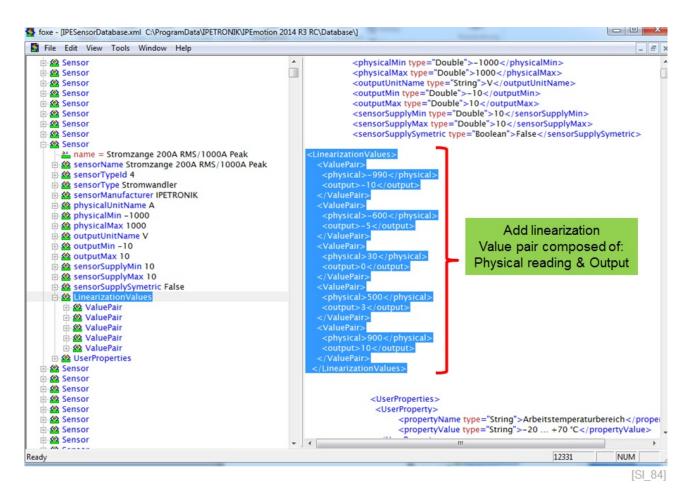
You can add non-relevant information for the functionality of the sensor data base like the working temperature range under the "UserProperties" entry. These are Key/Value pairs, which are used for displaying the information. Please note that these data are not used in any calculation. All the sensor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

6.9.3 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

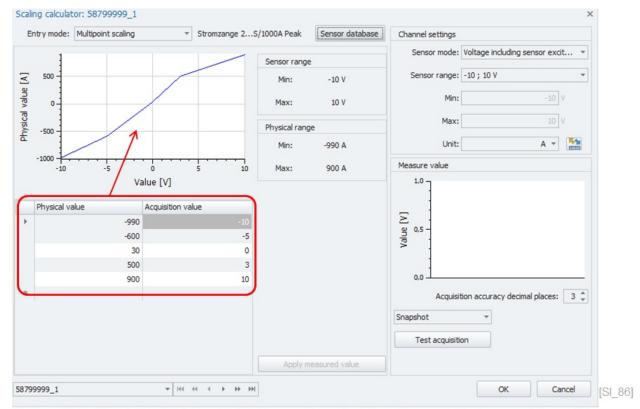
The sensor specific linearization information can only be added through the XML file directly. The Sensor Database Editor and the corresponding CSV/Excel import function is **currently not supporting** this function. When you select a sensor with linearization values they are directly indicated in the 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 Sensor	ensor specific
Name	Manufacturer	Type	Serial number	Favo	Phys. v		IPETRONIK
					-		e Stromzange 200A RMS/100
01	IPETRONIK	Current tra					e Current transformer
					Jex	Physical value	
GTF20midi	GIGATRONIK				Elec	Physical valu	e Electric current
GTF20midi	GIGATRONIK		SN #1		Elec	Minimu	n -1 kA
GTF20midi	GIGATRONIK	Shunt	SN #2		Elec	Maximur	n 1kA
GTF30midi	GIGATRONIK	Shunt			Elec	Output size	
GTF40midi	GIGATRONIK	Shunt			Elec		e Electric voltage
GTF 50 midi	GIGATRONIK	Shunt			Elec		n -10 V
GTF60midi	GIGATRONIK	Shunt			Elec	Maximu	n 10 V
GTF70midi	GIGATRONIK	Shunt			Elec	Sensor supply Excitatio	10.1
GTF80midi	GIGATRONIK	Shunt			Elec	Linearization	1 10 4
GTF 100midi	GIGATRONIK	Shunt			Elec		Multipoint linearization
GTF 125midi	GIGATRONIK	Shunt			Elec		0 -990 A = -10 V
GTF 150midi	GIGATRONIK	Shunt			Elec		1 -600 A = -5 V
GTF200midi	GIGATRONIK				Elec		2 30 A = 0 V
CT 0.1-P	LEM	Current tra			Elec		3 500 A = 3 V
CT 0.2-P		Current tra			Elec		4 900 A = 10 V
	LEM					Further properties	
CT 0.4-P	LEM	Current tra			Elec	vrbeitstemperaturbereic	
CT 0.1-TP	LEM	Current tra			Elec		t 1% ±500mA
CT 0.2-TP	LEM	Current tra			Elec 🗸	Frequenzbereic	DC DIS 1KHZ
					+		

[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.

-	Mana	Manufacturer	Turne	Serial number	Envir	Dhune une	Sensor	
	Name	Manufacturer	Туре	Serial number		Phys. va	Serial number	SN #1
9						<u>^</u>	Calibration	Invalid
	Stromzange 300A	IPETRONIK	Current tra			Elect	Calibration	Li i v cinci
	Stromzange 200A RMS/1000	IPETRONIK	Current tra			Elect	Calibration date Expiration date	
	GTF20midi	GIGATRONIK	Shunt			Elect	Linearization	11.04.2000
ſ	GTF20midi	GIGATRONIK		SN #1		Elect	Linearization	Multipoint linearization
Ľ	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
	GTF50midi	GIGATRONIK	Shunt			Elect		
	GTF60midi	GIGATRONIK	Shunt			Elect		
	GTF70midi	GIGATRONIK	Shunt			Elect		
	GTF80midi	GIGATRONIK	Shunt			Elect		
	GTF 100midi	GIGATRONIK	Shunt			Elect		
	GTE125midi	GIGATRONIK	Shunt			Flect		
						•		

6.9.4 Adding new Sensors – through the Scaling Calculator

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 6.8.

try mode:	2-point scaling *	Sensor database	 Channel settings 	5
250 -		Add settings as a	user-defined sensor	tage including sensor excitation
- 10		Min: 0 V	Sensor range: U	; 10 V
		Max: 10 V	Min:	0 V
200 -		Physical range	Max:	10 V
		Min: 0 A	Unit:	A 👻
		Max: 250 A	Measure value	
≤ 150 - ≌		Linear equation: y = m * x + b	1,0 7	
Physical value [A]		Factor: 25 Offset: 0	0,8 -	
ISA 100 -		Under U		
<u>م</u>			≥ 0,6 -	
50 -		Add sensor to DB.	[X] 0,6 -	
			0,2	
0-	0 2 4 6 8	10	0,0	
	Value [V]			
Physical r				cy decimal places: 3 🌲
Ain:	0 A		Snapshot	v
ax:	250 A		Test acquisit	ion

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	-	
Manufacturer:	LEM	-	
Sensor name:	Current Clamp		
Serial number:	1301		
	OK Cance		[SI 8

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

ra	a column head	er here to gr	oup by that colu	umn				Sensor type properties	Sensor specific
			-		-		1.01	Sensor	
	Name	Manufac	Туре	Serial nu ?	Favo	Phys. range	Ph	Manufacturer	LEM
Ŷ				13				Name	Current Clamp
	Current Cla	LEM	Current tra	1200		0 A 200 A	0/	Sensor type	Current transformer
	Current Cla		Current tra	1301		0 A 250 A		Physical value	
	current cla	LEM	current tra	1301	-	0 A 250 A		Physical value	Electric current
					,		- 1	Minimum	0 A 0
							- 1	Maximum	250 A
							- 1	Output size	
								Output size	Electric voltage
							_ [Minimum	
								Minimum Maximum	0 V
									0 V
c [✓ Starts with([S	erial number], '13')			Edit Fi			0 V

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.

6.10 **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:

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

General Format	Scaling	Display	CAN	Thermo			Signals Ac	hĥŝ	3 B X	anager Analys	S Reporting	Scripting	Info 🔿
Displaying area												Scipcing	2110
Min:	-60,00		/	Max:	1370,00	Stop Store Pause	New Pag		Undo grid Are		Tree		
Formatting Decimal places:	Automatic	Ŧ		~		Channels Pages Channels D		00-					
Name						56101546_1	\sim	00-					
Name:	56001556_	1 Temp				56101546_2 56101546_3 56101546_4 > 56001556_1 Temp		00-					
						56001556_2 56001556_3 56001556_4 56001556_5 56001556_5 56001556_7 56001556_8	~~~~	00-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0		:40 11:07:45	11:07:50	11:07:55	11:08:0
ieneral Format	Scaling	Display	CAN	Thermo			Signals A	The Distance	View Data	Manager Analy	sis Reporting	 IPEmotion Scripting 	Info (*
Displaying area Min:	10,00		/	Max:	40	Stop Store Pause	New Pa	ye-1 Fix	Undo grid A	rea y-t chart Bements	Tree		
Formatting						Channels Pages Channels D	40 isplay	,]					
Decimal places:	Automatic	Ŧ				Name	3:	5					
lame						56101546_1 56101546_2	N 31						
Name:	56001556_	1 Temp				56101546_3 56101546_4 > 56001556_1 Temp	N 25	;					
SI_91]						56001556_2 56001556_3 56001556_4 56001556_6 56001556_6 56001556_7 56001556_8 Status-Storage gro	N 24 N 11 N 11 N 11 N 11		11:09:20 1 Temp	11:09:25	11:09:30	11:09:35	11:09:40
Form	natting				Covers the de will show as								h
► (Dis	play) Na	ame			Covers the c me. The disp The display tions like lim name on the OPTIONS > ¹	blay name i name will n it or range instruments	s only ot be monit	v relev used oring.	ant fo for foi If you	r the VI mulas like to	EW wo and oth see the	rk area er fund displa	a. C- IV
eneral Format	Scaling	Display	CAN	Thermo		File Project		Acquisition		X X A			
isplaying area Min:	10,00			Max:	40,00	Stop Store Pause		*	Fix Undo grid	Area Alphanun			
ormatting						Control Channels Pages Channels	Screen	pages	> Layout	Lieme	ю неж 6001556_1 тет	p_XYZ	
Decimal places:	Automatic	-				Name							
ame						56101546_1 56101546_2	N						

56001556 2 Show instruments display name rather 56001556_4 than the channel name. 56001556_5 56001556_ 01556_ 01556_8 [SI_92]

Define standard decimal templates on module level 6.10.1

Name: 56001556_1 Temp xyz

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

56001556_1 T

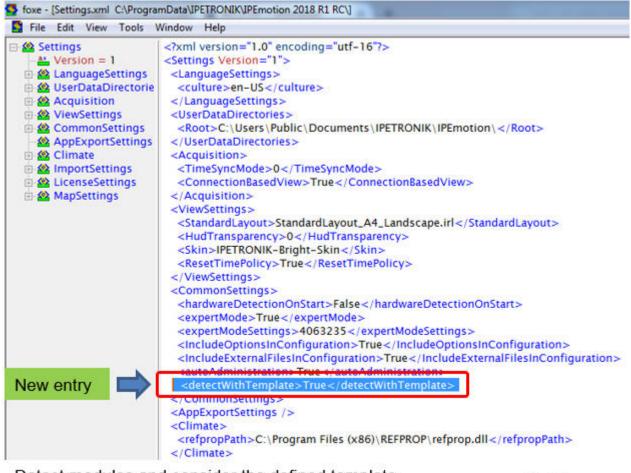
21,78

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 R1\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.

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

[SI 95]

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.

V02.05.01= Name Type ∑ ? 4 ∰ X-1 1095993 N0555152.8 5	Name 91199998_1 91199998_2 91199998_3 91199998_4 91199998_5 91199998_6	Active	Unit V V V V	Phys Min Function Adjust T Use as d	EDS	x
· 曲 X-1 8	91199998_2 91199998_3 91199998_4 91199998_5 91199998_6	K K K	v v v	🔯 Adjust T	EDS	1
· 曲 X-1 8	91199998_2 91199998_3 91199998_4 91199998_5 91199998_6	N N N	v v v	🔯 Adjust T	EDS	1
	91199998_7 91199998_8 Save te	y s	1	Cut Copy Paste Paste be Cean	Ctrl+X Ctrl+C Ctrl+V ctrl+V	,
	ieneral Format Displaying area Min: Formatting	Scaling -100,00	Display	Copy to Paste fro Scaling c Cross re	om file calculator	_

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

[SI_96]

6.10.2 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		[SI 93

6.10.3 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	rmo			
c	AN ID: 15						
	LSB: 0]	Chann	el-specifc	
Motorola f	format:				tab sh	eets	
Overfi	ow bit:						
General Format	Scaling	Display	STG mode	Excitation	Filter	Data output	i i
Hardware filter	o com rg	unpier)				Para andrar	
Hardware filter:	Off		Ŧ				
Software filter							
Type:	Off		Ŧ				
Frequency:	16666,666	Hz	-				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.	. 1
Import		** *	technikmedia Universal Mo	01.02.02	Universal Modbus PlugIn	T
Export		hal	Demo	01.05.00	Generation of demo signals	1
Analysis Maps Directories Units		Оре	n option setting	s <table-cell></table-cell>	Open manual	
Maps Directories		Оре	n option setting:	s 🔓	Open manual	
Maps Directories Units Hotkey		Оре	n option setting:	S 🔓		
Maps Directories Units Hotkey User administration		Оре	n option setting:	S 🔓	Open manual	
Maps Directories Units Hotkey User administration BPEdoud	i Plugin s	etting		S 🔓		
Maps Directories Units Hotkey User administration UPEdoud PlugIns	f Plugin s Specify ti The used	etting: he plugin	is to be used.	ne list. If a version numb		1

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.

IPEmoti	on settings	- IPETRONIK X			
thernet i	nterfaces	CAN interfaces	Options	Components	
Ethernet	hardware d	etection interfaces			
		Detection mode:	Enable all	-	
Enable		IP4 address range		Network interface	
4	192.168.2	32,1-40	Ethernet	3	Address range
	192,168.2	33.1 - 40	Not conne	cted	Address range
	192.168.2	34.1 - 40	Not conne	cted	Address range
	192.168.2	35.1 - 40	Not conne	cted	Address range
			Set all I	P address ranges	

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 selecte	d	*	
Enable		IP4 address range		Network inte	rface	
~	192, 168, 2	32.1 - 40	Ethernet 3			Address range
	192.168.2	33.1 - 40	Not connect	ed	1	Address range
	192.168.2	34.1-40	Not connect	ed	1	ddress range
	192.168.2	35.1 - 40	Not connect	ed	11	Address range
			Set all IP a	address rang	s	
		IP add	ess range			
72			rk: Ethernet	3 🔸	*	
addres	s range	S MA	C: P:	3C-E1-A1-	46-18-FE	
		Metho	d: DHCP		Ţ	
		X-Syste	m:	192.16	58.232.1	192.168.232.4
		DHCP serve	er:	192.168.	232.250	192.168.232.25
		Mask:	255.255.			

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

0	ETH-2: Inactive ETH-3: Inactive ETH-4: Inactive		
	The devices have to be p	owered off and on again to activate the d	hanges.
		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.

		ponents	Options C	CAN interfaces	t interfaces	Ethernet
tes	CAN hardware detection baud rates			tion interfaces	rdware detect	CAN har
1 MBd 🗹	1 MBd	*	lle	on mode: Enable	Detecti	
500 kBd 🗹	500 kBd	CAN bus	Serial	Medium	£)	Enable
250 kBd 🗹	250 kBd	4	d b	+ 0	IPEcan	V
125 kBd 📃	125 kBd	-2 *	6	+ 0	IPEcan	V
100 kBd 🗔	100 kBd	-3 *	d b	7 0] IPEcan	
50 kBd	50 kBd	-4 ··· (6)	б	-	IPEcan	
	Automatic CAN ID placing					Disable
detection:	Activate Auto CAN ID after detection:				DrewTech	
art CAN ID: A	Start CAN ID:			isation mode	vice synchron	CAN dev
		*	nous	Mode: Synchro		

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	on settings - IPETR	ONIK X			
themet i	nterfaces CAN int	erfaces Options	Components		
CAN hard	lware detection interf	aces		CAN hardware detection baud rates	
	Detection mode:	Only selected	*	1 MBd	2
Enable	Medium	Serial	CAN bus	500 kBd	-
	IPEcan *	0 d	CAN-1 *	250 kBd	~
	[IPEcan] ¥	b 0	CAN-2 *	125 kBd [
	IPEcan *	0 d	CAN-3 *	100 kBd	2
	IPEcan *	0 d	CAN-4 *	50 kBd (1
Disable				Automatic CAN ID placing	
	DrewTech *			Activate Auto CAN ID after detection:	~
CAN devi	ce synchronisation mo	ode		Start CAN ID:	
	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.

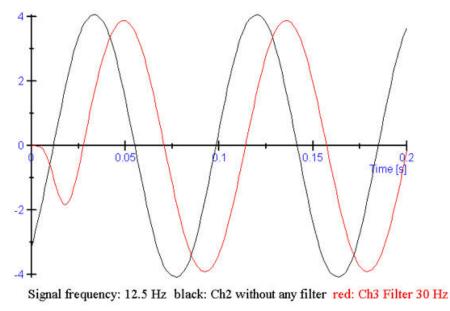
IPErnotion settings - IPET Ethernet interfaces CAN ir		Components			
Aliasing-free filter settings					
Aliasing-free filter sett	ings:	~			
CSV import mode					
CSV import mode:	Default	-			
Calibration interval					
Interval:	No control				
Warning:	30 days before expire	ation 🔻			
TEDS sensors					
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

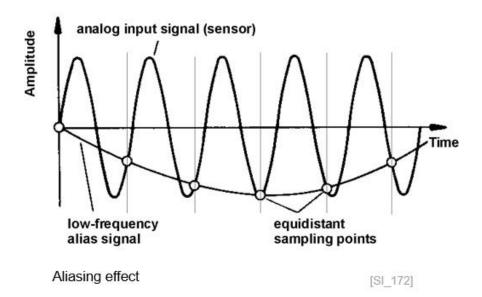
Although today's microprocessors provide a high processing power, the use of hardware filters is still essential. Especially when users cannot exclude that (periodic) signals can pass the AD converter and software filter, which cannot process the signals. Every sampling system follows Shannon's sampling 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 I



7.4 Components

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	net interfaces CAN interfaces	10000
		Priority		Туре
1		Normal	IPETRONIK X	
		Normal	Sx-STG	100
		Normal	Mx-STG2 6	
		Normal	Mx-SENS2.8	0
		Normal	Mx-SENS2 4	
		Normal	Mx-SENS2 4 FAST	
		Normal	M-SENS2	
		Normal	M-SENS2 DSP	_ _
		Normal	M-SENS2 250HZ	
		Normal	M-SENS2 250HZ DSP	
		Normal	M-SENS	Participa -
		Normal	M-SENS DSP	
		Normal	M-SENS 8	[event
		Normal	M-SENS 8 DSP	and the second
		Normal	M-SENS 8plus	(and
		Normal	M-SENS 8plus DSP	1
		Normal	SIM-STG	1
		Normal	M-THERMO2	- 🚘
		Normal	M-THERMO2 HV	-
		Normal	M-THERMO2 u	-
		Normal	M-RTD2	- 6
		Normal	M-UNI2	-
		Normal	M-TDC	man
2		Normal	Mc-THERMO	
	Cancel	OK		

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
	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	

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
DREWTECH	Mongoose
I+ME ACTIA	Basic+24 XS
ETAS	ES581
ETAS	ES593
ETAS	ES595
EthernetSystems	