VMx5 HMI

Installer

Installer manual
VMx5 HMI

9UMENX519-1200
Release: 220128

VMx5 HMI – Installer

1. VMx5 HMI package installation

1.1. Introduction

The VMx5 HMI is the management software package of the modular multifunction VM25 and VM15 systems for machine tools. The application comprises:

- The operator interface through which it is possible to monitor the correct evolution of the processes and functions enabled in the system (automatic balancing, touch detection, in-process measurement of the parts being machined).
- A set of controls at the operator s disposal for working with the system in manual mode
- Parameter programming pages for both the system and each individual function so that the application can be completely customized.
- A set of graphic libraries (OCX, ActiveX, DLL controls) so that display interfaces fully integrated into the host control can be created.

This documentation concerns the installation and use of the VMx5 HMI package starting with version 12.0

1.2. Installation package

The VMx5 HMI is supplied in a package with the following part number:

9HMVMX5xxUSWP0 – VMx5 HMI package with USB 2.0 interface

where “xx” = indicates the software version

The kit supplied includes:

- USB flash drive containing VMx5 HMI and VMx5 Service software with documentation
- USB/BsLink serial converter with drivers for OS ®Windows

The cable to connect the VMx5 control unit to the PC is supplied separately, depending on the required length.

1.3. System requirements

Minimum requirements of the host PC:

- Pentium IV – 1,2 GHz processor or equivalent
- 1 Gb Ram (2 Gb recommended)
- 200 MB Hard Disk free
- VGA graphic card with minimum resolution 640x480 (SVGA 1024x768 recommended)
- 1 x USB 2.0 port free
- TCP/IP protocol installed
- Operating system
  - XP SP2
  - Vista
  - W7
  - W8, 8.1
  - W10
- Additional operating system requirements:
  - Windows installer 3.1
  - Framework .NET 2.0 or 3.5 (depends on release version)
  - Microsoft InteropForm Redistributable Package 2.0
- Other requirements may be necessary on dedicated platforms

1.4. Installation

1.4.1. Installation of the USB-BsLink serial converter driver

The USB-BsLink serial converter comes with a kit including:

- USB-BsLink hardware converter (p/n 9CSUSB23003000)
- USB extension cable
- USB flash drive containing driver and user documentation

To install the driver:

- Insert the USB flash drive containing driver into the USB port of the PC
- Insert the converter into the USB port of the PC
- Wait for the device to be recognised and follow the instructions

Note: refer to the documentation provided in the installation USB flash drive for detailed information

1.4.2. VMx5 HMI installation on a stand-alone PC

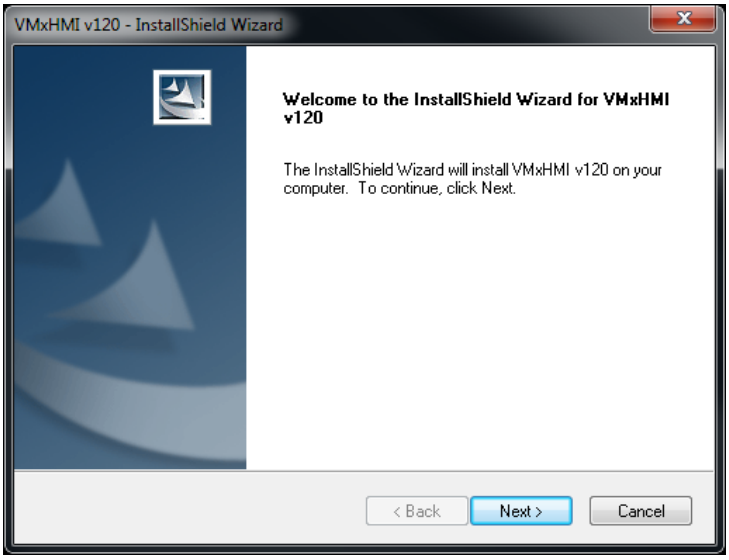
The procedure will install the following components:

- VMx5 HMI application
- Auxiliary Windows components (if necessary)

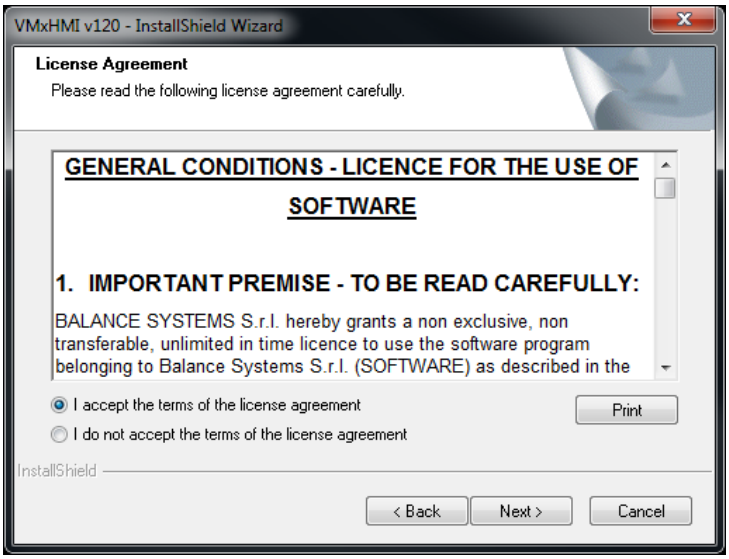
1.4.2.1. Procedure

To install the VMx5 HMI package, plug in the USB flash drive into the USB port of the PC:

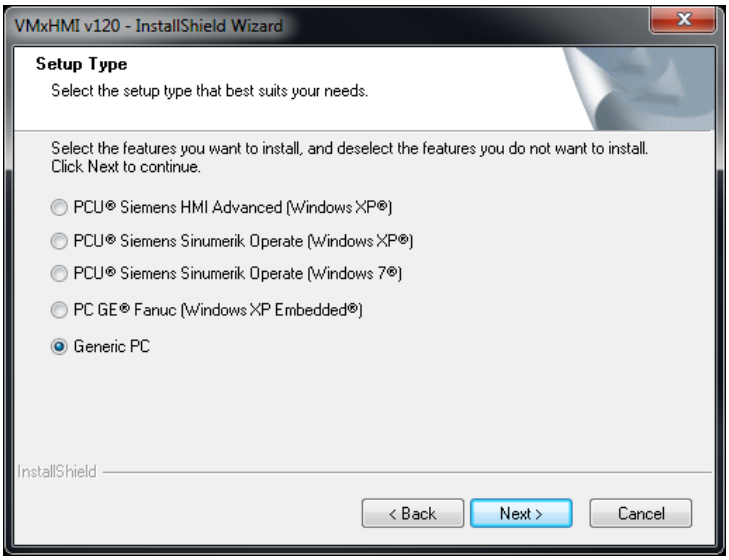
- Click on *Start* in Windows, select **Run…**
- Enter **< Drive>:\HMI v120.yymmdd\Setup.exe** (where: < Drive> is the USB flash drive).
- Continue by following the instruction.



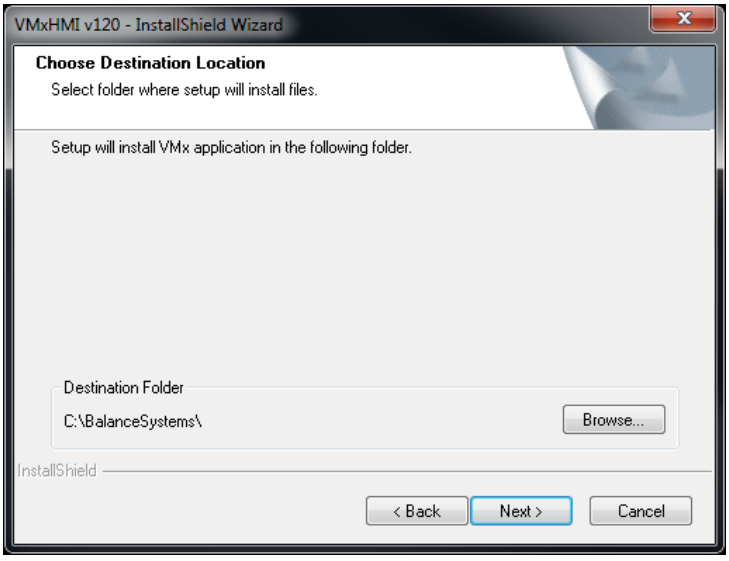
- Read carefully the general conditions of the license for the use of the software and accept them.



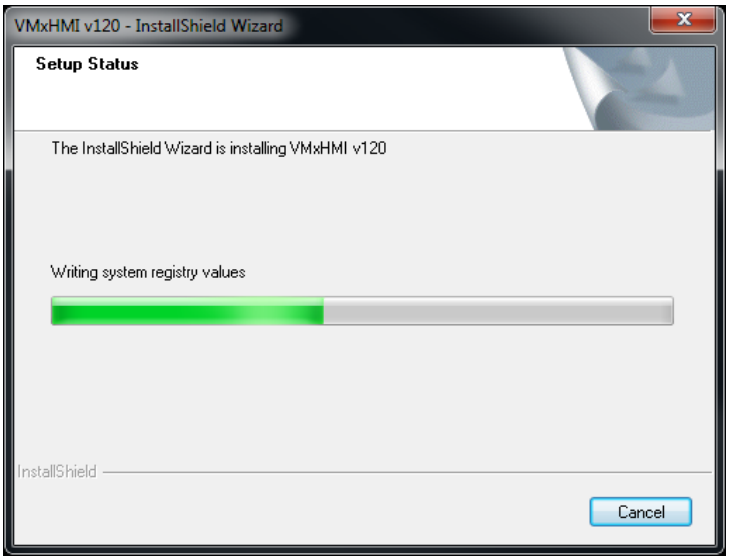
- Select the “Generic PC” option

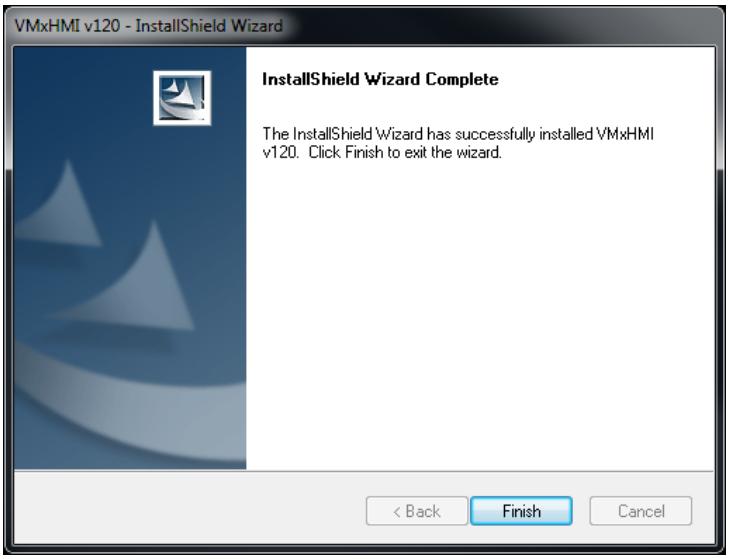


- Select the folder where setup will install files. The default path is C:\BalanceSystems\



- Continue by following the instructions

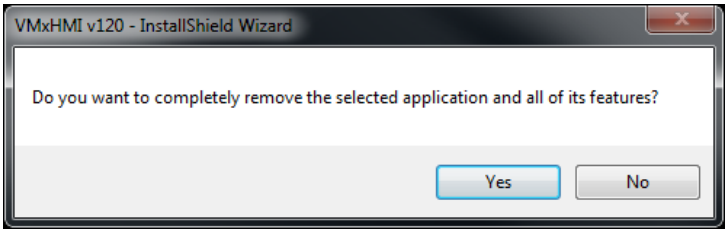




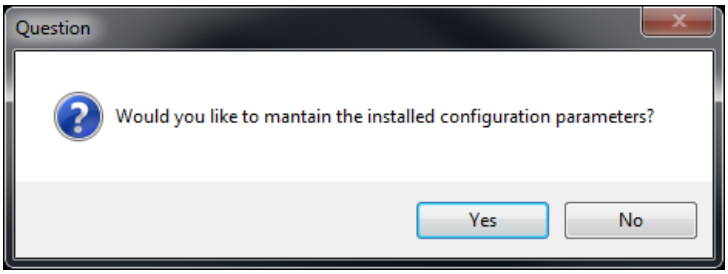
NOTE

- Previous versions of the VMx5 HMI package should be removed before proceeding with the new installation.

- The setup software will allow the user to uninstall previous VMx5 HMI package versions.



- To maintain previous VMx5 HMI configuration parameters, select “Yes”.



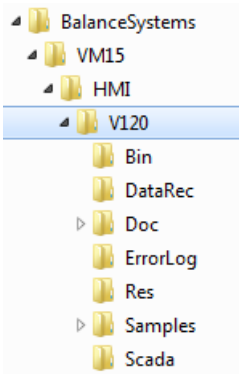
- As an alternative, follow the standard Windows procedures to remove any previous installations of the VMx5 HMI.

  - Click on *Start* in Windows, select Settings and Control Panel
  - Double click on Add/Remove Software
  - Select VMx5 HMI and click on Remove

- When the uninstall procedure is completed, run the setup procedure again and follow the instructions.

1.4.2.2. Folder organization

Structure of the folders after installing in "C:\"



Name	Description
BalanceSystems	OEM folder
VM15	VM15 System folder
HMI	VMx5 HMI application
v120	Version 12.0 folder
Bin	System and Graphic Library files
DataRec	Data recording storage folder
Doc	User documentation
Res	Resources (e.g. Languages)
Samples	Examples for integrating the graphic library
Scada	Communication layer application

1.4.3. VMx5 HMI Installation on machine control ®Siemens PCU

The procedure will install the following components:

- VMx5 HMI application
- Auxiliary Windows components (if necessary)

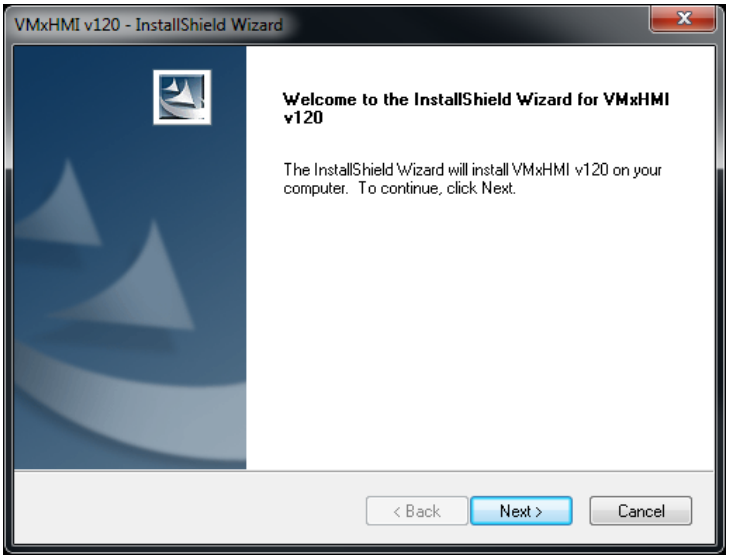
1.4.3.1. Procedure

Start the ®Siemens PCU in WINDOWS mode:

- Turn on the PCU
- During the start phase, press “3” as soon as the white screen with the version indicated in the lower right-hand corner appears
- Enter user ID: “auduser”
- Enter the manufacturer’s password
- Press ENTER

To install the VMx5 HMI:

- Click on *Start* in Windows, select **Run…**
- Enter **<Drive>:\HMI v120.yymmdd\Setup.exe** where: < Drive> is the USB flash drive).
- Continue by following the instruction



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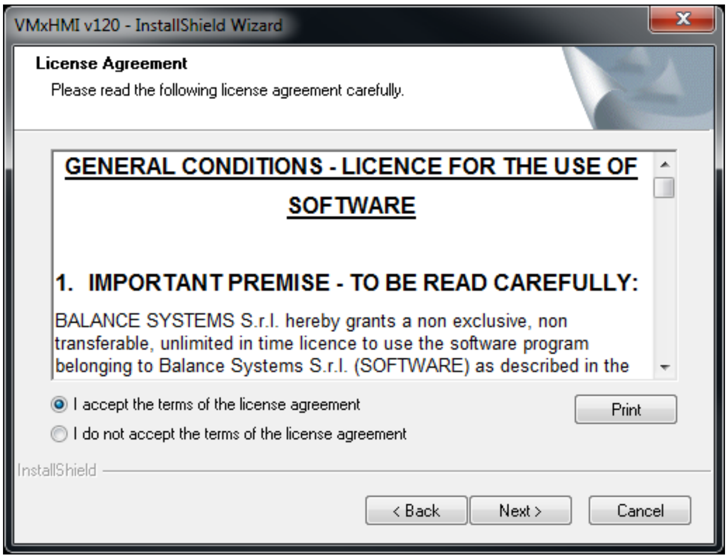
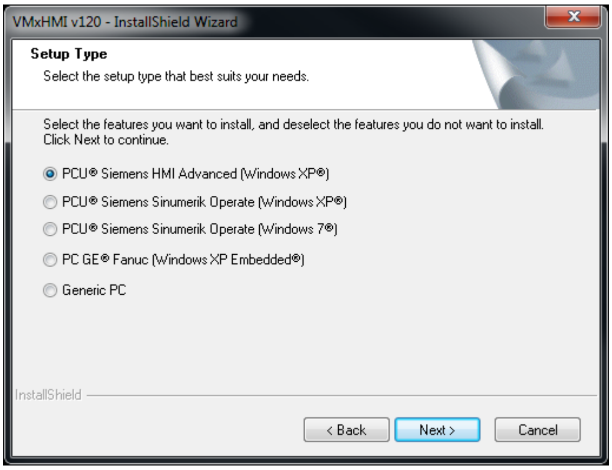
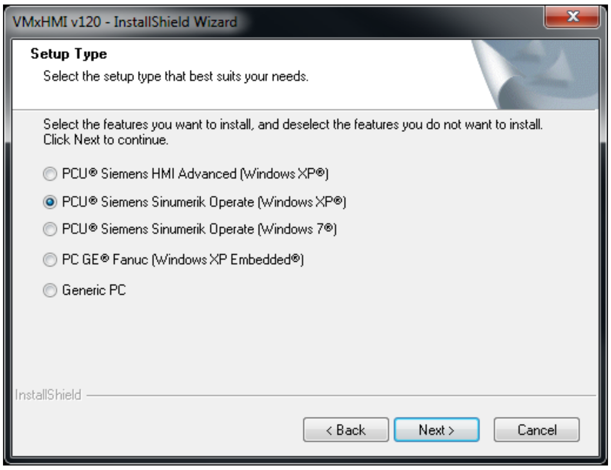
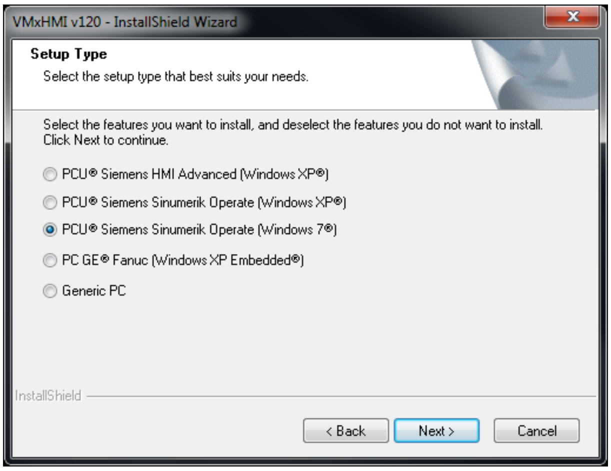


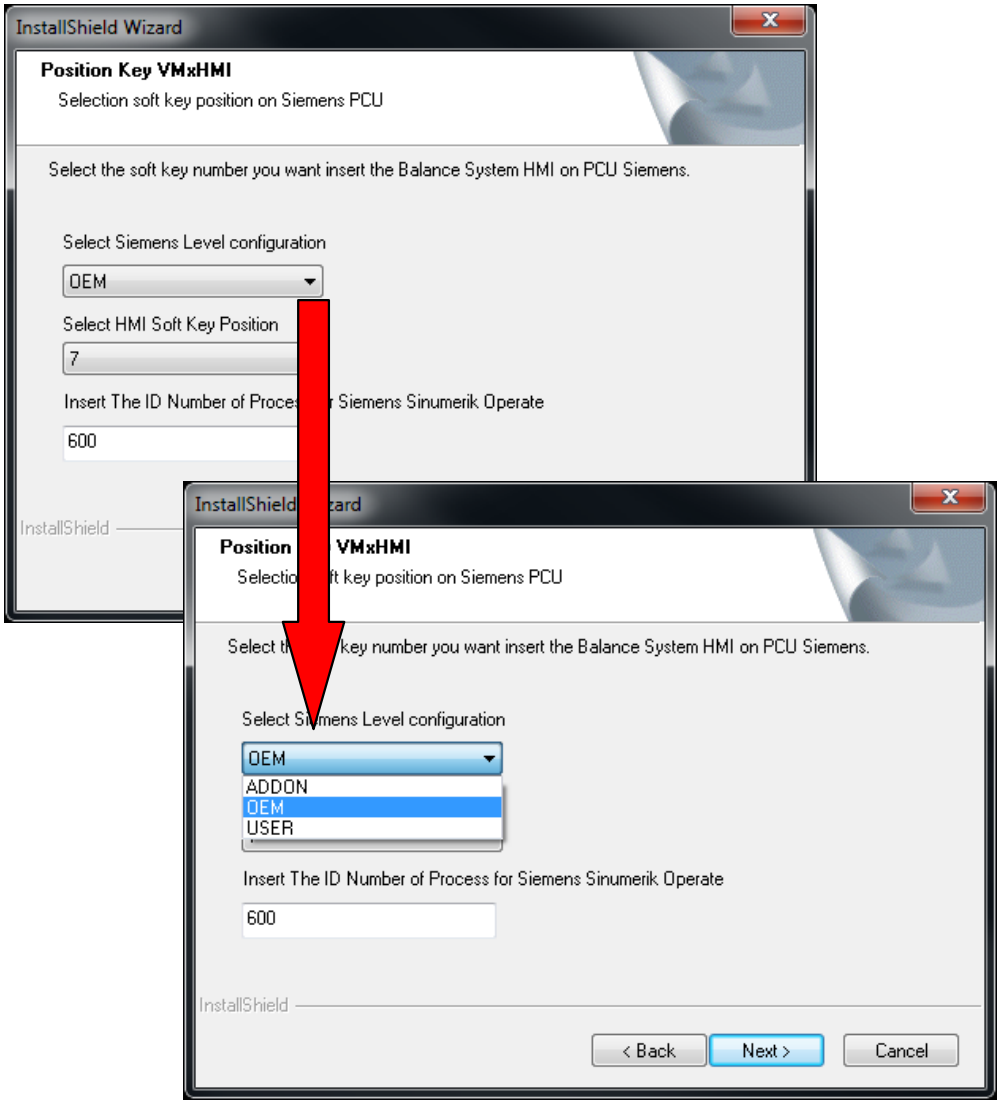
- Select the target of installation:
  - ”PCU Siemens HMI Advanced (Windows XP)”
  - ”PCU Siemens Sinumerik Operate (Windows XP)”
  - ”PCU Siemens Sinumerik Operate (Windows 7)”







- Choose the destination folder:



FOLDER	ADVANCED for Windows XP
	FOLDER PATH
ADDON	F:\add_on\BalanceSystems\
OEM	F:\oem\BalanceSystems\
USER	F:\user\BalanceSystems\

FOLDER	OPERATE for Windows XP
	FOLDER PATH
ADDON	F\hmisl\addon\sinumerik\hmi\BalanceSystems\
OEM	F:\hmisl\oem\sinumerik\hmi\BalanceSystems\
USER	F:\hmisl\user\sinumerik\hmi\BalanceSystems\

FOLDER	OPERATE for Windows 7
	FOLDER PATH
ADDON	C:\... \MotionControl\addon\BalanceSystems
OEM	C:\... \MotionControl\oem\BalanceSystems
USER	C:\... \MotionControl\user\BalanceSystems

NOTE: OEM level is default selected

IMPORTANT: from the selected level depends the view of the installed applications.
The applications installed at highest levels can influence the ones installed at lower levels.
See below the scale of importance of the available levels:

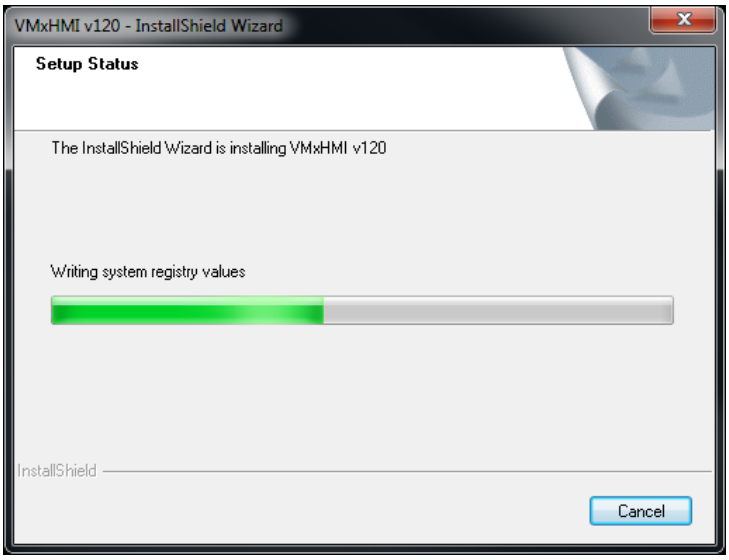
- OEM : Higher level
- ADDON : Intermediate level
- USER : Lower level

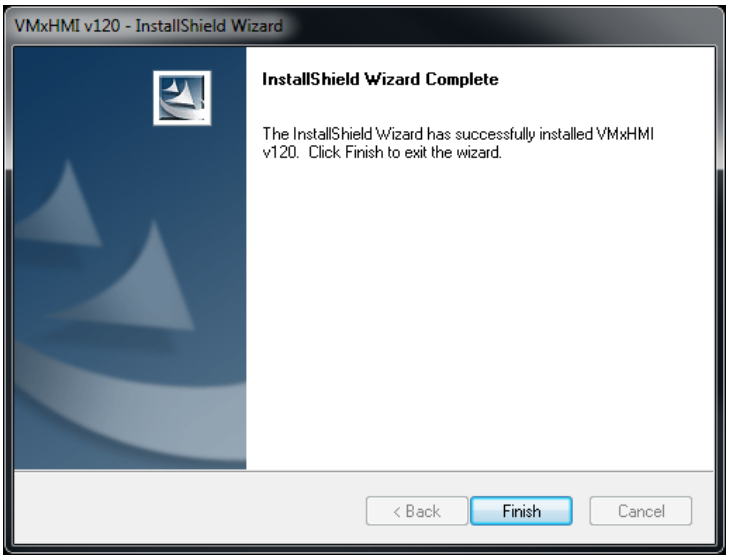
The installer has to make sure that the installation level will not be in conflict to the already installed application levels.

NOTE: on “Siemens Operate” for both Windows XP and Windows 7, the installer can select the ID number process (Default value 600). If not choosen by the installer, the system will re-address ID to another value, pending by the already installed applications.

NOTE: the selection of the softkey (default value 7) has to be taken according to the available space on the Siemens HMI keyboard. See paragraph 1.4.3.4.

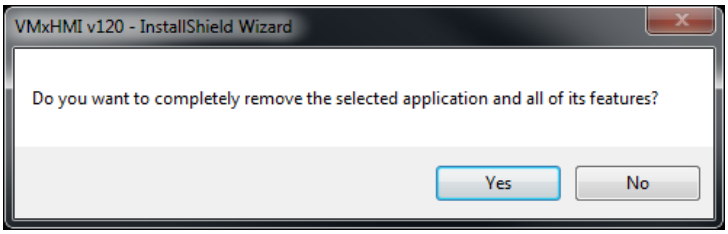
- Continue by following the instruction



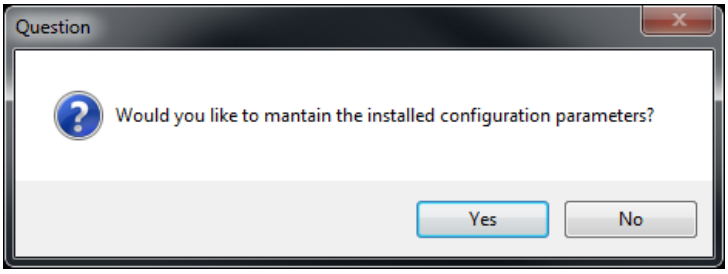


NOTE

- Previous versions of the VMx5 HMI package should be removed before proceeding with the new installation.
- The setup software will allow the user to uninstall previous VMx5 HMI package versions.



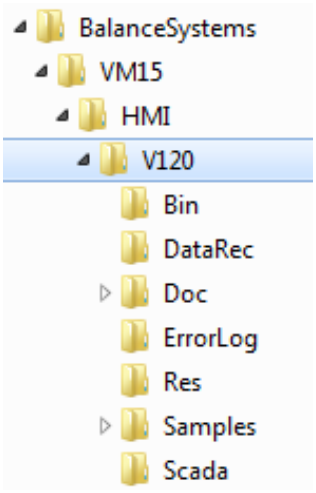
- To maintain previous VMx5 HMI configuration parameters, select “Yes”.



- As an alternative, follow the standard Windows procedures to remove any previous installations of the VMx5 HMI.
  - Click on *Start* in Windows, select Settings and Control Panel
  - Double click on Add/Remove Software
  - Select VMx5 HMI and click on Remove
- When the uninstall procedure is completed, run the setup procedure again and follow the instruction.

1.4.3.2. Folder organization

Structure of the folders after installing in "F:\...\BalanceSystems\..."



Name	Description
BalanceSystems	OEM folder
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Bin	System and Graphic Library files
DataRec	Data recording storage folder
Doc	User documentation
Res	Resources (e.g. Languages)
Samples	Examples for integrating the graphic library
Scada	Communication layer application

1.4.3.3. Integrating VMx5 HMI inside ®Siemens HMI – Sinumerik Advanced

The VMx5 HMI application can be started directly in the ®Siemens HMI – Sinumerik Advanced by assigning a special softkey.

- Enter the following instructions in the TaskConfiguration section of file F:\Add_on\Regie.ini to associate for instance starting VMx5 HMI with the horizontal softkey "7"

  [TaskConfiguration]
  Task7 =
  name :=OEMFrame,
  CmdLine:="F:\\Add_on\\BalanceSystems\\VM15\\HMI\\v120\\BSVM15HMI.exe -hosted",
  ClassName :="",
  WindowName :="BSVM15 HMI",
  Timeout :=20000,
  Preload :=False

- Enter the following instructions in the "HSoftkeyTexts" section of the file F:\ Add_on\ Language\ RE_en.ini (and in all those of the recognised languages)

  [Hsoftkey Texts]
  HSK7 = "VM15 HMI"

- In some ®Siemens HMI version it is also necessary to add the following section in the file F:\Add_on\OemFrame.ini

  [BSVM25HMI]
  nSwitchToTaskAfterTermination=-2
  nInitShowMode=3
  nShowMode=3
  fforcetaskfocus=1

In this way the application will always be at the operator's disposal and will be closed only when the ®Siemens HMI is closed.

NOTE

The templates for Regie.ini, Re_xx.ini and OemFrame.ini are supplied as text file in the following installation path:

F:\Add_on\BalanceSystems\VM15\HMI\v120\Samples\Siemens\Add_on\Regie.txt
F:\Add_on\BalanceSystems\VM15\HMI\v120\Samples\Siemens\Add_on\Language\Re_xx.txt
F:\Add_on\BalanceSystems\VM15\HMI\v120\Samples\Siemens\Add_on\OemFrame.txt

To complete the installation on Siemens HMI follow this procedure:

Regie.ini

- Open the text file Regie.txt
- Open to edit the ini file F:\Add_on\Regie.ini, if this file does not exists, create it.
- Copy the complete contents of the **[TaskConfiguration]** section from Regie.txt to F:\Add_on\Regie.ini file
- Assign the desired Task number (i.e. **Task7**, as shown in the example above)
- Save the updated F:\Add_on\Regie.ini file

Re_xx.ini

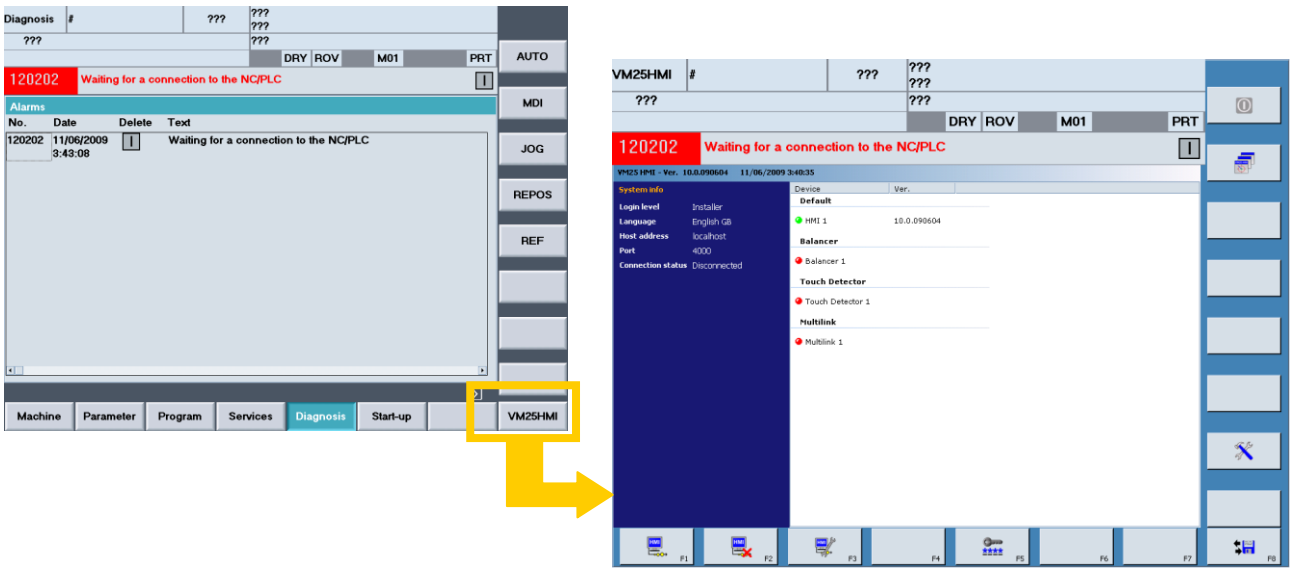
For each user language:

- Open the text file Re_xx.txt

- Open to edit the language file F:\Add_on\Language\Re_xx.ini, if this file does not exist, create it.
- Copy the complete contents of the **[Hsoftkey Texts]** section from Re_xx.txt to F:\Add_on\Language\Re_xx.ini file
- Assign the same softkey number reserved in the Regie.ini file (i.e. **HSK7**, as shown in the example above)
- Save all the updated F:\Add_on\Language\Re_xx.ini file

OemFrame.ini

- Open the text file OemFrame.txt
- Open to edit the ini file F:\Add_on\OemFrame.ini,
  - if this file does not exist, copy OemFrame.txt as OemFrame.ini in the F:\Add_on folder.
  - if the file already exists copy the complete contents of the **[BSVM15HMI]** section from OemFrame.txt to F:\Add_on\ OemFrame.ini file.
- Save the updated F:\Add_on\ OemFrame.ini file



1.4.3.4. Integrating VMx5 HMI inside ®Siemens HMI sl – Sinumerik Operate

The VMx5 HMI application can be started directly in the ®Siemens HMI sl – Sinumerik Operate by assigning a special softkey.

The VMx5 HMI installation package will provide for the complete integration of the configuration files assigning the horizontal softkey No. 7 by default.

In case of different customization, follow the instruction below.

Activating

Proceed as follows to enable the Service Desktop:

1. As soon as (1) is displayed under the version number on the bottom right of the startup screen, press the key “3”.

Display during startup of the SINUMERIK 840Di sl

2. Enter the manufacturer password
3. Click the “Service Desktop” button in the displayed selection menu or press the “Return” key

Integrating VMx5 HMI application into HMI sl

Generally, applications are selected using a softkey in the area switchover bar. The operating software is started and controlled from an application called System Manager. This System Manager also handles the control of the OEMFrame applications.
The System Manager is configured using the “systemconfiguration.ini” configuration file.
Below the example for the configuration procedure.
NOTE: the folder can vary pending by the selection made (see paragraph 1.4.3.1).

a. Creating a configuration file **systemconfiguration.ini**

   Open folder: **F:\hmisl\addon\sinumerik\hmi\cfg**

   Edit: **systemconfiguration.ini**

b. Contents of **systemconfiguration.ini (Siemens Operate for Windows XP)**

```
[processes]
PROC600=process:=BSVM25HMISYS,
cmdline:="f:\hmisl\addon\sinumerik\hmi\BalanceSystems\..
..\VM15\HMI\V120\BSVM25HMI.exe -hosted", oemframe:=true, deferred:=true,
windowname:="BSVMx HMI"

[areas]
AREA600= name:=BSVM25HMI, process:=BSVM25HMISYS, panel:=SlHdStdHeaderPanel
```

Contents of **systemconfiguration.ini (Siemens Operate for Windows 7)**

```
[processes]
PROC600=process:=BSVMxHMISYS,
cmdline:="c:\ProgramData\Siemens\MotionControl\oem\BalanceSystems\VM25\HMI
\V120\BSVM25HMI.exe -hosted", oemframe:=true, deferred:=true,
windowname:="BSVM25 HMI"

[areas]
AREA600= name:=BSVM25HMI, process:=BSVM25HMISYS,
```

c. Configuring additional settings

In order to configure the following settings, you require the "slamconfig.ini" configuration file:

- Assigning the softkey position of a specific operating area
- Creating foreign-language text
- Displaying icons for the operating area on the softkey

d. Creating a configuration file **slamconfig.ini (for Windows XP)**

Open folder: **F:\hmisl\addon\sinumerik\hmi\cfg**

Edit: **slamconfig.ini**

Creating a configuration file **slamconfig.ini (for Windows 7)**

Open folder: **C:\Programdata\Siemens\Motioncontrol\Sinumerik\hmi\oem\cfg**

Edit: **slamconfig.ini**

e. Contents of **slamconfig.ini**

```
[BSVMxHMI]
TextId = VMx HMI
Picture = BSVMxHMI.png
SoftkeyPosition = 7
```

f. Copy language files in **F:\hmisl/addon/sinumerik/hmi//lng (Windows XP only)**

g. Copy picture file in **F:\hmisl/addon/sinumerik/hmi/ico/icoXXX (for Windows XP)**
Copy picture file in **C:\Programdata\Siemens\MotionControl\Sinumerik\oem\hmi\ico (for Windows 7)**

NOTE
For further information refer to the document:
"Embedding Solution Partner applications in SINUMERIK Operate.pdf"

1.4.4. VMx5 HMI Installation on machine control ®GE Fanuc PC

1.4.4.1. Procedure

The procedure will install the following components:

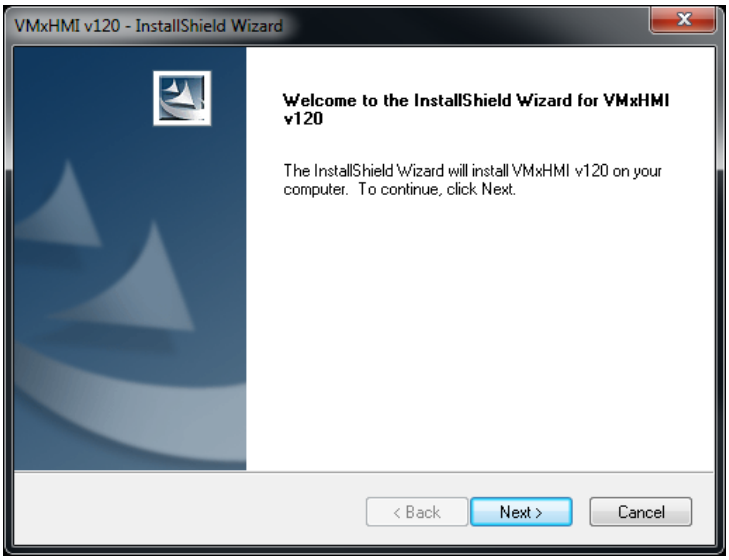
- VMx5 HMI application
- Auxiliary Windows components (if necessary)

To install the package on Machine Control ®GE Fanuc with O.S. ®Microsoft Windows XP Embedded, it is required the utility Framework .NET 2.0 in full format. To proceed with the correct installation, follow the procedure (read additional information in <CD>:\VM15 HMI\Utility\NET Fw Cleanup Tool\User Guide.htm)

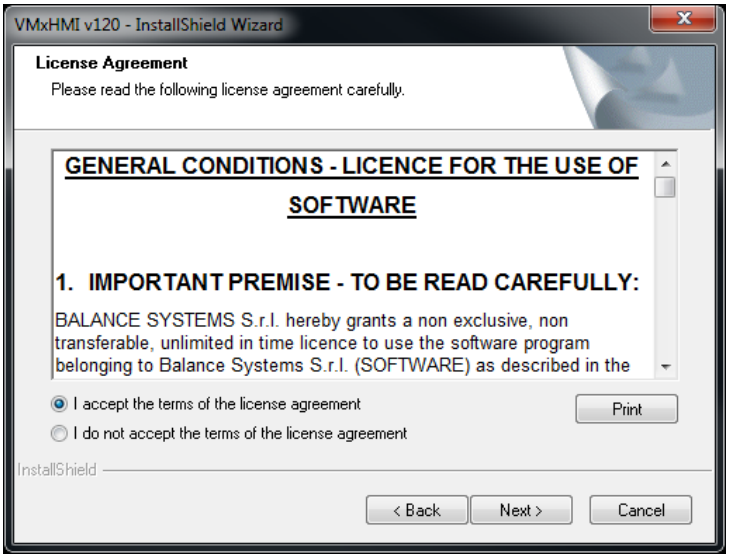
- Launch the tool **<Drive>:\VM15 HMI\Utility\NET Fw Cleanup Tool\cleanup_tool.exe**
- Follow the procedure below

To install the VMx5 HMI package, put the USB flash drive into the port of the PC:

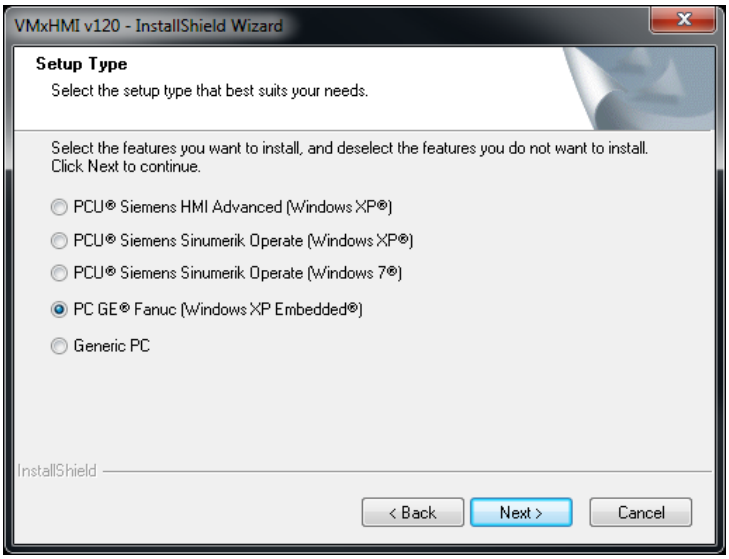
- Click on *Start* in Windows, select **Run…**
- Enter **<Drive>:\HMI v120.yymmdd\Setup.exe** (where: <CD> is the USB flash drive
- Continue by following the instruction.



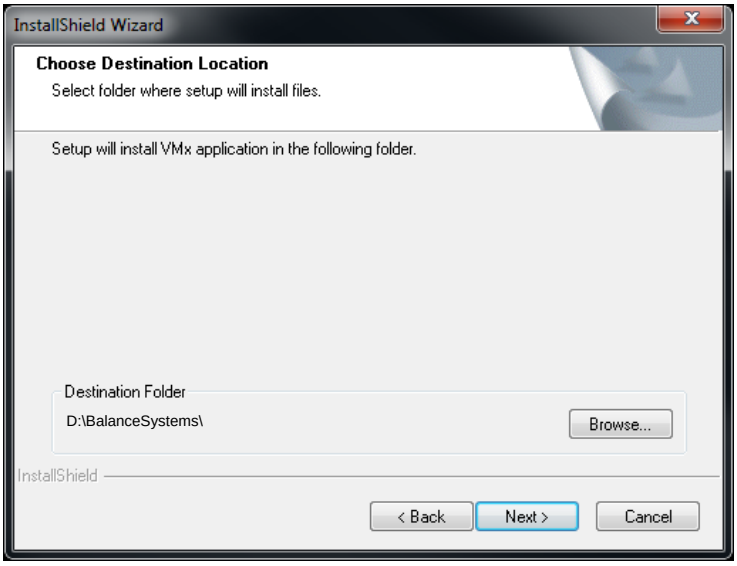
- Read carefully the general conditions of the license for the use of the software and accept them.



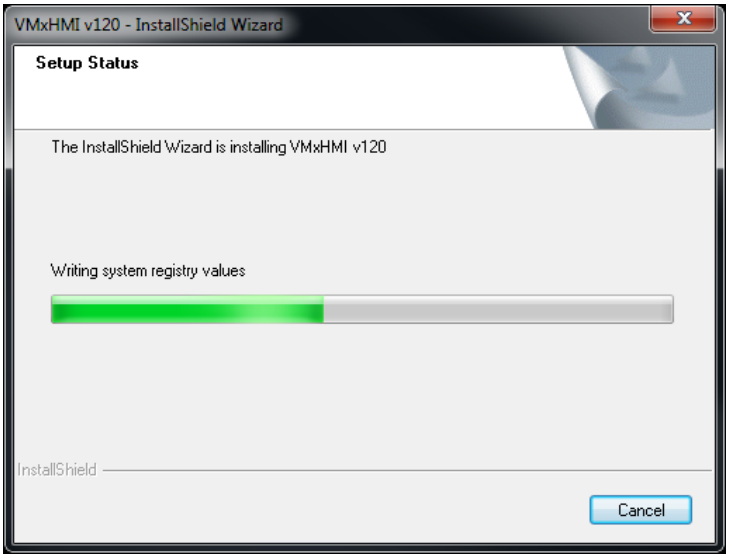
- Select the “PC ®GE Fanuc” option

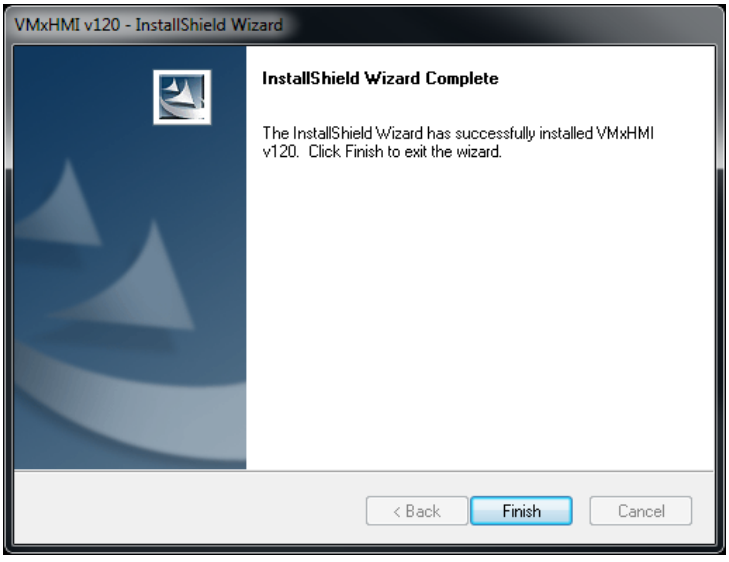


- Select the folder where setup will install files. The default path is D:\BalanceSystems\



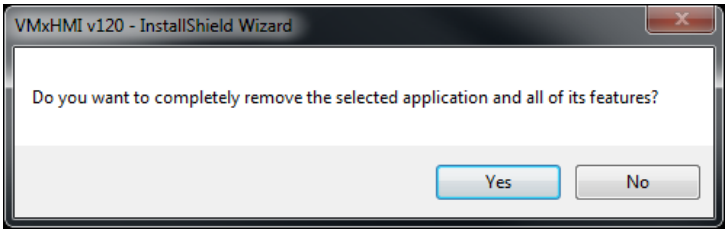
- Continue by following the instructions



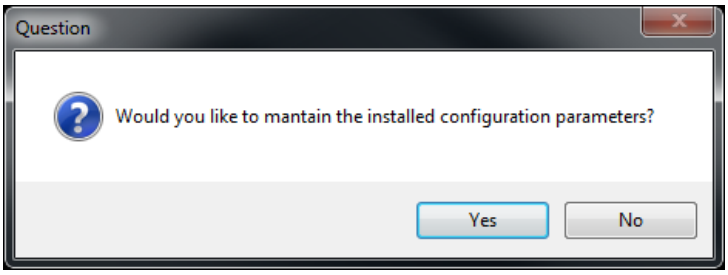


NOTE

- Previous versions of the VMx5 HMI package should be removed before proceeding with the new installation.
- The setup software will allow the user to uninstall previous VMx5 HMI package versions.



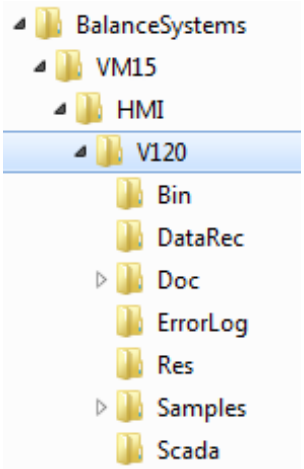
- To maintain previous VMx5 HMI configuration parameters, select “Yes”.



- As an alternative, follow the standard Windows procedures to remove any previous installations of the VMx5 HMI.
  - Click on *Start* in Windows, select Settings and Control Panel
  - Double click on Add/Remove Software
  - Select VMx5 HMI and click on Remove
- When the uninstall procedure is completed, run the setup procedure again and follow the instruction.

1.4.4.2. Folder organization

Structure of the folders after installing in "D:\"



Name	Description
BalanceSystems	OEM folder
VMx5	VMx5 System folder
HMI	VMx5 HMI application
v120	Version 12.0 folder
Bin	System and Graphic Library files
DataRec	Data recording storage folder
Doc	User documentation
Res	Resources (e.g. Languages)
Samples	Examples for integrating the graphic library
Scada	Communication layer application

1.4.5. Hardware connections

To start the application it is necessary to connect to the rack of the VMx5 system through a serial connection (see figure), following this sequence:

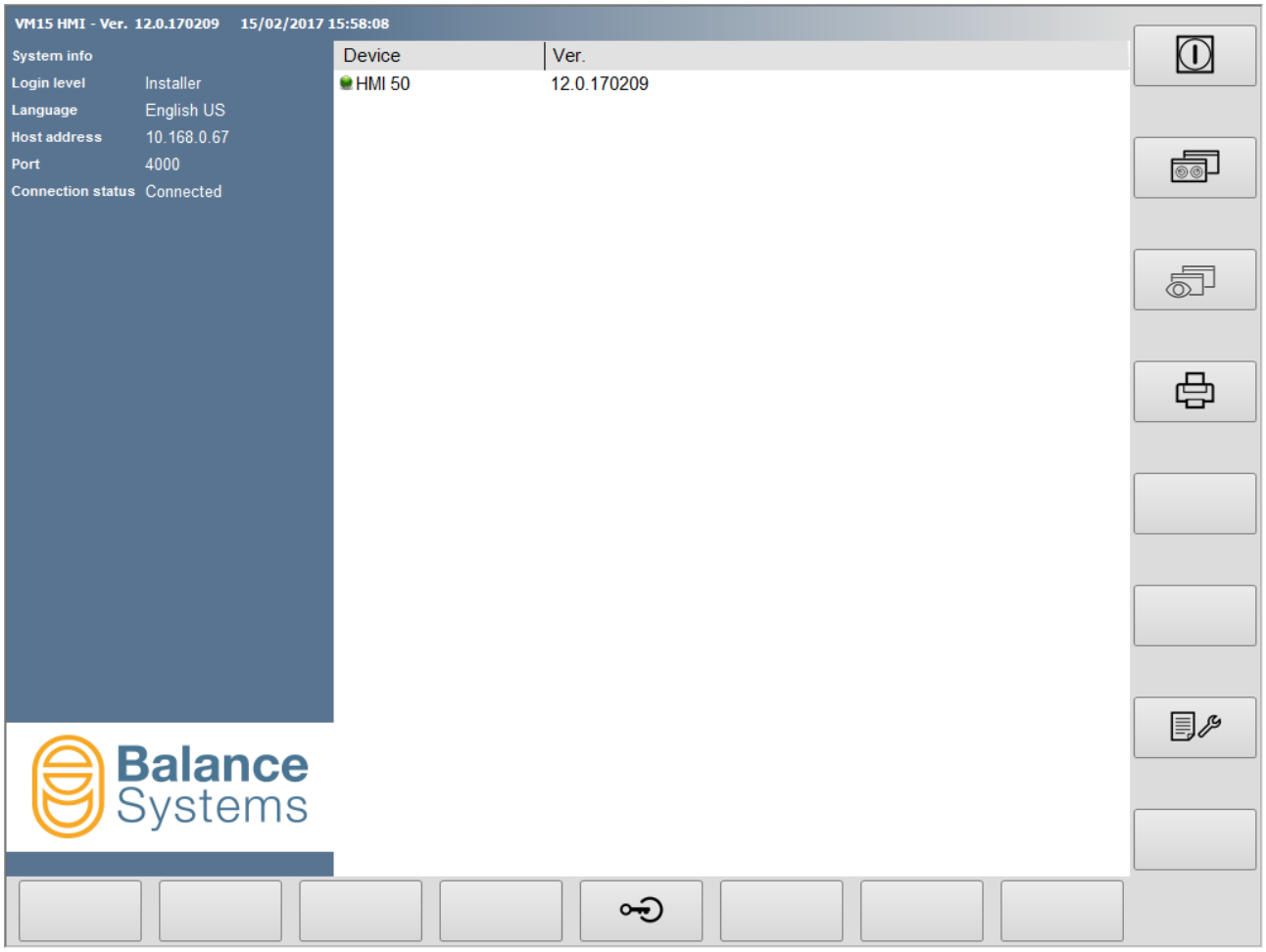
- Connect the remote cable on the VMx5 rack side (P1 connector)
- Connect the serial converter to the other end of the cable
- Turn on the VMx5 rack
- Connect the serial converter to the USB port of the PC

2. Configuring the VMx5 HMI application

The installation procedure ends by creating a desktop link to start the VMx5 HMI application.

To be able to correctly use the VMx5 HMI application, it is necessary to configure some parameters.

- Make sure that the VMx5 rack is on and connected to the PC
- Start the VMx5 HMI application



At the first start-up it is necessary to configure:

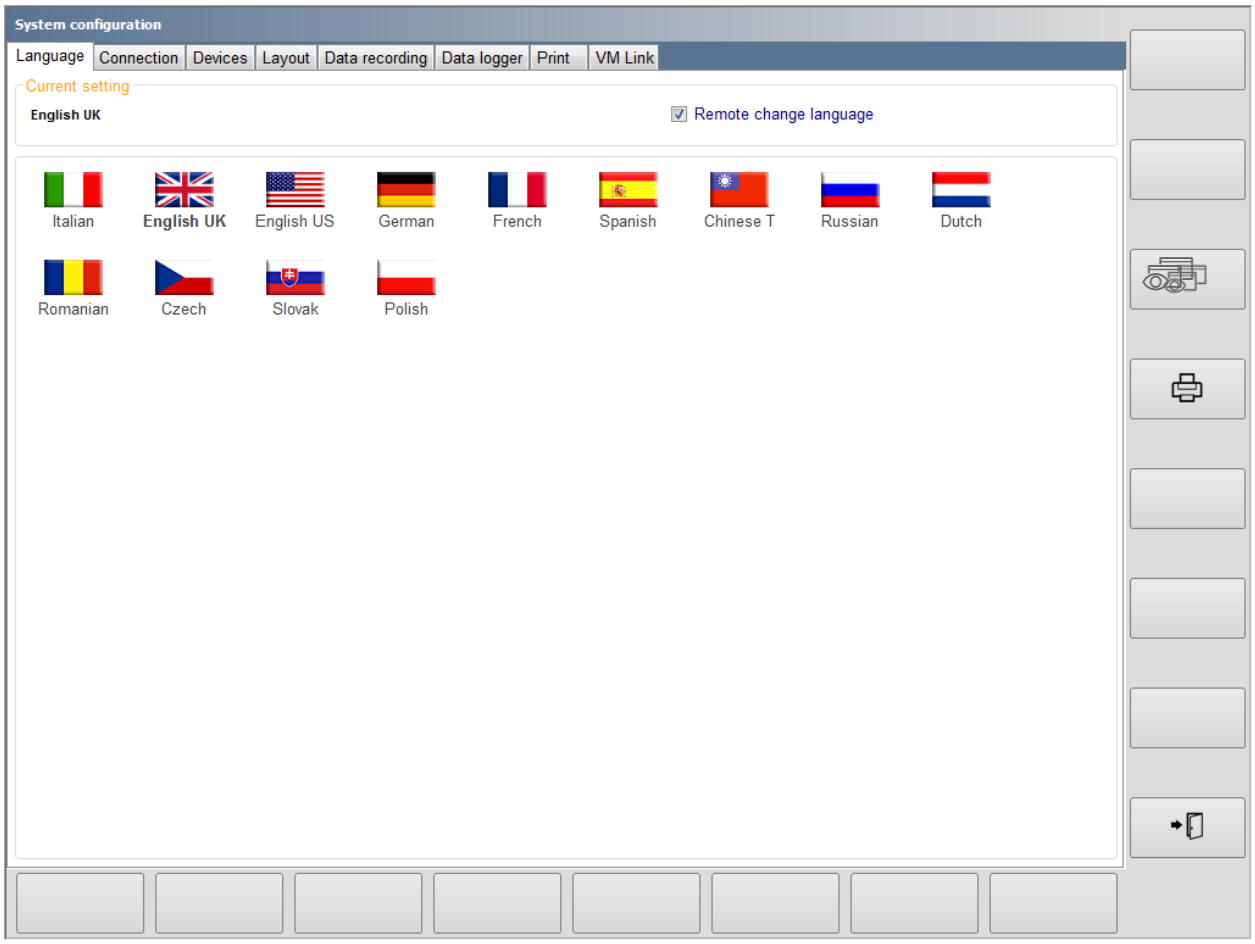
- User language
- COMx / USB connection port
- IP address for remote operation (if used)
- VMx5 system configuration

Select the **Parameter** command  **[Shift+F7]** to choose the configuration menu

System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0001	Exit HMI	Shift+F1	Close the VMx5 HMI
	0010	Page Change	Shift+F2	Switch between the installed devices
	0095	Viewer page	Shift+F3	It displays last opened viewer page
	0011	Print	Shift+F4	Print the displayed screen
	0013	Parameters settings	Shift+F7	Access parameter management for system configuration
	0005	Login	F5	Access login levels management

2.1. Language configuration

- Select the tab **Language** to choose the user language

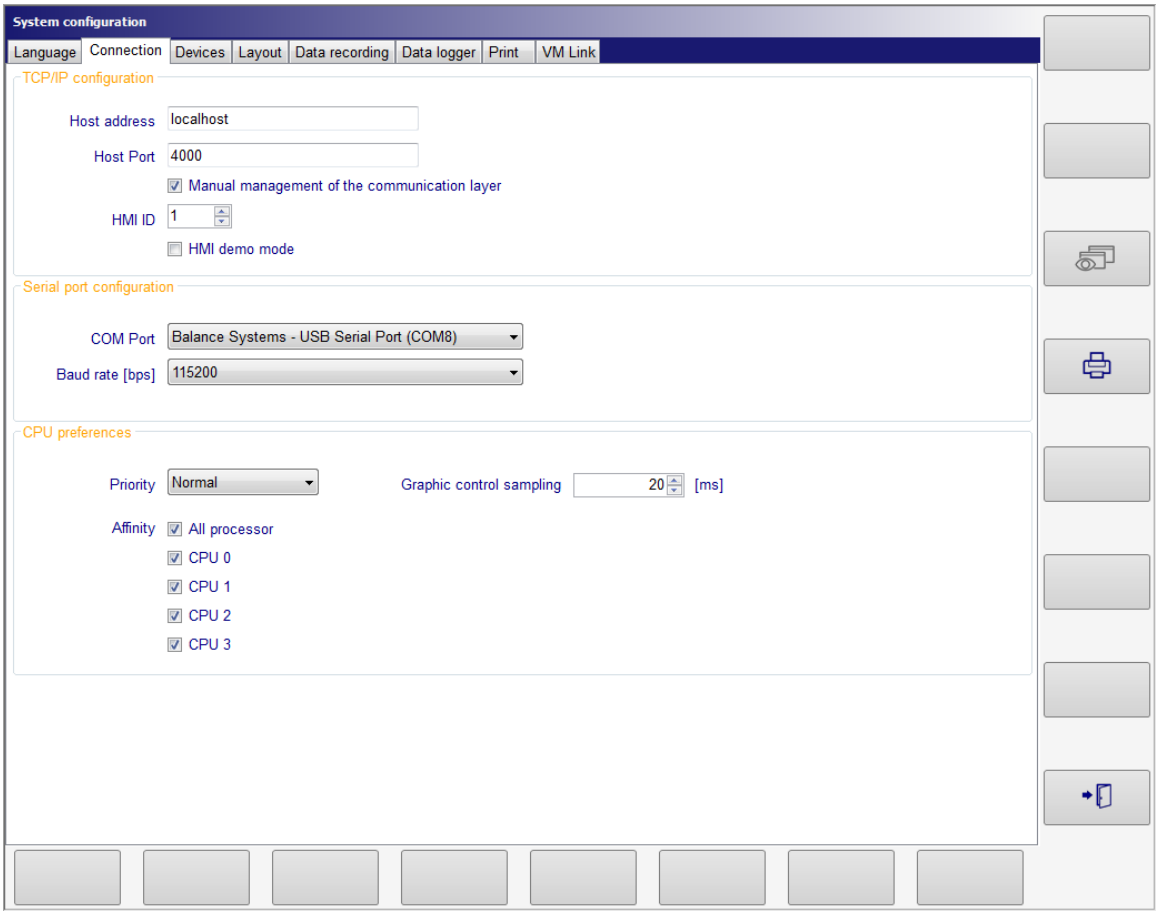


System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0095	Viewer page	Shift+F3	It displays last opened viewer page
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration

Parameter	Description
Remote change language ☐	[check box]. When activated, it is possible to automatically manage the language by profibus or profinet (acyclic data). Further informations about language CN table are described on *"9UMEN1507-1100 YYMMDD Remote Programming v120 En.pdf"*

2.2. Connection configuration

- Select the tab **Connection** to configure the VMx5 communication ports



System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0095	Viewer page	Shift+F3	It displays last opened viewer page
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration

2.2.1. COMx port for rack connection

If the PC is directly connected to the VMx5 rack via USB port, set the parameters in the "Serial port configuration" box.

Parameter	Description
COM Port **[COM1]**	Com port number COM1, COM2, ..., COM16
Baud rate [bps] **[115200]**	Com port baud rate 9600, 19200, 38400, 57600, 115200

2.2.2. IP address for remote operation

In the case of remote connection via Ethernet TCP/IP to another VMx5 HMI or VMx5, set the parameters in the "TCP/IP configuration" box

Parameter	Description
Host address **[localhost]**	IP address of the device to which the VMx5 rack is physically connected. Example: **192.168.1.62**
Host port **[4000]**	Number of the Ethernet port. Example: **4000**
Manual managing of the communication layer ☐	[check box]. When activated, the communication task with the VMx5 rack is manually managed by the installer. This feature is reserved for special applications guided by Balance Systems
HMI Id **[1]**	Address of the actual VMx5 HMI instance in the VMx5 system (values from 1 to 49) Should be used when more than one VMx5 HMI or VMx5 Control Panel are connected to the same system. Setting "0" the address is automatically assigned (values from 50 to 127)

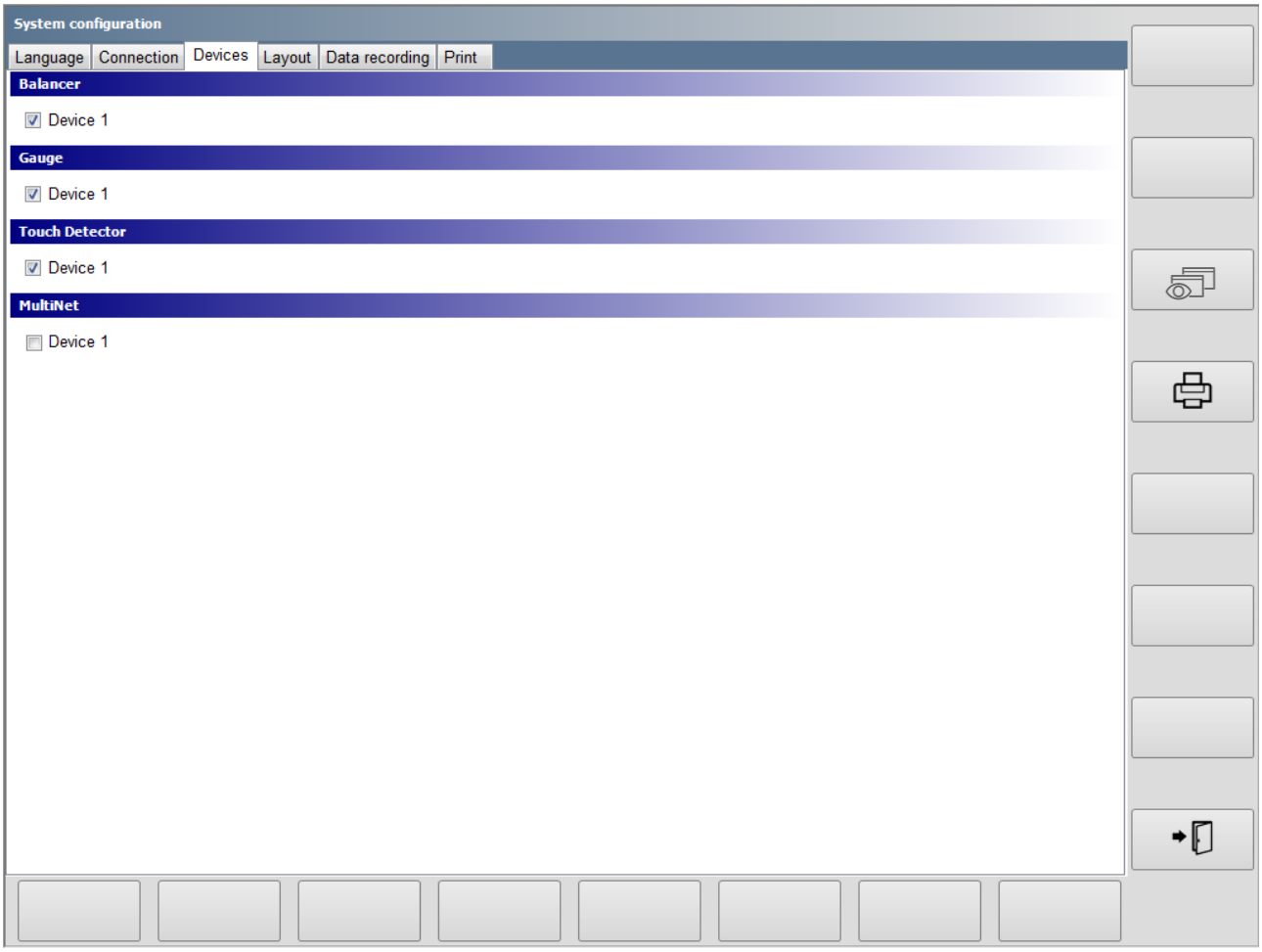
2.2.3. CPU preferences

Parameter	Description
Priority **[Normal]**	It sets execution priority of VMx5 HMI process into the operating system.
Affinity **[All processors]**	Related to system resources, it allows to define CPU which have to be used by VMx5 HMI
Graphic control sampling [ms] **[20]**	It defines HMI sampling time

2.3. VMx5 system configuration [Devices]

- Select the "**Devices**" tab to define the VMx5 system configuration
- Enable the devices. In the example: Balancer 1, Touch Detector 1

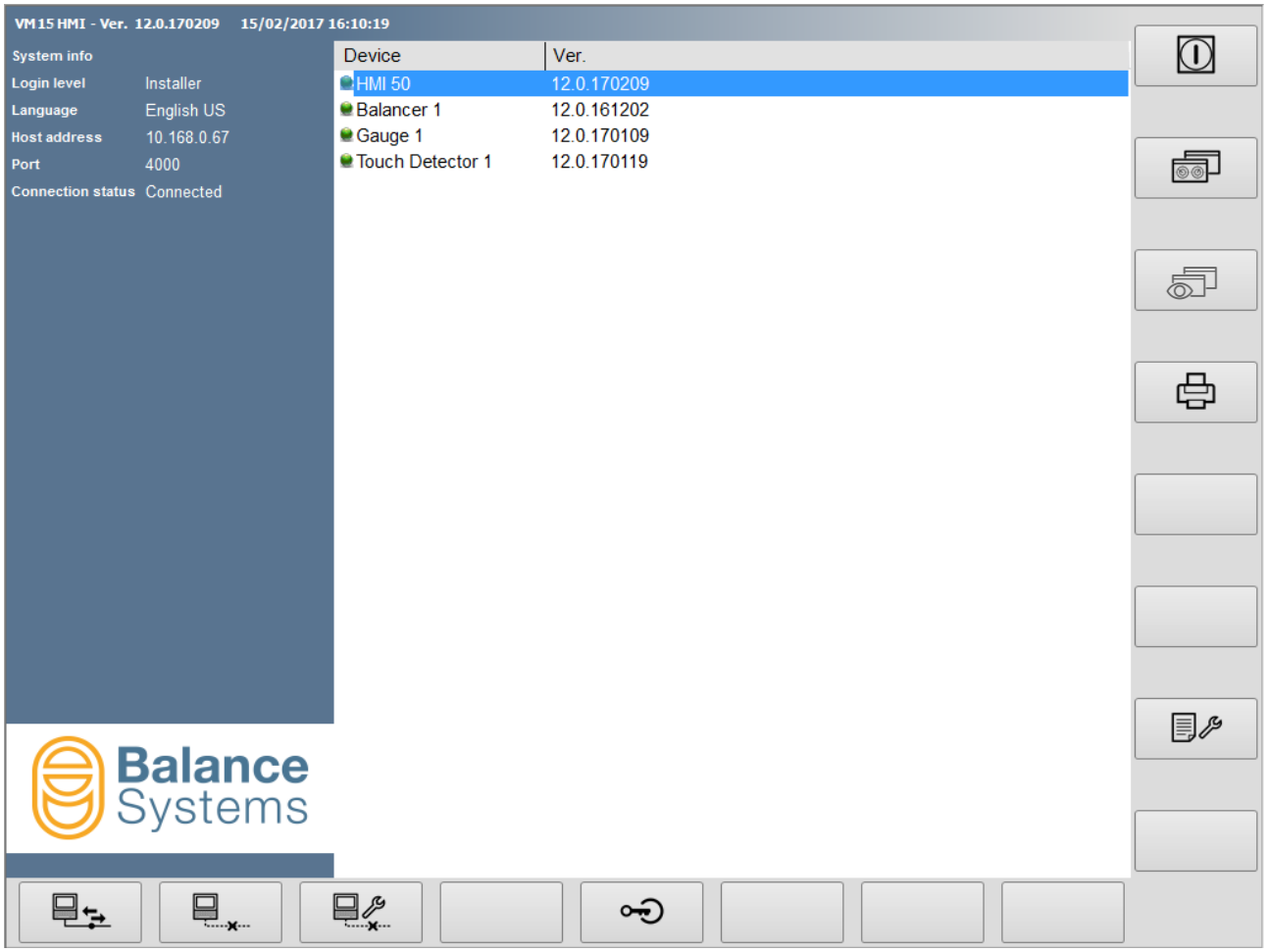
Note: to optimise the test phase when the system is turned on, enable only the devices actually installed in the system



System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0095	Viewer page	Shift+F3	It displays last opened viewer page
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration

2.4. Connection and devices recognition

Once the operations described in the previous paragraphs have been completed, it is possible to start the connection procedure for devices recognition using the **Connect** command  **[F1].**



System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0001	Exit HMI	Shift+F1	Close the VMx5 HMI
	0010	Change Page	Shift+F2	Switch between the installed devices
	0095	Viewer page	Shift+F3	It displays last opened viewer page
	0011	Print	Shift+F4	Print the displayed screen
	0013	Parameters	Shift+F7	Access parameter management for systems configuration
	0002	Connect	F1	Start the connection procedure between the VMx5 HMI interface and the VMx5 rack
	0003	Disconnect	F2	Stop the communication between the VMx5 HMI interface and the VMx5 rack
	0004	Service	F3	Switch to “**service**” mode for mainteniance operations
	0005	Login	F5	Access login levels management

3. Programming and Setup

3.1. Introduction

This chapter is devoted to describing configuration parameters regarding the VMx5 HMI application.

Before proceeding to set the parameters, it is necessary to verify the following conditions:

- The hardware of every card must be properly configured
- Every card must be able to support all of the required options
- Every card must be properly housed in the VMx5 rack
- The VMx5 HMI application must be enabled for controlling every card installed

Note: All of the configurable parameters will be described. Some of them, or entire selections, might not be available on the system being used, depending on the hardware and software configurations of the cards installed.

Typical work flow for starting and configuring the system:

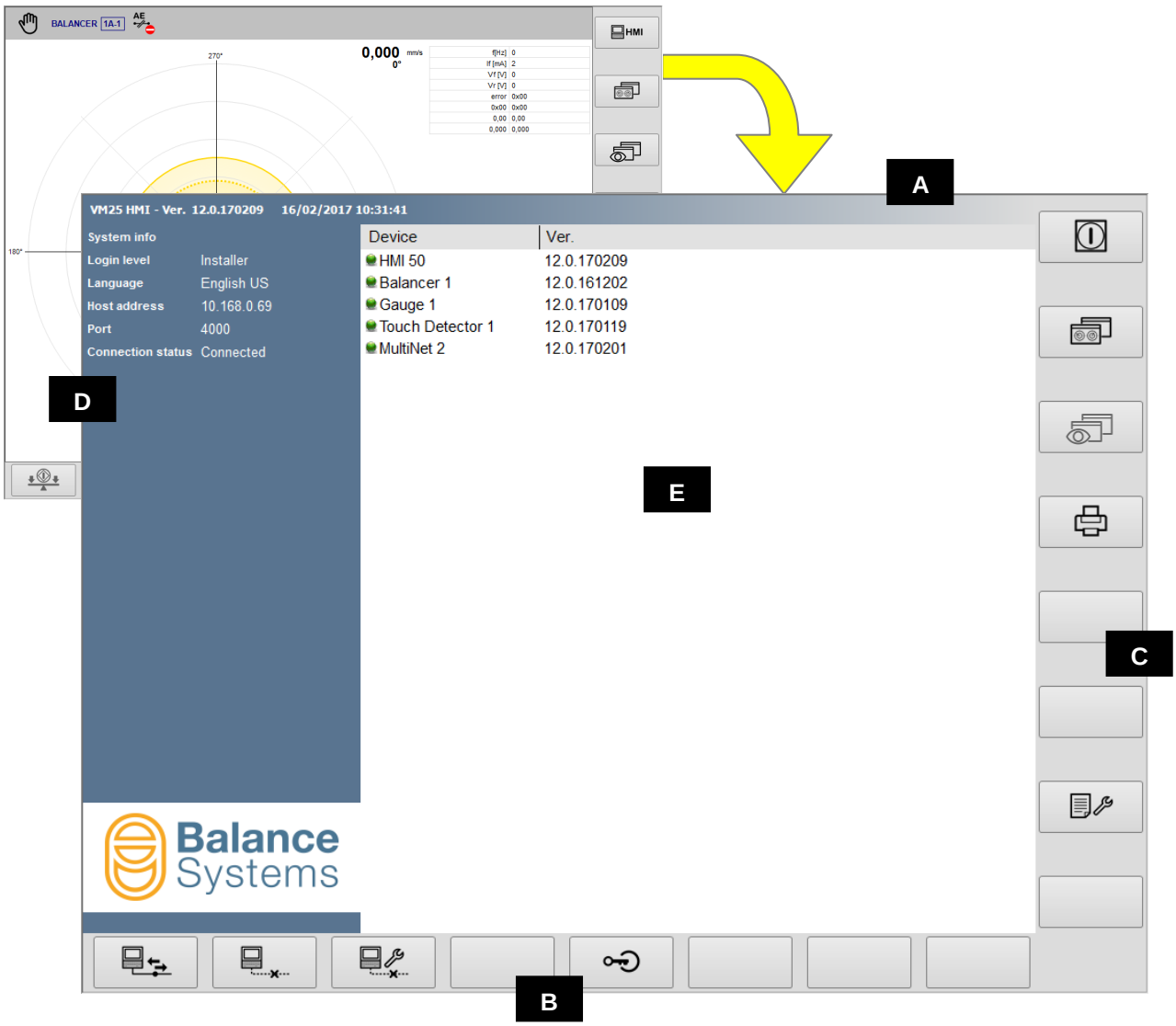
1. Access to the system settings
2. Language setting
3. Connection parameter setting
4. Setting the system configuration (installed devices)
5. Setting of the login access level
6. Setting the VMx5 HMI interface layout
7. Setting of each installed device
8. Backup execution

NOTE

For the description of the setup parameters of each installed device refer to the document present at the link Parameter setup

3.2. HMI system settings

After the VMx5 HMI application has been installed, press the command **HMI** HMI **[Shift+F1]** to access to the system settings.



The following areas are identified on the screen:

A. Header
B. Horizontal control bar associated with the keys **[Fx]**
C. Vertical control bar associated with the keys **[Shift+Fx]**
D. System connection configuration summary
E. List of installed devices:

- Device name
- Software version
- Memory version

The commands available are summarized in the following table

System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0001	Exit HMI	Shift+F1	Close the VMx5 HMI
	0010	Change Page	Shift+F2	Switch between the installed devices
	0095	Viewer page	Shift+F3	It displays last opened viewer page
	0011	Print	Shift+F4	Print the displayed screen
	0013	Parameters	Shift+F7	Access parameter management for systems configuration
	0002	Connect	F1	Start the connection procedure between the VMx5 HMI interface and the VMx5 rack
	0003	Disconnect	F2	Stop the communication between the VMx5 HMI interface and the VMx5 rack
	0004	Service	F3	Switch to “**service**” mode for mainteniance operations
	0005	Login	F5	Access login levels management

3.2.1. Setting the Access Level [Login]

The VMx5 system is equipped with a login system, managed via enabling password that allows access for use according to 4 different hierarchical levels. In addition to enabling the use of particular functions, each level allows the use of the functions of all lower levels.

The following factory-set passwords are difined for the different access levels:

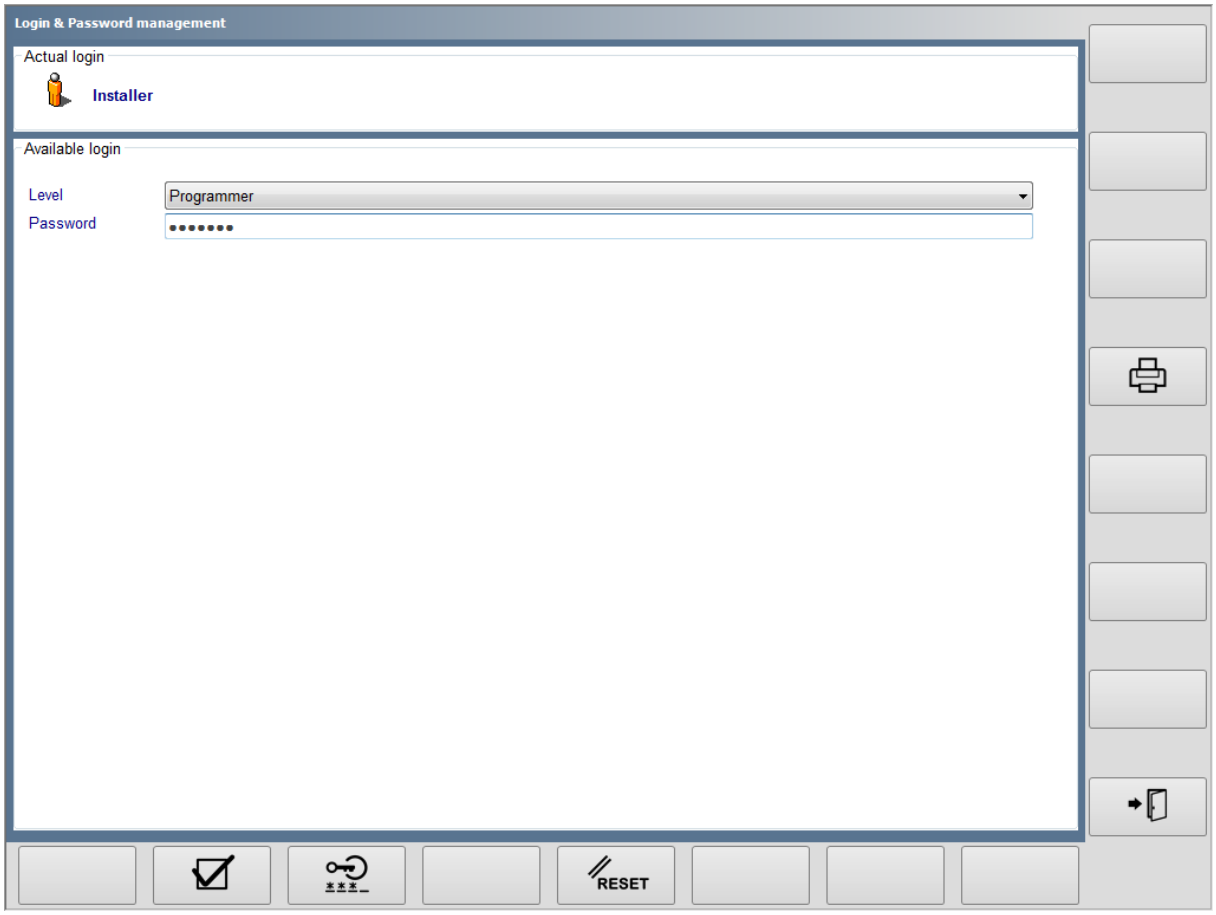
Level	Password	Description
Observer	1	All the enabled devicecs operate automatically without any possibility of intervention. The only active functions allow the display to be shifted over to various devices and to change the access level
Operator	1 2 9 4	All of the enabled devices operate automatically with the possibility of accessing the correction functions (see detailed information on the individual device)
Programmer	1 4 3 2	Every VMx5 system device can operate both automatically and manually with access to the working parameters of each device (see detailed information on the individual device)
Installer	1 2 2 1	Every VMx5 system device can operate both automatically and manually with access to the Setup menu of the entire system. This level is reserved for the technical personnel specialized in installing the VMx5 system

It is possible for the user to define their own customised passwords, and to restore the factory default passwords.

To access the access level management, use the **Login** command  **[F5]**

3.2.1.1. Login change

- Select the new access level (use the mouse or the direction arrows)
- Enter the password relative to the new level and press **Confirm** ☑ **[F2]**

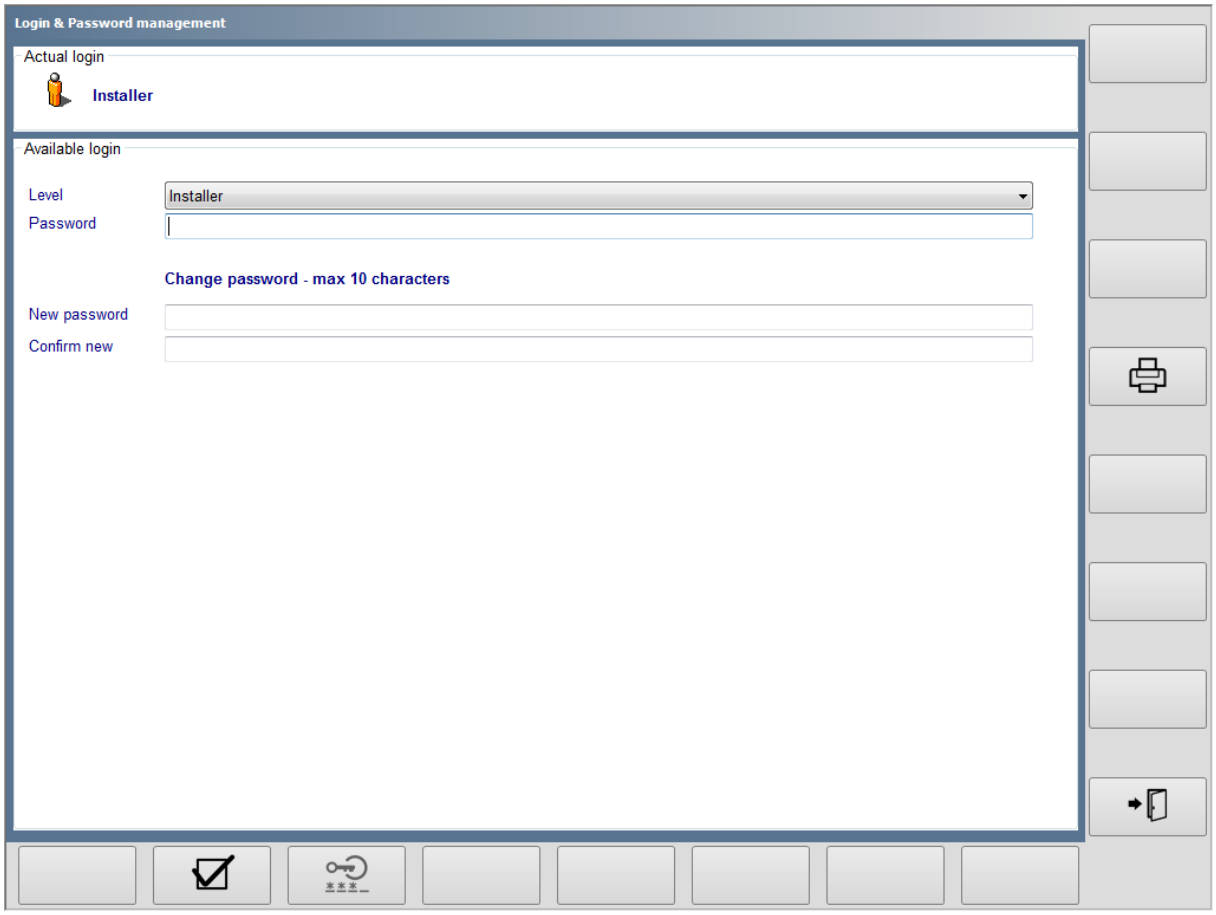


System commands				
Icon	**ID**	**Command name**	**Button**	**Description**
🖶	0011	Print	Shift+F4	Print the displayed screen
☑	0015	Confirm	F2	Activate the new access level
🔑 ***	0006	Change password	F3	Allow the password to be changed
RESET	0042	Reset	F5	Restore the factory passwords
🚪	0017	Exit	Shift+F8	Exit & save the configuration

3.2.1.2. Password modification

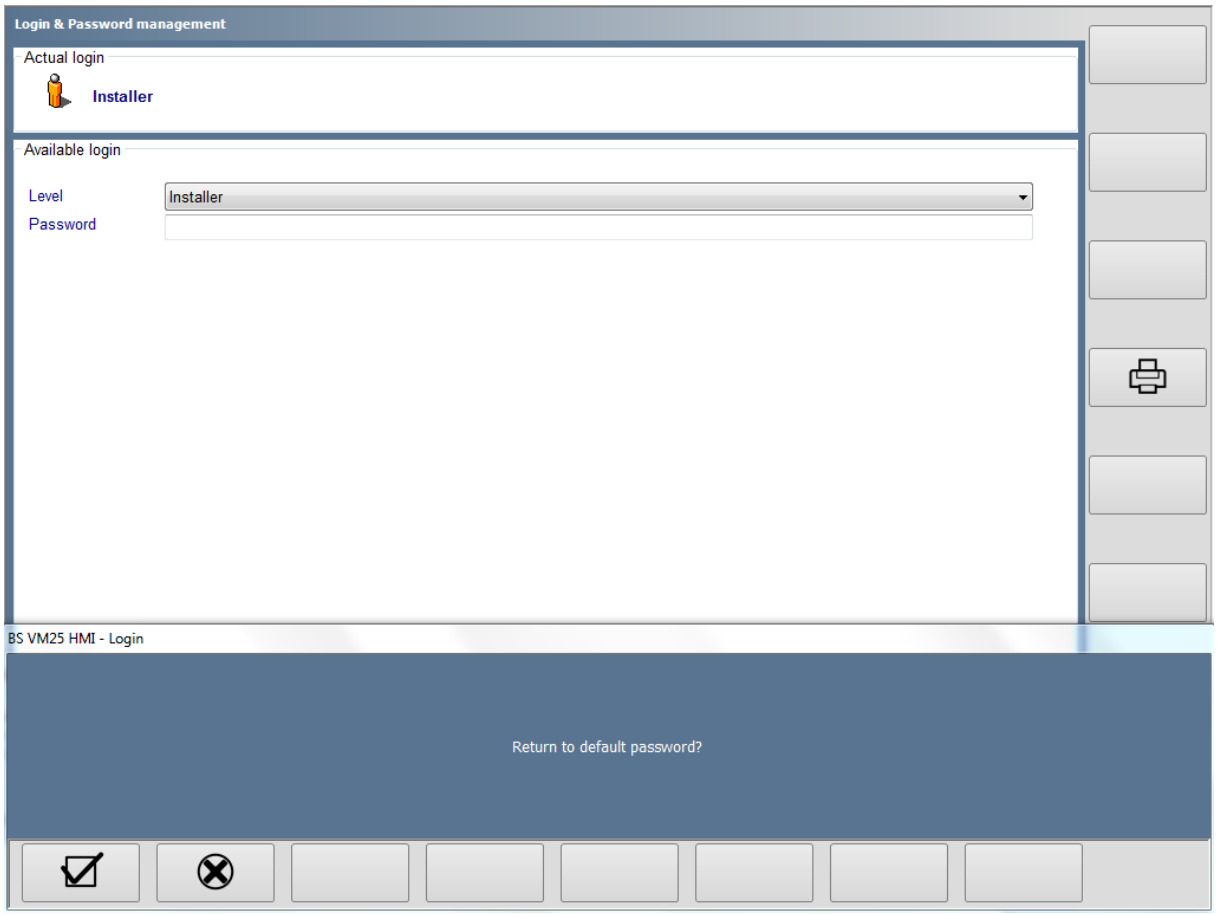
All of the passwords can be modified as follows:

- Press **Change password** **[F3]**
- Enter the password of the level you want to modify
- Enter the new password
- Enter the new password again
- Press **Confirm** **[F2]** to save the new password



3.2.1.3. Restoring the factory password

- Access with **Installer** login
- Press RESET **[F5]**

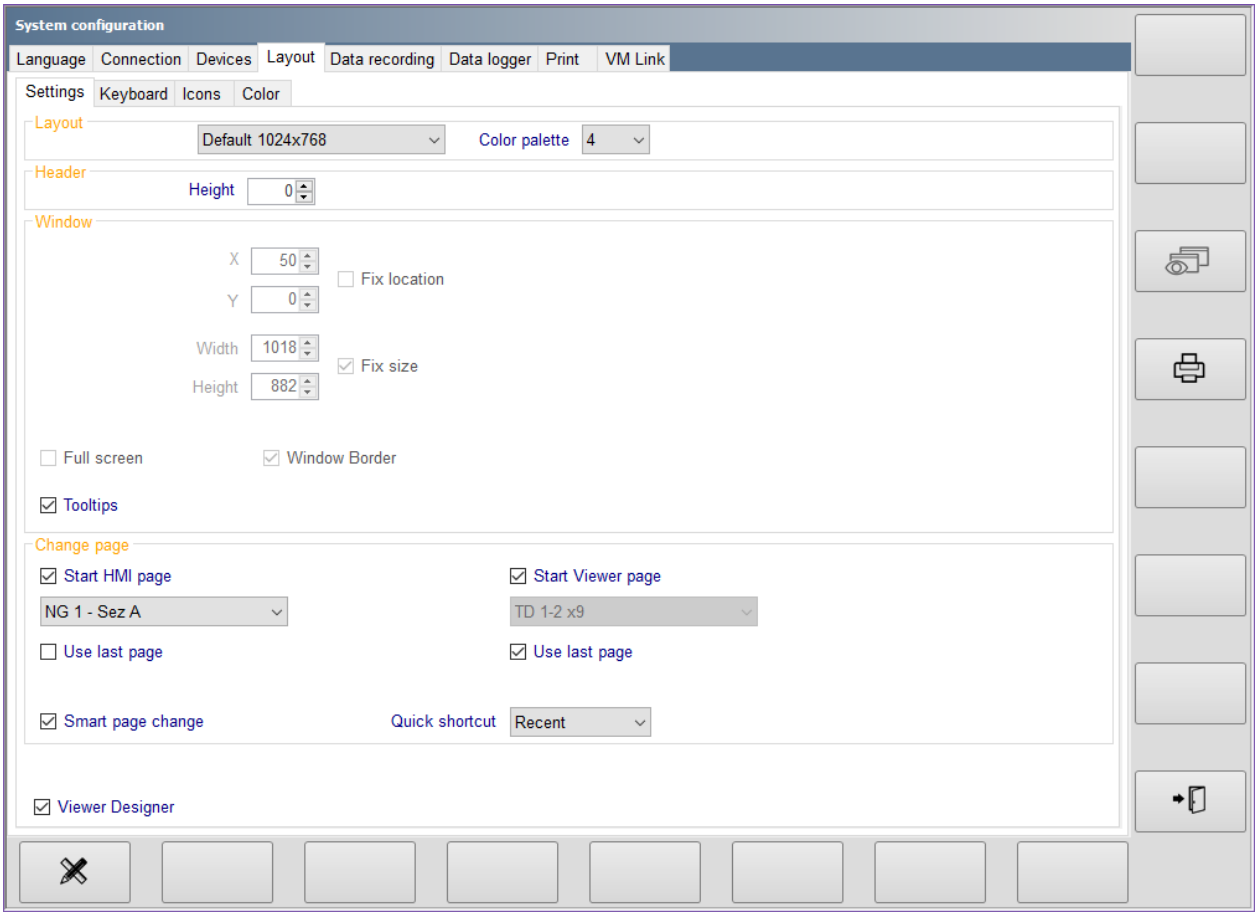


3.2.2. Customization of the VMx5 HMI interface layout [Layout]

The VMx5 HMI interface is designed to adapt to the host. This means that is why the user can select a set of layouts (number of commands and their positions, header sizes, etc.) in addition to having the possibility to create a completely personalized layout.

To select the desired layout, use the **Parameters** command  **[Shift+F7]**

- Select the **Layout** tab



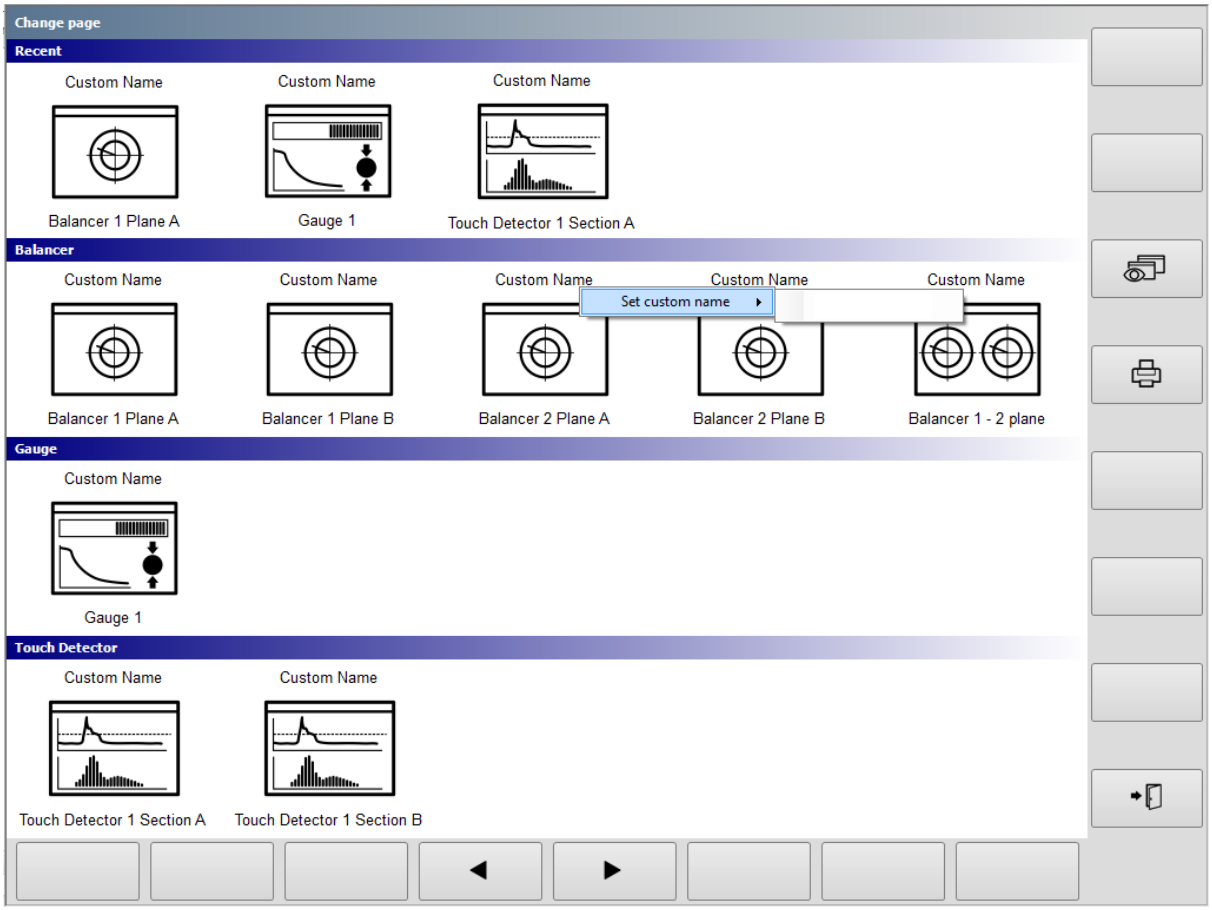
In the “Settings” box

Parameter	Description
Header height **[70]**	Space set aside for the header, in number of pixels The application does not occupy this area, and it is often assigned to, for example, other applications e.g. Siemens HMI.
Color palette **[0]**	Select one of the options to define the colour palette.
Layout **[Custom]**	A set of default layouts already designed for typical applications is available **PCU50 ®Siemens** **PC ®GE Fanuc** Otherwise, a personalised layout can be defined. **Custom**: the parameters in the “Actual configuration” box are enabled.
Width **[800]**	VMx5 HMI form width (pixels)
Height **[600]**	VMx5 HMI form height (pixels)
X position **[50]**	Horizontal position in pixels. 0 = left side
Y position **[0]**	Vertical position in pixels. 0 = top side
Full screen ☐	[Check box] If selected, the VMx5 HMI form will take the full sceen
Fix Size ☐	It Allows to lock the window with a default size
Fix Location ☐	It Allows to lock the window in a default position
Window Border ☐	Shows the classic Windows view
Tooltips ☐	Shows the helpful tooltips for commands and states
Smart change page (*) ☐	Enables smart change page
Quick shortcut **[drop-down menu]**	It allows to choose page quick shortcut in the smart change page (favorites or recent)
Start HMI page ☐	Enabling the check box, the HMI will display the page indicated in the below drop down menu at the start-up.
Use last page (HMI) ☐	Enabling the check box, at the start-up, the HMI will display the last shown page.
Start VIEWER page ☐	Enabling the check box, the viewer will display the page indicated in the below drop down menu at the start-up.
Use last page (VIEWER) ☐	Enabling the check box, at the start-up, the viewer will display the last shown page.

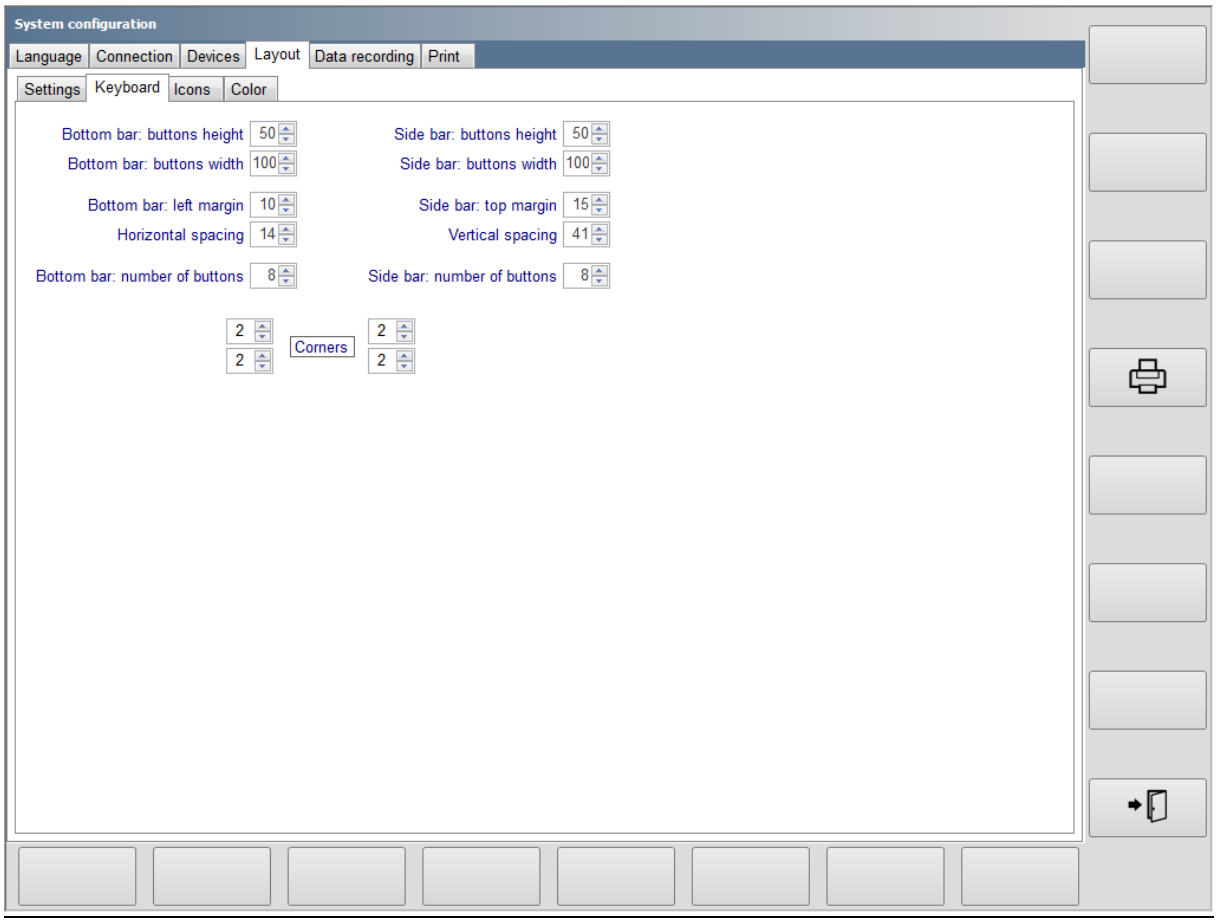
Parameter	Description
Viewer Designer ☐	Enable Viewer feature and allows to enter in Viewer settings page

(*) Smart change page allows to directly choose the page to display avoiding to continuously press **Change page** **[Shift+F2]** to reach desired page.

Recent / favorites menu is also available.
Left-click on desired page, allows to open the page.
Right-click on desired page allows to customize the name of the page.

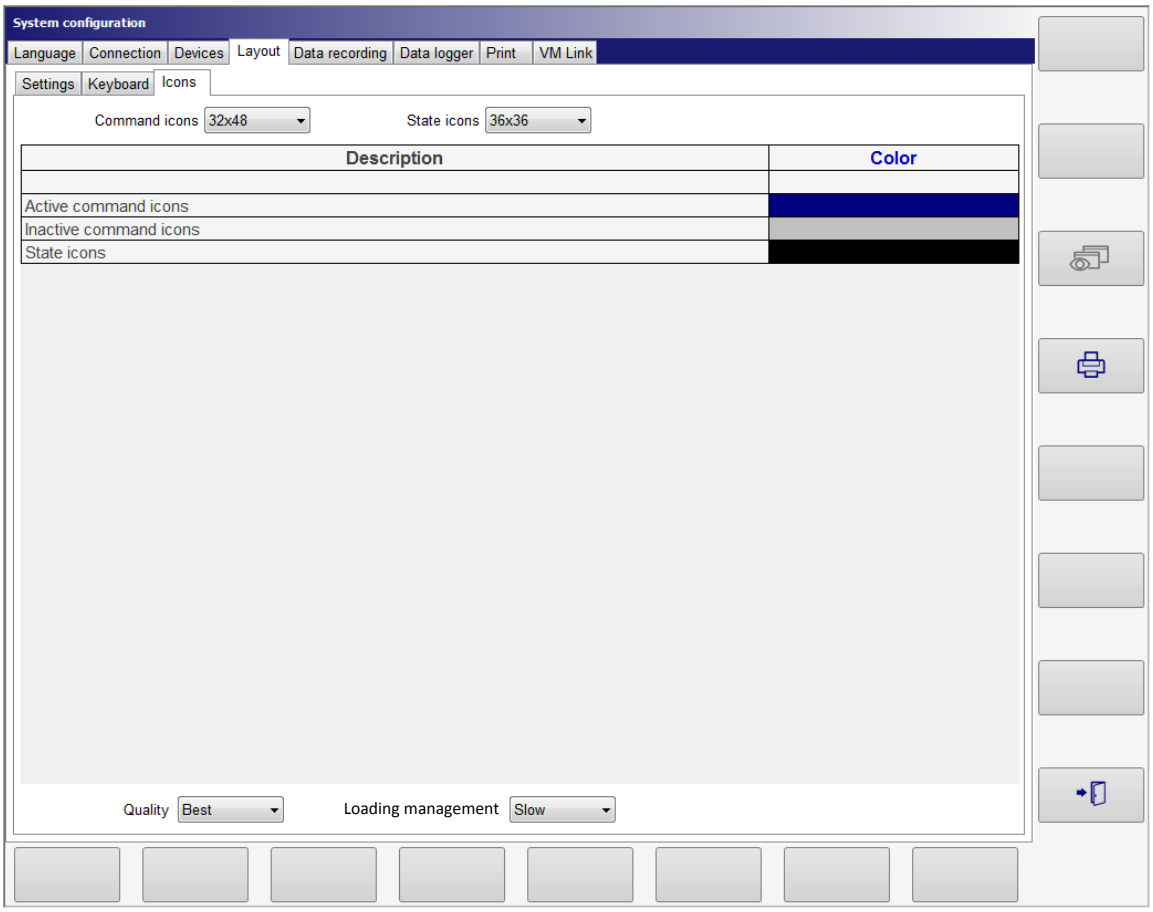


In the “Keyboard” box



Parameter	Description
Top Margin [10]	Position associated with the command bar on the side (in pixels, starting from the top)
Side Bar: Button height [59]	Height of the button (in pixels)
Side Bar: Button width [59]	Width of the button (in pixels)
Vertical spacing [1]	Distance (pixels) between two adjacent button
Number of buttons [8]	Number of buttons of the side command bar

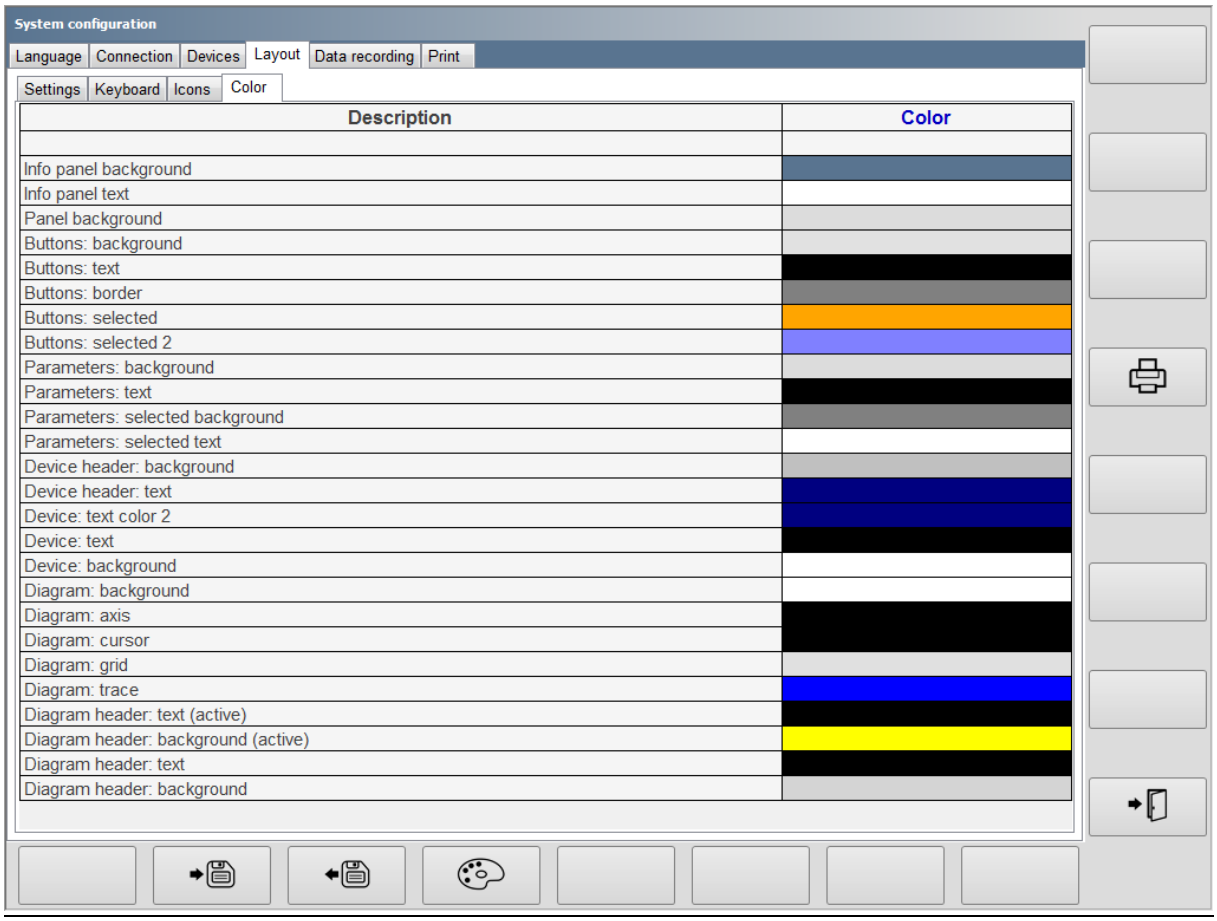
Parameter	Description
Left Margin **[8]**	Position associated with the command bar on the bottom (in pixels, starting from the top)
Bottom bar: Button width **[90]**	Width of the buttons (pixels)
Bottom bar: Button height **[50]**	height of the buttons (pixels)
Horizontal spacing **[1]**	Distance (pixels) between two adjacent buttons
Number of buttons **[8]**	Number of buttons of the bottom command bar



In the “Icons” box

Parameter	Description
Command icons size	Sets the size of Command icons
State icons size	Sets the size of State icons
Active command icons color	Changes color of active icons Command
Inactive command icons color	Changes color of inactive icons Command
State icons color	Change the color for status icons
Quality	Choice between two levels of graphic quality
Loading management	It defines HMI icons management: **Standard:** all the icons are loaded during HMI start up in background. Connection or others operations are available during icons loading. **Slow:** all the icons are loaded before HMI start up. Connection or others operations are not available during icons loading.

System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration



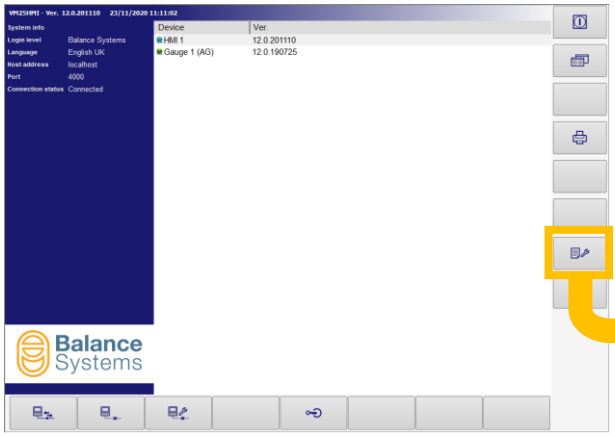
In the “Color” box

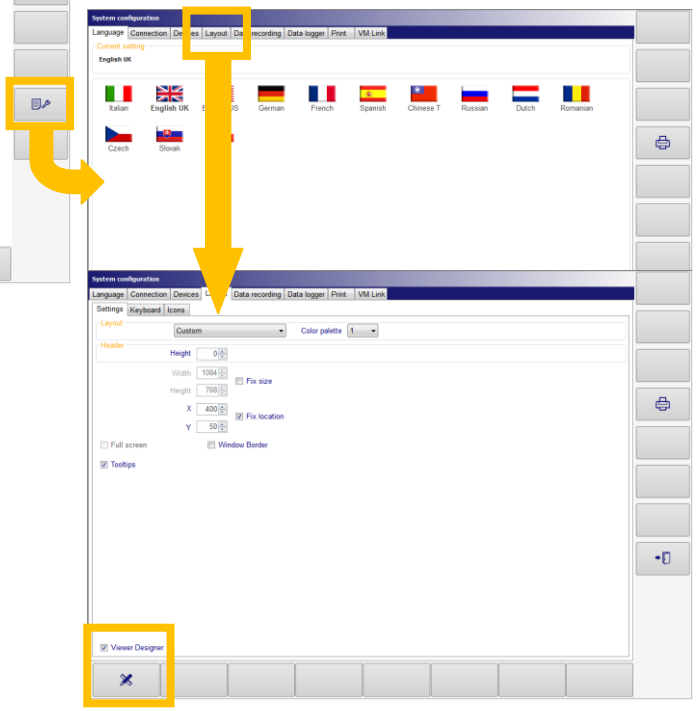
System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration
	0026	Factory color palette	F4	Sets the factory colors palette
	0023	Data loading	F3	Loads the color configuration
	0024	Data save	F2	Save the color configuration

3.2.2.1. Viewer settings

Viewer feature allows to create customizable pages (up to 16) in order to show VMx5 function pages (balancer, touch detection, gauge) on the PC or NCU screen (as a pop-up) to monitor all the processes independently from NCU main sowtware.
Each page, once created, can be recalled and displayed with Profibus or Profinet asynchronous commands.

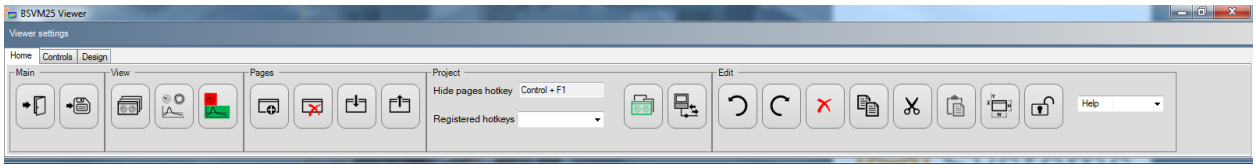
In order to access to Viewer settings follow nexts steps:

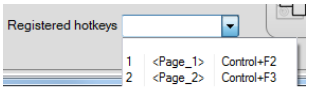


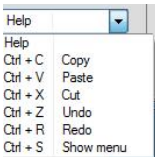


In the layout page, check “View Designer” checkbox and click on  button.

Settings page will be appear on the screen as follow:

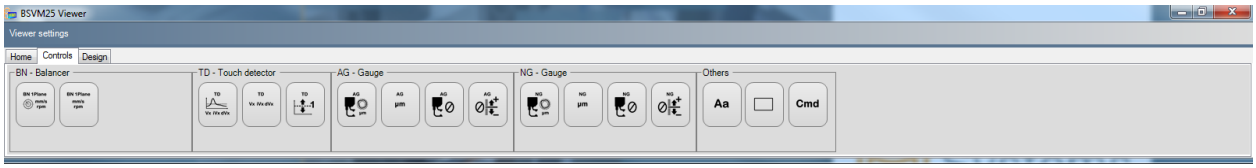


Viewer settings (“Home” tab)				
Icon	**ID**	**Setting Name**	**Button**	**Description**
		Exit		Exit
		Save		Save viewer pages settings
		Page List		Shows all viewer pages with their ID
		Control List		It lists all the objects included in the selected page
		Temp background		Allows to temporary import an image file (“.bpm” “.png” “.tiff” “.jpg”) to use as page background. This setting helps the installer to define the correct position of the page on the screen. Make sure to disable “Trasparent background” checkbox in DESIGN drop-down menu.
		New page		It adds new page to the list (up to 16).
		Delete page		It deletes selected page
		Import page		It allows to import page configuration file (“.bpg”)
		Export page		It allows to save configured page as “.bpg” file in order to import the same page on different machine
		Hide pages hotkey		It defines hotkey to hide viewer pages
		Registered hotkeys		Shows registered hotkeys list 
 		No top most Top most		Defines if the page has to be showed always on top or not
 		Connect Disconnect		Allows temporary connection to the system to show how configured page works. During the connection is not possible to apply any page modification

Viewer settings (“Home” tab)				
Icon	**ID**	**Setting Name**	**Button**	**Description**
		Undo		Undo last modification (Ctrl + Z)
		Redo		Redo last modification (Ctrl + R)
		Delete		It deletes selected object (Canc)
		Copy		It copies selected object on the same or on another page (Ctrl + C)
		Cut		It cuts selected object on the same or on another page (Ctrl + X)
		Paste		It pastes copied or cutted object on the same or on another page (Ctrl + V)
		Size and position		Allows to define height, width and position of selected object (control, command, label or panel). Size and position modification it is also possible using the mouse.
 		Unlock position Lock position		Unlock / Lock the position of the selected object on the screen
		Help		Shows hotkeys list for operations: copy, paste, cut, undo, redo, show menu. 

In the table below, all the controls and available commands are listed. Follow the steps indicated in the next section to perform the association between:

- Controls and function card (and section)
- Commands and controls



Viewer settings (“Controls” tab)				
Icon	**ID**	**Control / Command Name**	**Button**	**Description**
BN 1Plane mm/s rpm		BN 1 plane full		Allows to import balancer 1 plane full control in the selected page Unbalance vector, rpm value and weights movemet indicators will be displayed. Tollerances will be related to selected part program. Follow the instructions given in the BALANCER “Design” tab to configure the control.
BN 1Plane mm/s rpm		BN 1 plane compact		Allows to import balancer 1 plane compact control in the selected page. Unbalance and rpm value will be displayed. Follow the instructions given in the BALANCER “Design” tab to configure the control.
TD Vx iVx dVx		TD full		Allows to import touch detector full control in the selected page Variables and limit related to selected part program will be shown. Follow the instructions given in the TOUCH DETECTOR “Design” tab to configure the control.
TD Vx iVx dVx		TD compact		Allows to import touch detector compact control in the selected page Variables values related to selected part program will be shown. Follow the instructions given in the TOUCH DETECTOR “Design” tab to configure the control.

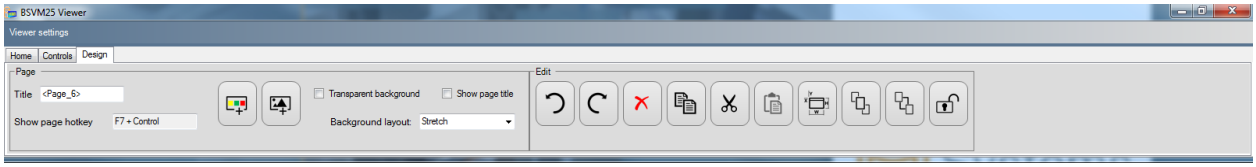
Viewer settings (“Controls” tab)				
Icon	**ID**	**Control / Command Name**	**Button**	**Description**
		TD command		Allows to import touch detector commands object in the selected page Limits modification will be available on selected part program Follow the instructions given in the TOUCH DETECTOR “Design” tab to configure the command.
		AG full		Allows to import AG full control in the selected page. Measured value, limits and offset related to selected part program will be shown. Follow the instructions given in the GAUGE “Design” tab to configure the control.
		AG compact		Allows to import AG compact control in the selected page. Measured value related to selected part program will be shown. Follow the instructions given in the GAUGE “Design” tab to configure the control.
		AG zero		Allows to import AG zero control in the selected page. Follow the instructions given in the GAUGE “Design” tab to configure the control.
		AG command		Allows to import AG commands in the selected page Offset correction will be available on selected part program. Follow the instructions given in the GAUGE “Design” tab to configure the command.
		NG full		Allows to import NG full control in the selected page. Measured value, limits and offset related to selected part program will be shown. Follow the instructions given given in the GAUGE “Design” tab to configure the control.
		NG compact		Allows to import NG compact control in the selected page. Measured value related to selected part program will be shown. Follow the instructions given in the GAUGE “Design” tab to configure the control.
		NG zero		Allows to import NG zero control in the selected page. Follow the instructions given in the GAUGE “Design” tab to configure the control.
		NG command		Allows to import NG commands in the selected page Offset correction will be available on selected part program. Follow the instructions given in the GAUGE “Design” tab to configure the command.

Viewer settings (“Controls” tab)				
Icon	**ID**	**Control / Command Name**	**Button**	**Description**
Aa		Text		Allows to add labels inside the page. Follow the procedure listed in “Label adding” section to configure the label.
▭		Panel		Allows to add Panels inside the page. Follow the procedure listed in “Panel adding” section to configure the label.
Cmd		Command		Allows to add buttons inside the page for the following functions: - **Home**: switch-off viewer page - **Next**: switch to next page (according with defined ID) - **Previous**: switch to previous page (according with defined ID) - **Screenshot**: allows to save a picture of the page (“.bmp”) Follow the procedure listed in “Button adding” section to configure the label.

In the “Design” tab, it is possible to:

- Perform the association between controls and function cards (and section)
- Perform the association between commands and controls
- Customize controls view
- Customize the label
- Customize the panel
- Customize the button (home, next, previous, screenshot)

According to the selection (page, control, command, label, panel or button), window like follow can appear:

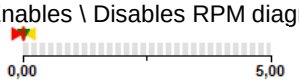
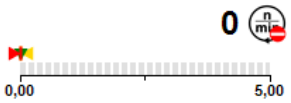
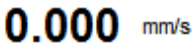
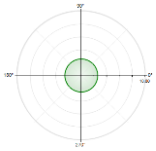


Follow the steps indicated in the next sections to correctly perform the associations and customize the pages.

Viewer settings (“Design” tab) - PAGE				
Icon	**ID**	**Setting Name**	**Button**	**Description**
		Title		It defines page title wich can be displayed or not according with “Show page title” checkbox.
		Show page hotkey		It allows to define current page hotkey.
		Background color		Allows to define page background color. It is available only if “Transparent background” checkbox is not checked
		Background image		Allows to import page background image (“.bpm” “.png” “.tiff” “.jpg”). It is available only if “Transparent background” checkbox is not checked
Transparent background ☐		Transparent background		[check box]. When enabled, page background becomes transparent. Background color and image are not available anymore
Show page title ☐		Show page title		[check box]. When enabled, page title will be shown. Available if transparent background checkbox is not enabled
		Background layout		It allows to define the layout of the image imported with “Background image” button.
		Undo		Undo last modification (Ctrl + Z)
		Redo		Redo last modification (Ctrl + R)
		Delete		It deletes selected object (Canc)
		Copy		It copies selected object on the same or on another page (Ctrl + C)
		Cut		It cuts selected object on the same or on another page (Ctrl + X)

Viewer settings (“Design” tab) - PAGE				
Icon	**ID**	**Setting Name**	**Button**	**Description**
		Paste		It pastes copied or cutted object on the same or on another page (Ctrl + V)
		Size and position		Allows to define height, width and position of selected object (control, command, label or panel). Size and position modification it is also possible using the mouse.
		Bring to front		Bring to front selected object (control, command, label or panel)
		Send to back		Send to back selected object (control, command, label or panel)
 		Unlock position Lock position		Unlock / Lock the position of the selected object on the screen

According to selected control, different customizations are available:

Viewer settings (“Design” tab) - BALANCER				
Icon	**ID**	**Setting Name**	**Button**	**Description**
RPM diagram ☐		RPM diagram		Enables \ Disables RPM diagram view: 
RPM info ☐		RPM info		Enables \ Disables RPM info view: 
RPM value ☐		RPM value		Enables \ Disables RPM value view: 
Balancing head ☐		Balancing head		Enables \ Disables motors status view:
Value ☐		Unbalance magnitude		Enables \ Disables unbalance magnitude value view: 
Phase ☐		Unbalance Phase		Enables \ Disables unbalance phase value view: 
% width		Diagram width		Defines polar diagram dimension related to the entire control page. 
Drop-down menu				**Full:** all the views are enabled (RPM, unbalance, diagram, motors). **Graph:** polar diagram and unbalance info are enabled only. **Debug:** **RPM:** RPM info are enabled only. **Motors:** motors status are enabled only. **Custom_1**: polar diaram, unbalance info and RPM value are enabled **Custom_2:** polar diaram, unbalance info, RPM value and motors status are enabled
Drop-down menu				**Base:** tollerances on polar diagram are indicated as a colored circumferences **Advanced:** tollerances on polar diagram are indicated as a colored area
Header ☐		Header		[check box]. When enabled, control caption will be shown.

Viewer settings (“Design” tab) - BALANCER				
Icon	**ID**	**Setting Name**	**Button**	**Description**
Color options				It is possible to customize the page choosing favourite color for the following objects: ▪ Background ▪ Grid ▪ Axis ▪ Fore (variables) ▪ Trace ▪ Axis label ▪ Min tolerance ▪ Max tolerance ▪ Max vibration ▪ Header color

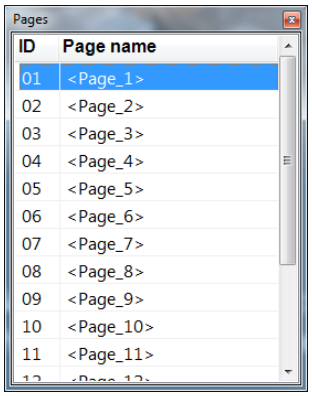
Viewer settings (“Design” tab) – TOUCH DETECTOR				
Icon	**ID**	**Setting Name**	**Button**	**Description**
Variables ☐		Variables		Enables \ Disables variables value view.
Vx ☐		Vx		Enables \ Disables Vx (V1, V2, V3, V4) value view.
Vx Peak ☐		Vx Peak		Enables \ Disables Vx Peak (V1, V2, V3, V4) value view. Peak value is indicated in square brackets [].
Header ☐		Header		[check box]. When enabled, control or command caption will be shown.
Color options				It is possible to customize the page choosing favourite color for the following objects: ▪ Background ▪ Grid ▪ Axis ▪ Fore (variables) ▪ Trace ▪ Axis label ▪ Header color

Viewer settings (“Design” tab) – AG GAUGE				
Icon	**ID**	**Setting Name**	**Button**	**Description**
Zoom on ☐		Zoom on		Enables \ Disables zoom on time graph. Enabling zoom on option, gauge and offset values will disappear.
RPM ☐		RPM		Enables \ Disables RPM value view. 
Offset ☐		Offset		Enables \ Disables offset value view. 
Drop-down menu				Choose the option according with related part-program: In process, roundness, post process, post processRoundess:
Header ☐		Header		[check box]. When enabled, control or command caption will be shown.
Color options				It is possible to customize the page choosing favourite color for the following objects: ▪ Background ▪ Grid ▪ Axis ▪ Fore (variables) ▪ Trace ▪ Axis label ▪ Header color

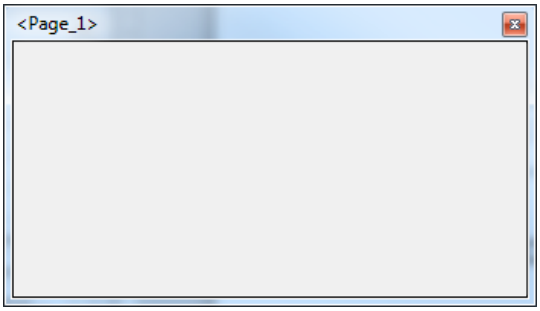
Viewer settings (“Design” tab) – NG GAUGE				
Icon	**ID**	**Setting Name**	**Button**	**Description**
Zoom on ☐		Zoom on		Enables \ Disables zoom on time graph. Enabling zoom on option, gauge and offset values will disappear.
RPM ☐		RPM		Enables \ Disables RPM value view. 
Offset ☐		Offset		Enables \ Disables offset value view. 
Drop-down menu				Choose the option according with related part-program: In process, roundness, post process, post processRoundess.
ShowGraph ☐		ShowLinearEnc		Enables \ Disables gauge graph view.
ShowDebug ☐		ShowDebug		Enables \ Disables debug variables view.
ShowStatus ☐		ShowStatus		Enables \ Disables status icons view.
ShowBarGraph ☐		ShowBarGraph		Enables \ Disables gauge bar graph view.
ShowHeadBar ☐		ShowHeadBar		Enables \ Disables gauge heads bar graphs view.
ShowQuote ☐		ShowQuote		Enables \ Disables gauge and offset values view.
ShowManData ☐		ShowManData		Enables \ Disables the view of following values: ▪ G2, G3, G4
Header ☐		Header		[check box]. When enabled, control or command caption will be shown.
Color options				It is possible to customize the page choosing favourite color for the following objects: ▪ Background ▪ Axis ▪ Trace ▪ Header color ▪ Grid ▪ Fore (variables) ▪ Axis label

3.2.2.1.1 Custom page generation procedure

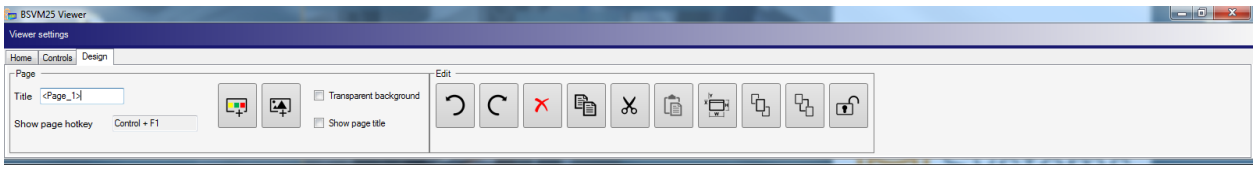
- In the HMI layout tab, check "View Designer" checkbox and click on  button.
- Click on page list button  in "Home" tab.



- Choose the page to configure with mouse double-click (i.e.: <Page_1>).
  A window like the following will appear.



- Select "Design" tab in order to configure page properties and layout:



In "Design" tab is possible to configure:

- Title of the page. It will be displayed instead of <Page_1>.
- Page hotkey (i.e.: Ctrl + F1). To recall the page.
- Background color  or Background image  . These features are available if "Transparent background" checkbox is not checked only.
- Page size and position with  button. Alternatively it is possible to resize and move the page using the mouse.
- Define page layer with  and  buttons.

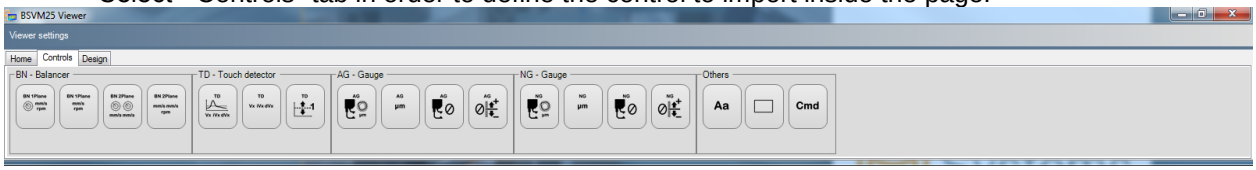
- Once page properties and layout has been defined, page position locking  is suggested.
- Save the current work with  button in "Home" tab.

Once page properties and layout has been defined, it is possible to add following objects inside the page:

- Function cards controls (Balancer, Touch detector, AG, NG)
- Commands (association with related control is required)
- Label
- Panel
- Button

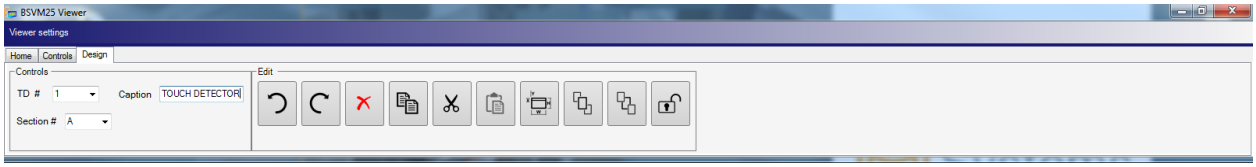
3.2.2.1.1.1 Adding of function cards controls

- Select "Controls" tab in order to define the control to import inside the page:



- Select desired control clicking with the mouse (i.e.: TD full).
- Using the mouse, draw inside the page the portion intended for selected control.

- Click on drawn control inside the page and then select "Design" tab in order to configure control properties and layout.



In "Design" tab is necessary to perform the association between drawn control and related function card (and plane or section accordingly with proper function card); i.e.: TD# 1 and Section# A.

In "Design" tab is also possible to configure:

- Caption of the control. It will be displayed instead of function card name.
- Control size and position with 

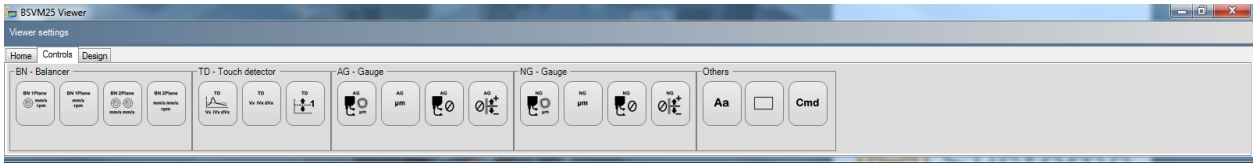
button. Alternatively it is possible to resize and move the control using the mouse.
- Define control layer with  and  buttons.

- Once control properties and layout has been defined, control position locking  is suggested.
- Save the current work with  button in "Home" tab.

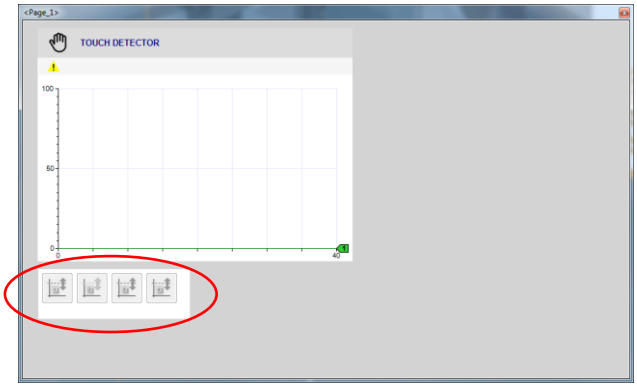
Note: Drawn control will display all the limits or tollerances or variables defined with selected part-program.

3.2.2.1.1.2 Adding of function cards commands

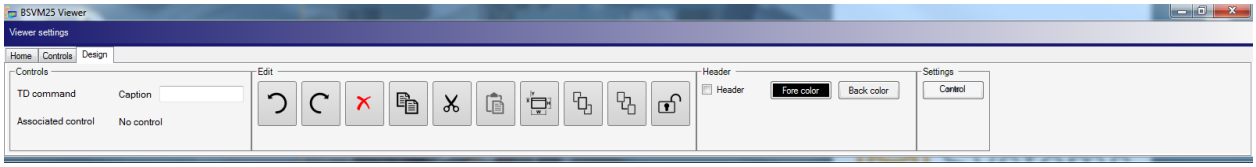
- Select "Controls" tab in order to define the command to import inside the page. Available commands are:
  - TD card limits adjustment
  - AG and NG offset adjustment



- Select desired command clicking with the mouse (i.e.: TD command).
- Using the mouse, draw inside the page the portion intended for selected command.

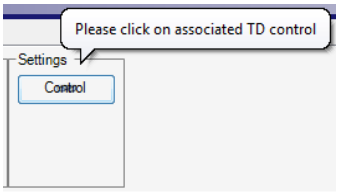


- Click on drawn command inside the page and then select "Design" tab in order to configure command properties and layout.

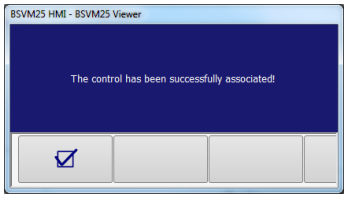


In "Design" tab is necessary to perform the association between drawn command and drawn control:

- click on "Control" button. Viewer setting page will ask to click on the associated drawn control.



- Click on the drawn control inside the page. Then a message of occurred coupling will appear.



In “Design” tab is also possible to configure:

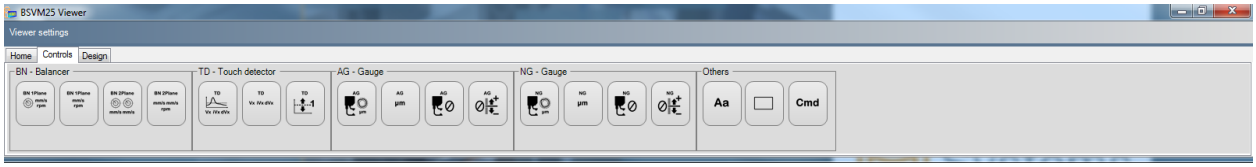
- Command caption (Header checkbox needs to be checked).
- command size and position with 

button. Alternatively it is possible to resize and move the command using the mouse.
- Define command layer with  and  buttons.
- Caption script color (Header checkbox needs to be checked).
- Caption background color (Header checkbox needs to be checked).

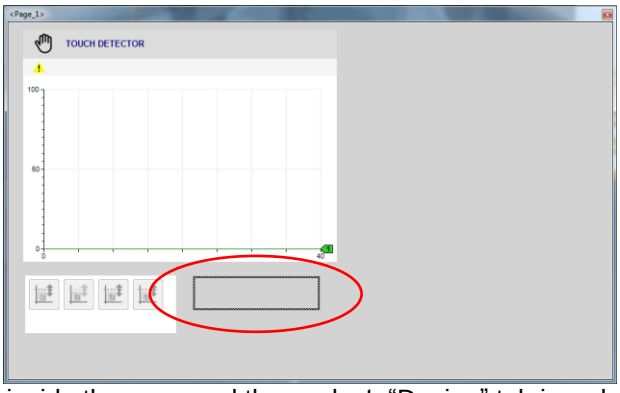
- Once control properties and layout has been defined, control position locking  is suggested.
- Save the current work with  button in “Home” tab.

3.2.2.1.1.3 Label adding

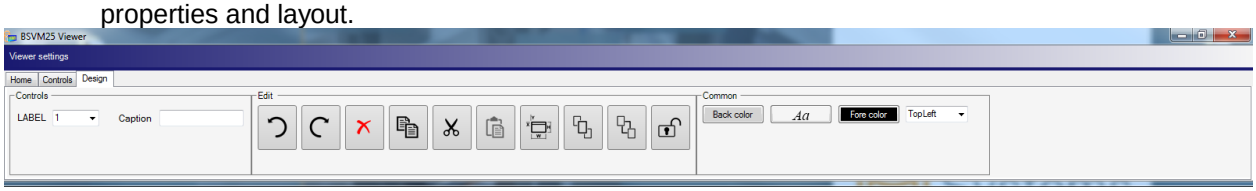
- Select "Controls" tab in order to select label object **Aa** to import inside the page.



- Using the mouse, draw inside the page the portion intended for selected label.



- Click on drawn label inside the page and then select "Design" tab in order to configure label properties and layout.



In "Design" menu is possible to configure:

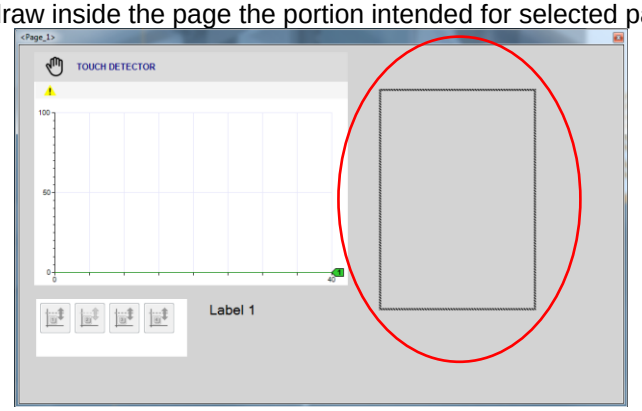
- Label ID.
- Label caption .
- Label size and position with  button. Alternatively it is possible to resize and move the label using the mouse.
- Define label layer with  and  buttons.
- Define label background color, font, script color and script formatting.

- Once label properties and layout has been defined, control position locking  is suggested.
- Save the current work with  button in "Home" tab.

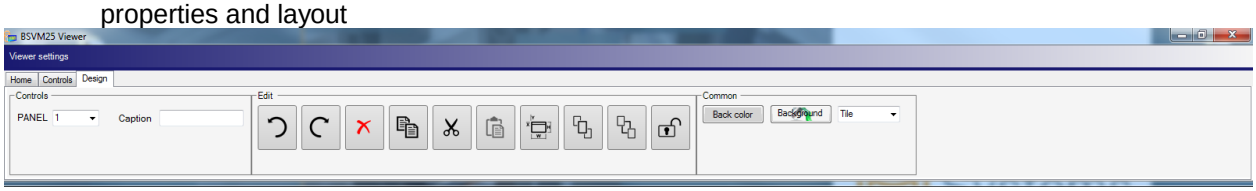
3.2.2.1.1.4 Panel adding

- Select "Controls" tab in order to select panel object  to import inside the page.

- Using the mouse, draw inside the page the portion intended for selected panel



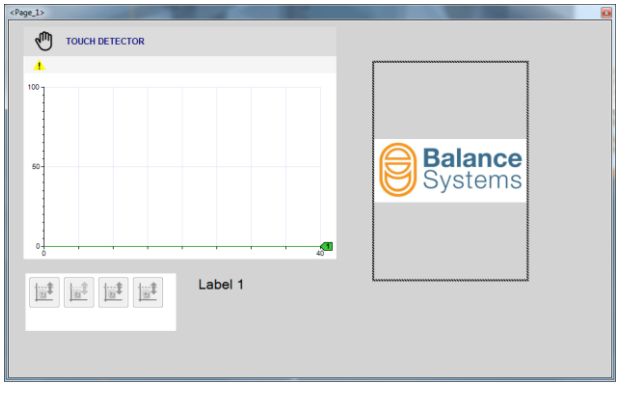
- Click on drawn panel inside the page and then select "Design" tab in order to configure panel properties and layout



In "Design" menu is possible to configure:

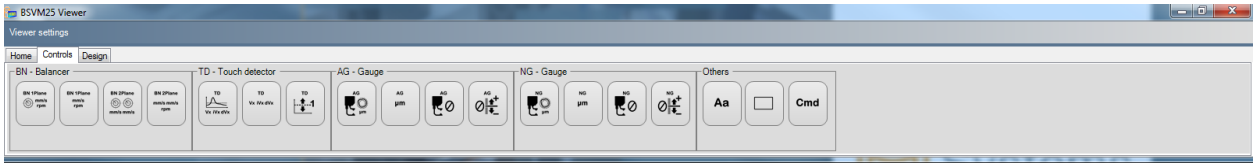
- Panel ID.
- Panel caption .
- Panel size and position with  button. Alternatively it is possible to resize and move the panel using the mouse.
- Define panel layer with  and  buttons.
- Define panel background color or background image, image location inside the panel.

- Once label properties and layout has been defined, control position locking  is suggested.
- Save the current work with  button in "Home" tab.

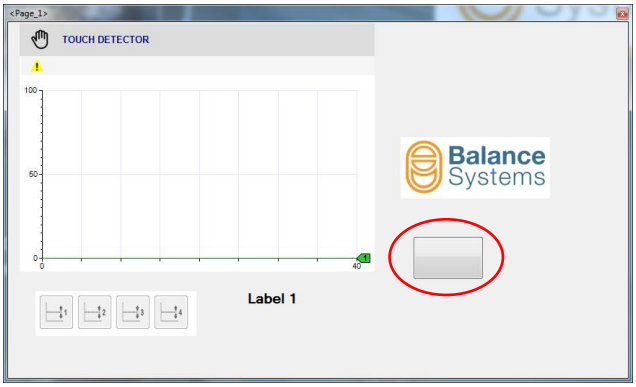


3.2.2.1.1.5 Button adding

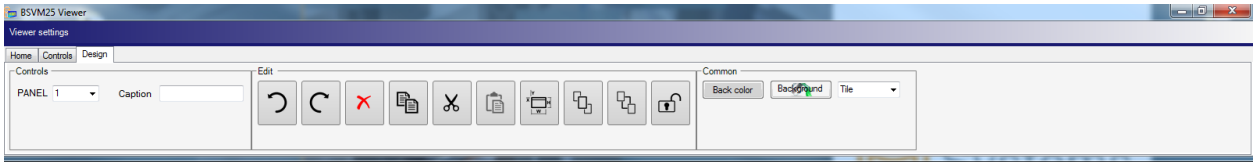
- Select "Controls" tab in order to select Cmd object **Cmd** to import inside the page.



- Using the mouse, draw inside the page the portion intended for selected button



- Click on drawn button inside the page and then select "Design" tab in order to configure button properties and layout
-



In "Design" menu is possible to configure:

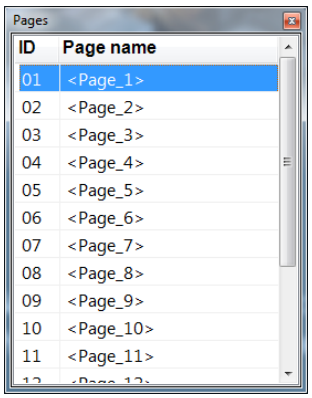
- Button label. It will be displayed clicking on "Control list" button 
- Button size and position with  . Alternatively it is possible to resize and move the button using the mouse.
- Define button layer with  and  .
- Define button background color.
- Define the function of the button:
  - **Home**: switch-off viewer page HMI
  - **Next**: switch to next page (according with defined ID) ▶
  - **Previous**: switch to previous page (according with defined ID) ◀
  - **Screenshot**: allows to save a picture of the page (".bmp") 

- Once button properties and layout has been defined, control position locking  is suggested.
- Save the current work with  button in “Home” tab.

3.2.2.1.1.6 Page export and import

Once custom page has been completed, it is possible to export the page in order to import it on another machine or PC.

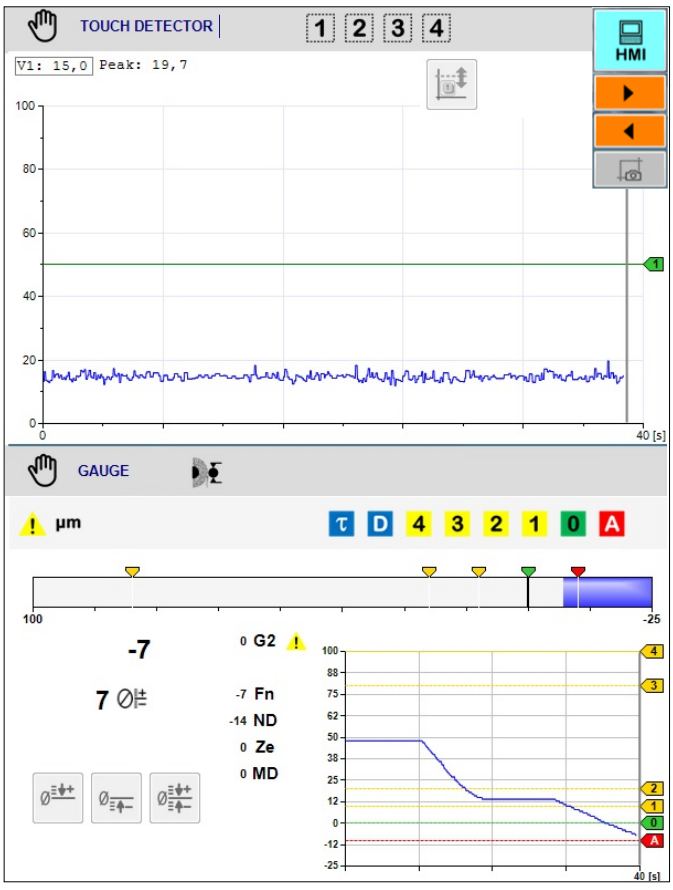
- Click on page list button  in “Home” drop-down menu.



- Choose the page to export with mouse one-click (i.e.: <Page_1>).
- Click on export page button  in order to choose the name of “.bpg” file and folder destination.

In order to import the page, click on import page button  and choose the “.bpg” file to import.

Custom page example in the picture below :

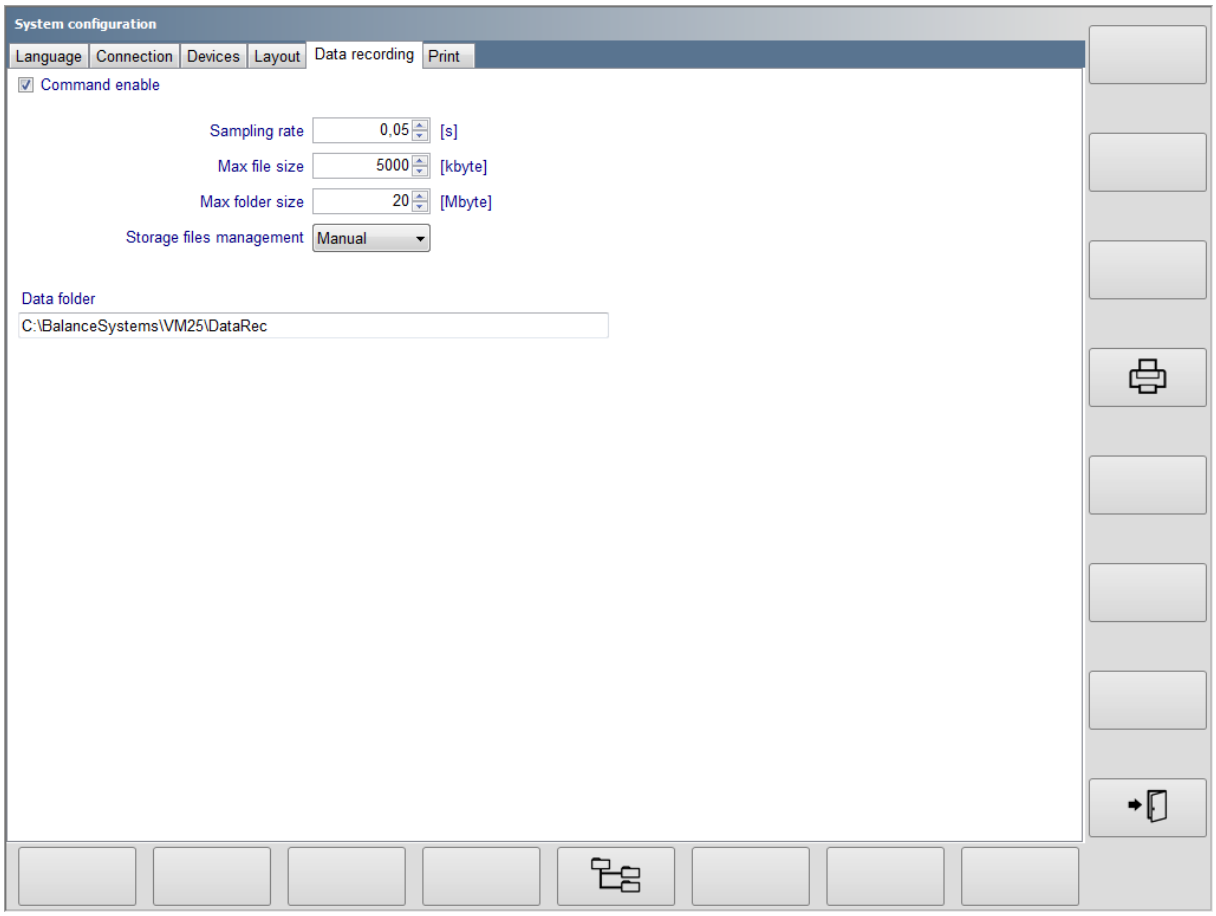


3.2.3. Data recording

From the individual device screens it is possible to record a set of system status and variable values with a given timing on a file for analysis and documentation purposes.

To access the data recording option setting, use the **Parameters**  **[Shift+F7]** commend on the System page.

- Select the **Data recording** tab



Parameter	Description
Command enable ☐	(check box). Enables the **Record** command [Shift+F4] that allows the process data of the function cards to be recorded on the file ● REC
Sampling rate [s] **[0.1 s]**	Indicates the time elapsing between the recorded samples
Max file size [kbyte] **[500 kb]**	When the maximum size is reached, the file is closed and a new file is opened.
Max folder size [Mbyte] **[10 Mb]**	Maximum size of the archive folder of the recordings. When the maximum size is reached, the operator is notified and he has to remove the files.
Data folder **<Drive>:\BalanceSystems\VMx\DataRec**	Definition of the destination folder where the data files will be stored.
Storage file mangement **[Automatic]**	Automatic: when DataRac folder is full the system will apply FIFO management: older files will be deleted. Manual: when DataRac folder is full the system will display a message box. The operator should remove manually the older files.

The files are archived in ASCII format in the default folder (see parameters table) with the following name:

BSREC_YYMMDD_hhmmss.txt

where:

YY	year
MM	month
DD	day
hh	hour
mm	minute
ss	second

The following table summarizes the format of the recorded data for each device. All information in the text file is headed in English.

Device	Device ID	Date - Time	Data
Balancer FFT	1..4	yy/mm/dd hh:mm:ss	"Step" component number "RPM" rotation speed "Frequency" frequency equivalent to rotation speed "Magnitude" magnitude of the vibration component
Balancer	1..4	yy/mm/dd hh:mm:ss	"Status flag" status in progress "RPM" rotation speed "PA: Unb Qty" unbalance quantity on plane A "PA: Unb Pos" unbalance position on plane A "PB: Unb Qty" unbalance quantity on plane B "PB: Unb Pos" unbalance position on plane B
Touch Detector	1..4	yy/mm/dd hh:mm:ss	"Vx: Am" average value "Vx: Ip" max value "Vx: Im" min value "L1" Limit 1 output status "L2" Limit 2 output status "L3" Limit 3 output status "L4" Limit 4 output status
Gauge	1..4	yy/mm/dd hh:mm:ss	"RPM" Rotation speed "Dimension" Dimension of the part "LE" Linear encoder position "Fn" Fine dimension "G2" Value of the G2 transducer "G3" Value of the G3 transducer "G4" Value of the G4 transducer "G5" Value of the G5 transducer
Gauge Roundness	1..4	yy/mm/dd hh:mm:ss	

IMPORTANT: The system will record the data of the current device displayed. Other variables are recorded for diagnostic purposes.

The following example shows the format of the text file content generated for the Touch Detector card. The REC file contents is strictly related with the part-program in use.

Example "BSREC_161118_135239.txt" contains data recorded on 18 November 2016 starting at 13:52:39.

```
//BalanceSystems S.r.l.
//VM25 Record file [BSREC_161118_135239.txt]
//File Version = 12.0
//
//Machine = BSVM25 Machine
//Number = 123456789
//Oem = Balance Systems
//End user = Balance Systems
//
//TouchDetector
//ID [1];Date;Hour;V1: Am;V1: Ip;V1: Im;L1;L2;L3;L4;//

1;16/11/18;13:52:39;12.4;14.4;10.9;True;True;True;True;
1;16/11/18;13:52:39;12.4;14.8;10.9;True;True;True;True;
1;16/11/18;13:52:39;12.1;14.8;10.7;True;True;True;True;
1;16/11/18;13:52:40;13.3;15.6;10.4;True;True;True;True;
1;16/11/18;13:52:40;13.0;15.6;11.0;True;True;True;True;
1;16/11/18;13:52:40;12.0;15.6;10.8;True;True;True;True;
1;16/11/18;13:52:40;12.3;15.4;10.6;True;True;True;True;
1;16/11/18;13:52:40;12.4;14.4;10.6;True;True;True;True;
```

System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration
	0020	Folder View	F5	Allow the archiving folder of the REC files to be selected

3.2.3.1. Recording commands

There are 4 mode to START / STOP data recording.

Mode	Action	Description
Manual	● REC ■ STOP	Start / Stop by user. See paragraph 2.1
Auto - 1	Digital I/O	Start / Stop by digital I/O interface. See document presente at the link Components
Auto - 2	Profibus / Profinet	Start / Stop by Profibus or Profinet interface. See document present at the link Multinet
Auto - 3	Call in VMx5-HMI controls	Start / Stop by properties in HMI graphic controls.

NOTE:

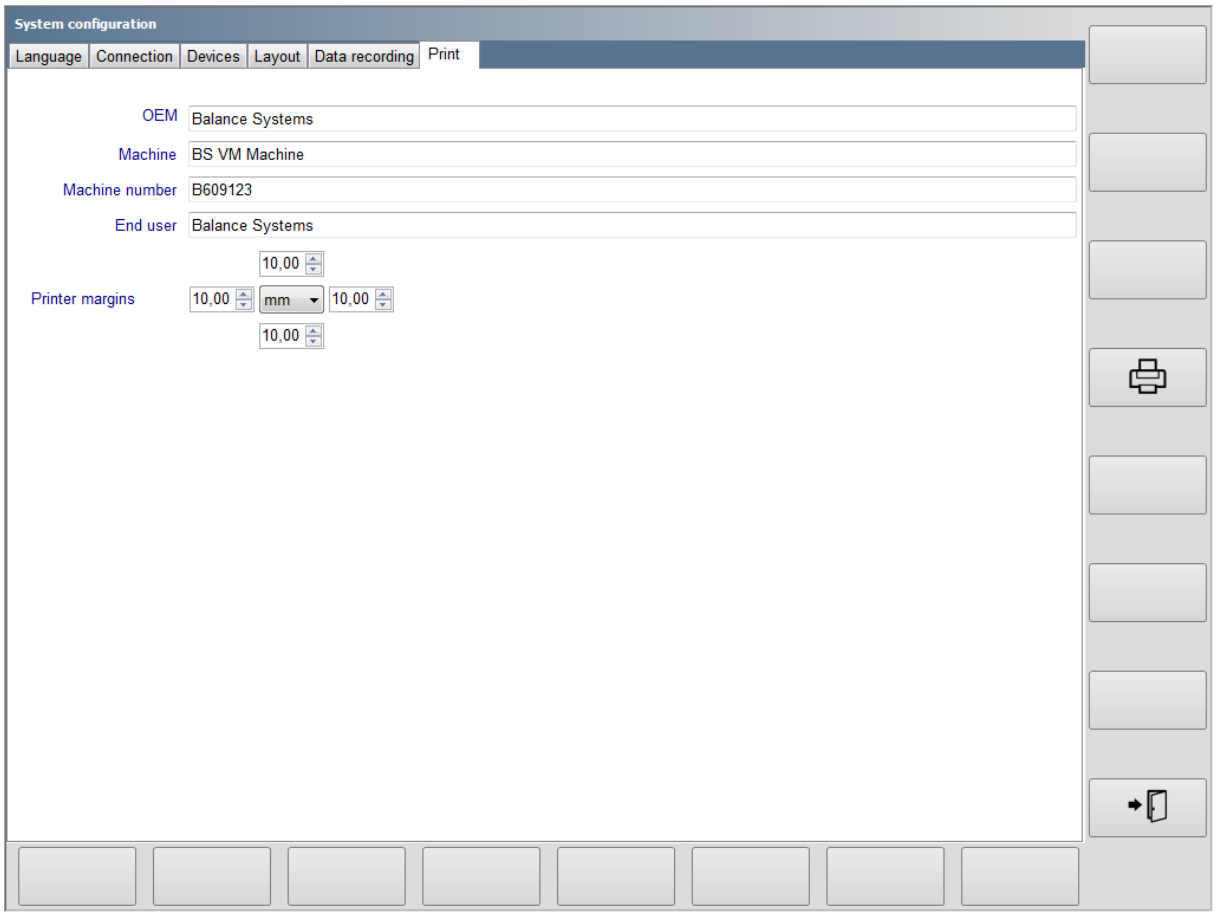
The command START REC opens a new data file and store the data.
The command STOP REC closes the data file.

3.2.4. Print

This allows printing of the current displayed screen on the default printer device.

Select the **Parameters** command  **[Shift+F7]** on the system page.

- Select the **Print** tab



It is possible to set a print report header containing the following information:

Parameter	Description
Manufacturer	Company name of the machine manufacturer (OEM)
Machine	Machine model
Number	Serial number of the machine
User	Company name of the machine user
Print margins	Definition of the printer margin areas

System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0011	Print	Shift+F4	Print the displayed screen
	0017	Exit	Shift+F8	Exit & save the configuration

3.2.5. Summary of the HMI parameters

SETUP

HMI

LANGUAGES
- Remote change language
- Italian
- English UK
- English US
- German
- Spanish
- French
- Russian
- Traditional Chinese
- …..

CONNECTION

TCP/IP CONFIGURATION
- Host address
- Host port
- Manual management of the communication layer
- HMI Id
- HMI demo mode

SERIAL PORT CONFIGURATION
- COM port
- Baud rate [bps]

CPU PREFERENCES
- Priority
- Affinity
- CPU 0,1,2,…
- Graphic control sampling

DEVICES

Balancer
- Device 1

Touch Detector
- Device 1

Gauge
- Device 1

Multinet
- Device 1

DATA RECORDING
- Command enable
- Sampling rate
- Max file size
- Max folder size
- Storage files management
- Data folder

PRINT
- OEM
- Machine
- Machine Number
- End user
- Printer margins

VM Link
- Search VM Link
- Stop search VM Link

LAYOUT

SETTING
- Layout
- Color palette
- Header height
- Width (for custom layout only)
- Height (for custom layout only)
- X position (for custom layout only)
- Y position (for custom layout only)
- Fix size (for custom layout only)
- Fix location(for custom layout only)
- Full Screen
- Window Border
- Tooltips
- Smart change page
- Quick shortcut
- Start HMI page
- Start VIEWER page
- Viewer Designer

KEYBOARD

BOTTOM / SIDE BAR
- Button height / width
- Left / Top margin
- Vertical / Horizontal spacing
- Number of buttons
- Corners

ICONS
- Command icons (size)
- State icon (size)
- Active command icons color
- Inactive command icon color
- State icon color
- Quality

COLOR
- Info panel background
- Info panel text
- Panel background
- Buttons: background
- Buttons: text
- Buttons: border
- Buttons: selected
- Buttons: selected 2
- Parameters: background
- Parameters: text
- Parameters: selected background
- Parameters: selected text
- Device header: background
- Device header: text
- Device: text color 2
- Device: text
- Device: background
- Diagram: background
- Diagram: axis
- Diagram: cursor
- Diagram: grid
- Diagram: trace
- Diagram header: text (active)
- Diagram header: background (active)
- Diagram header: text
- Diagram header: background

3.3. Devices software setup

The correct use of the devices

- Balancer
- Touch detector
- Gauge
- Multinet

needs to define a sets of parameters. Devices parameters are divided in three groups:

two are defined by system's installer

- **Options** Enabling hardware and software functions
- **Setup** Adjusting hardware devices and sensors / actuators

one is defined by system's programmer / installer

- **Work or Part-Program** Parameters of the process under control

NOTE
To access the parameters, each device should be switched in manual mode.

The contents of this chapter should be integrated reading the documentspresent at the link

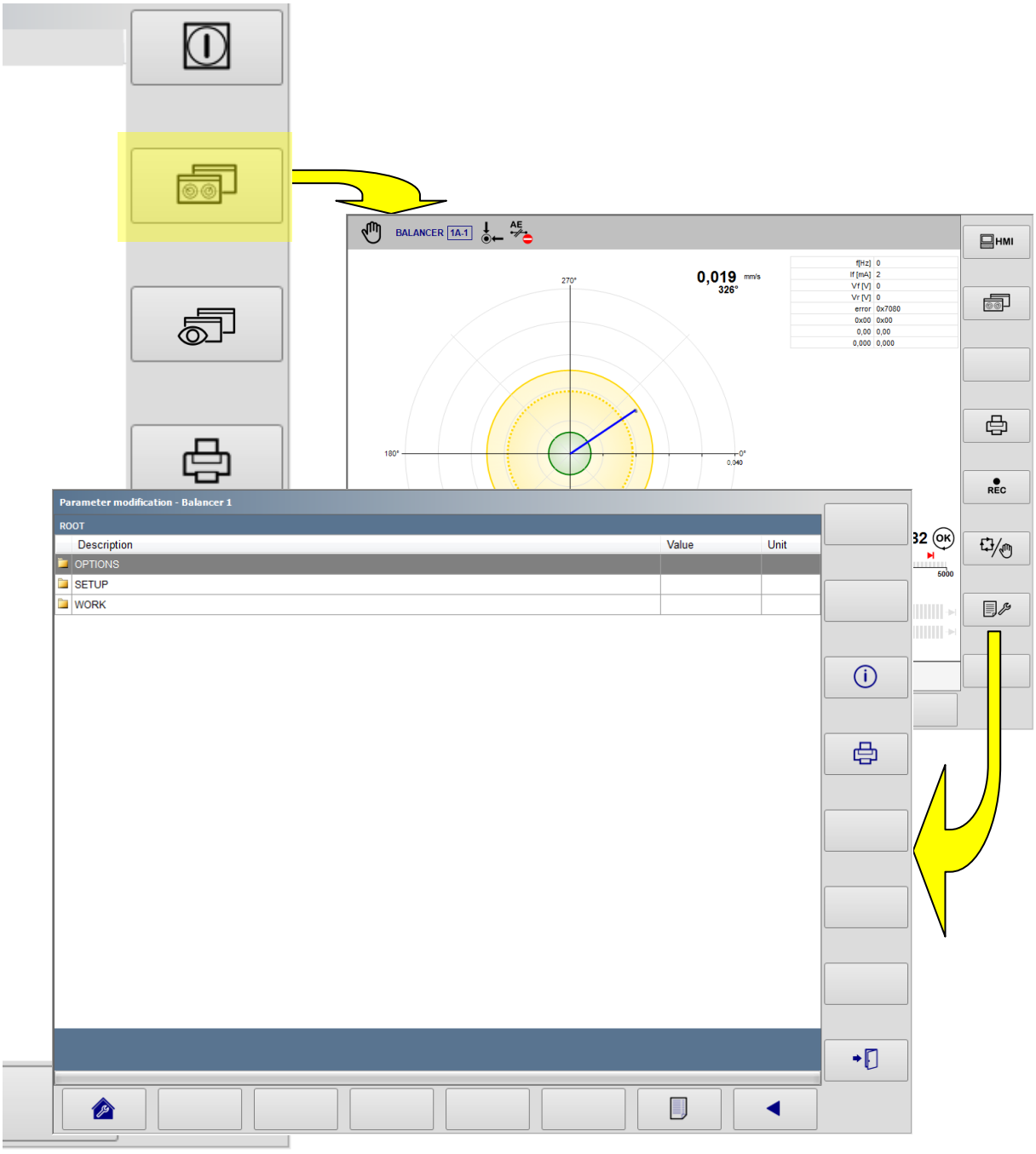
User Manual

Parameter setup

3.3.1. Parameter modification

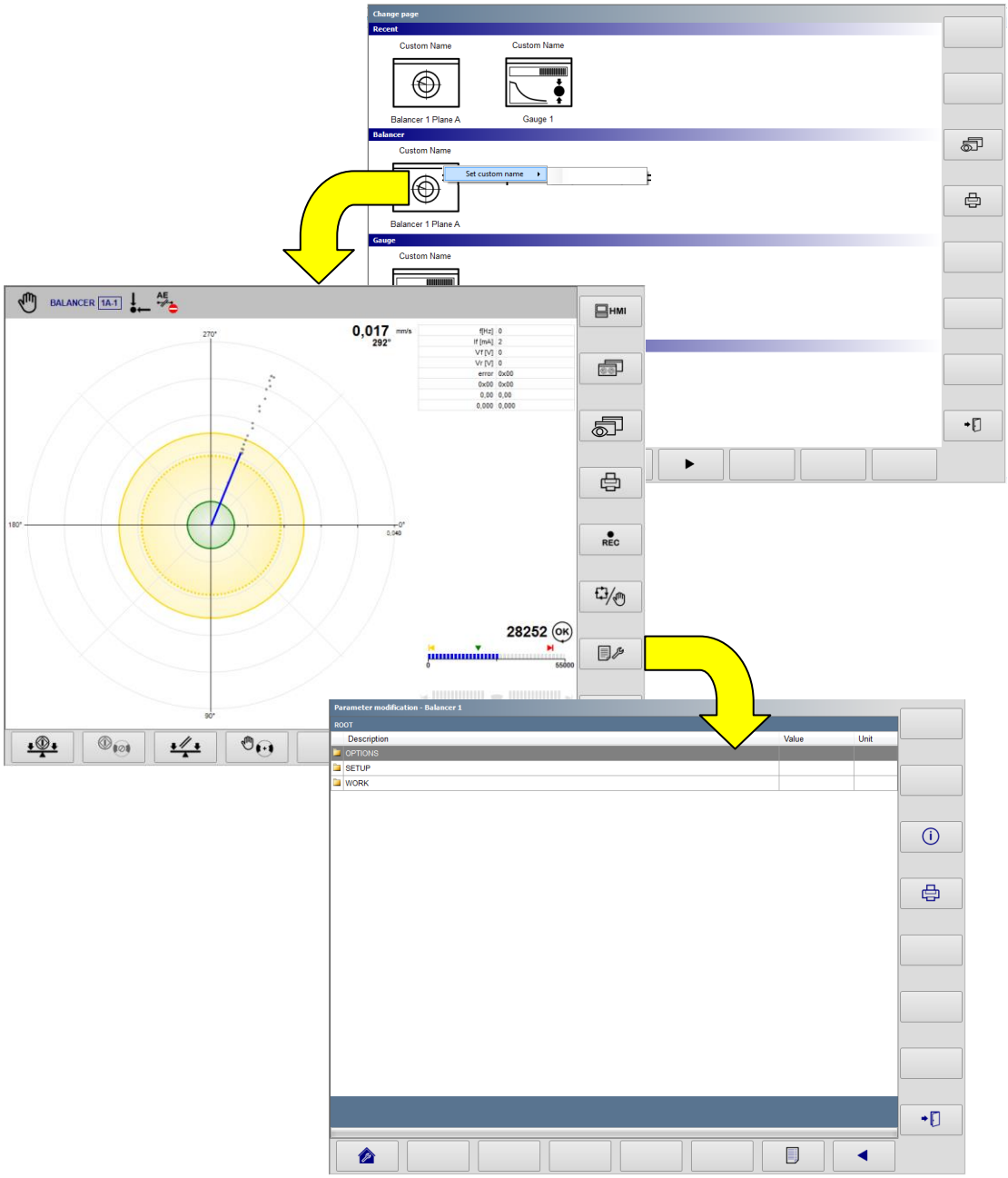
STARTING FROM THE DEVICE STATUS SCREEN IN MANUAL MODE

- Use the command **Change page** **[Shift+F2]**, to reach the desired device (i.e. “Balancer 1”)
- Switch in MANUAL MODE: command **Automatic** / **Manual** **[Shift+F6]**
- Press **Parameters** **[Shift+F7]**



As alternative, starting from the device status screen in manual mode, if “Smart change page” checkbox has been flagged in the HMI layout setup:

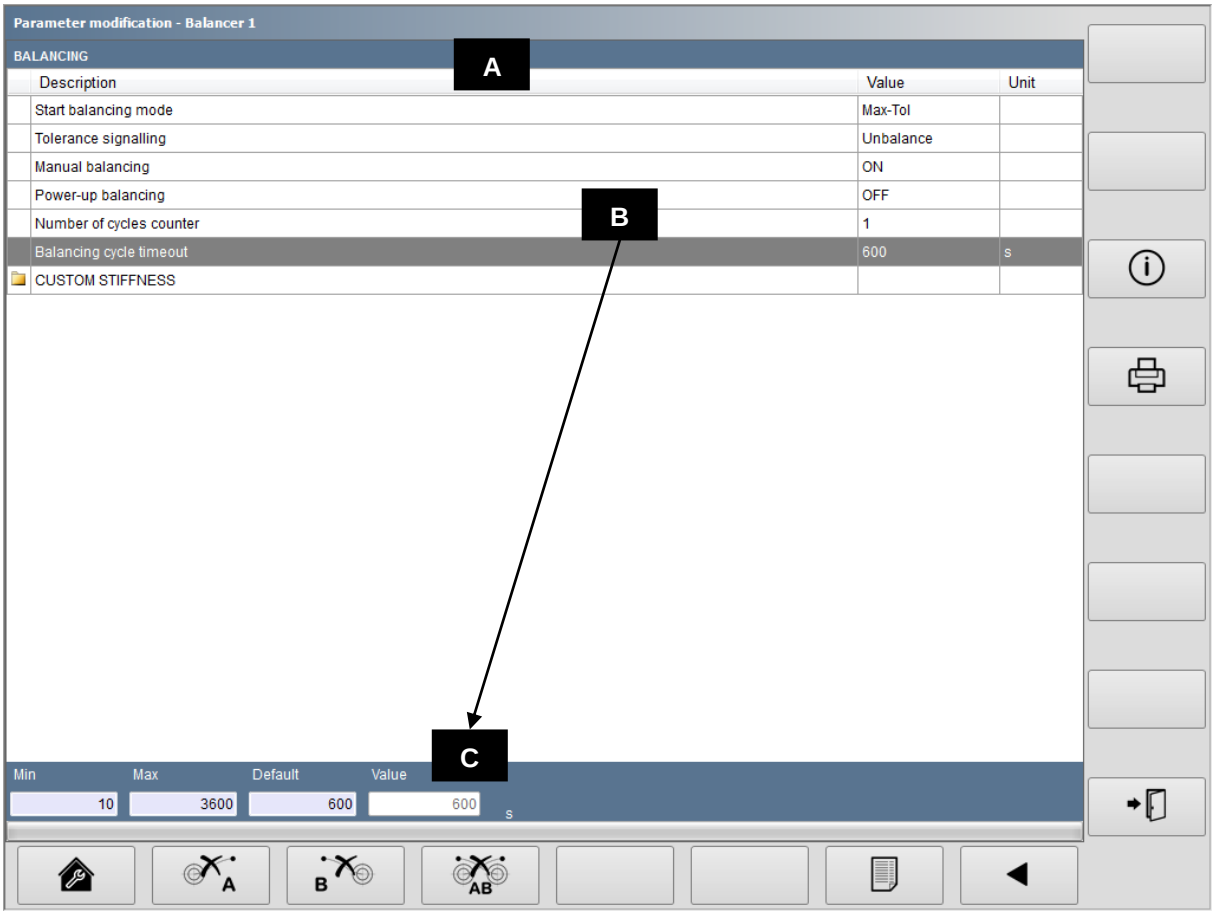
- Use the command **Change page**  **[Shift+F2]**, to open “Smart change page” view, then select desired page.
  Recent / favorites menu is also available.
  Left-click on desired page, allows to open the page.
  Right-click on desired page allows to customize the name of the page.



- Switch in MANUAL MODE: command **Automatic** / **Manual**  **[Shift+F6]**

- Press **Parameters**  **[Shift+F7]**

System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0011	Print	Shift+F4	Print the current parameter page
	0019	Factory preset	F1	Load the default value (factory preset)
	0008	Info	Shift+F3	Additional information about the parameters, for diagnostic purposes. Helpful in case of guided procedure by Balance Systems's service personnel.
	0036	I/O Test	F2	Access to the I/O Test function to check the device digital interface wiring.
	0021	Parameter list display	F7	Explore the parameters tree
	0033	Previous menu	F8	One level back in the parameters tree
	0017	Exit	Shift+F8	Exit & save the configuration



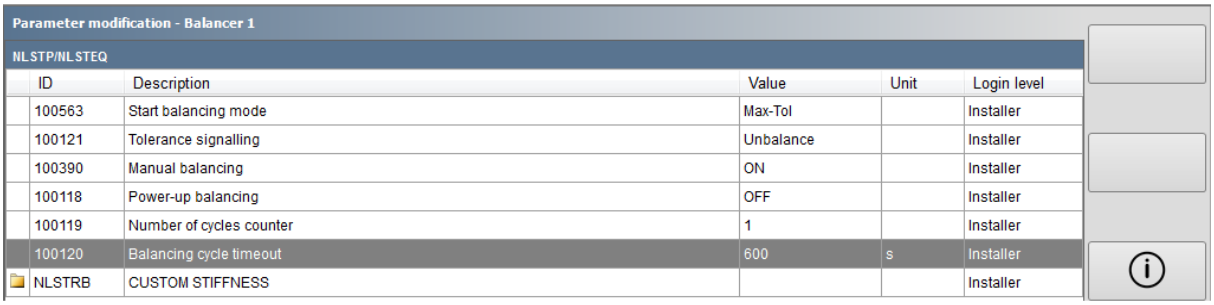
In the parameter modification page are present the following areas:

A. Actual parameter page and position in the device parameter tree
B. For each parameter are indicated:

- Description (parameter's name)
- Actual value
- Measuring unit

In case of extended information through the command **Info** **[Shift+F3]**

- ID, Id number of the parameter
- AL, access level required to modify the value



C. For each parameter with **numerical** format, are indicated:

- Min value
- Max value
- Defualt value (factory preset)
- Actual value

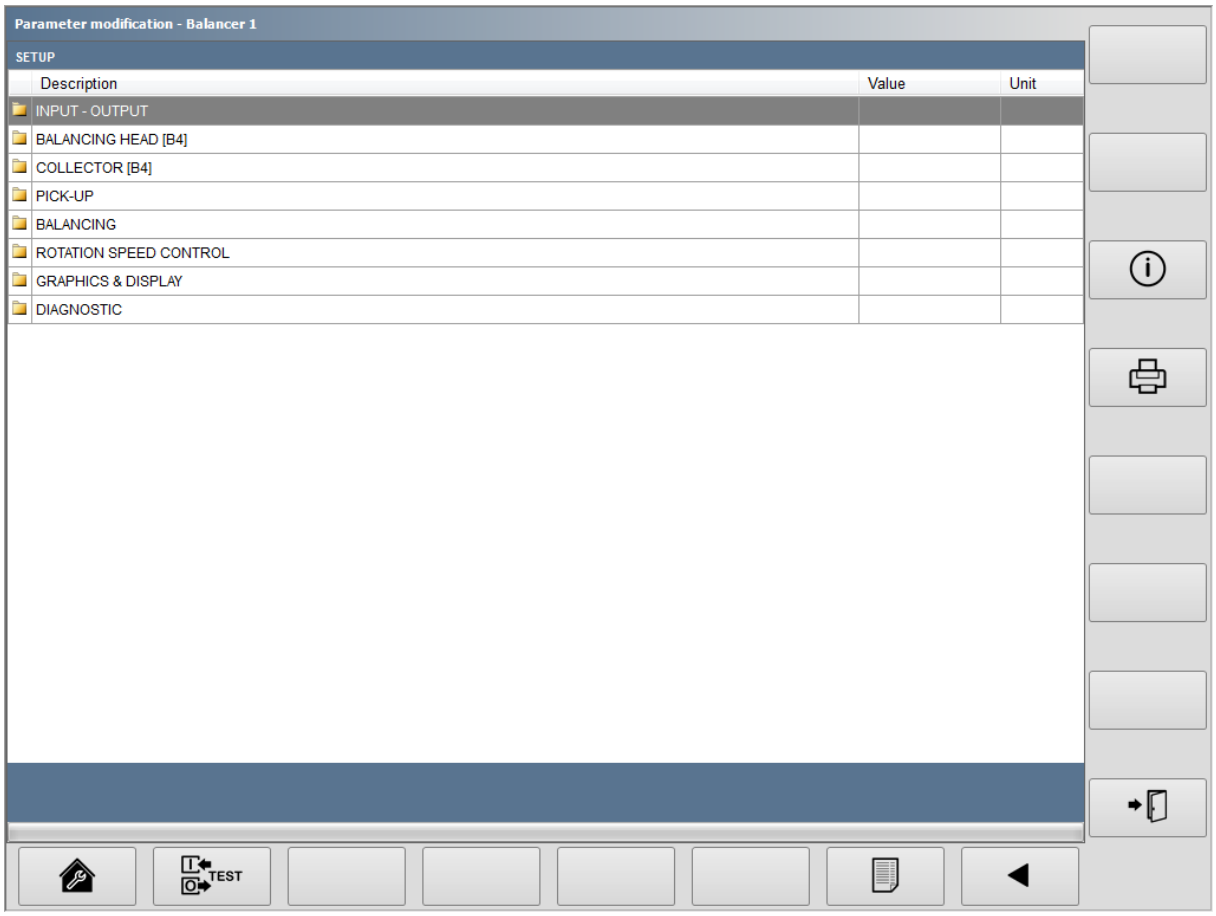
For each parameter with **list** format, are indicated:

- Defualt value (factory preset)
- Actual value

3.3.2. Digital I/O Test

To make installation easier during cabling and connection of the system to the machine's CNC, a special function of digital I/O test has been implemented which can be accessed from the setup stage of each of the following function cards:

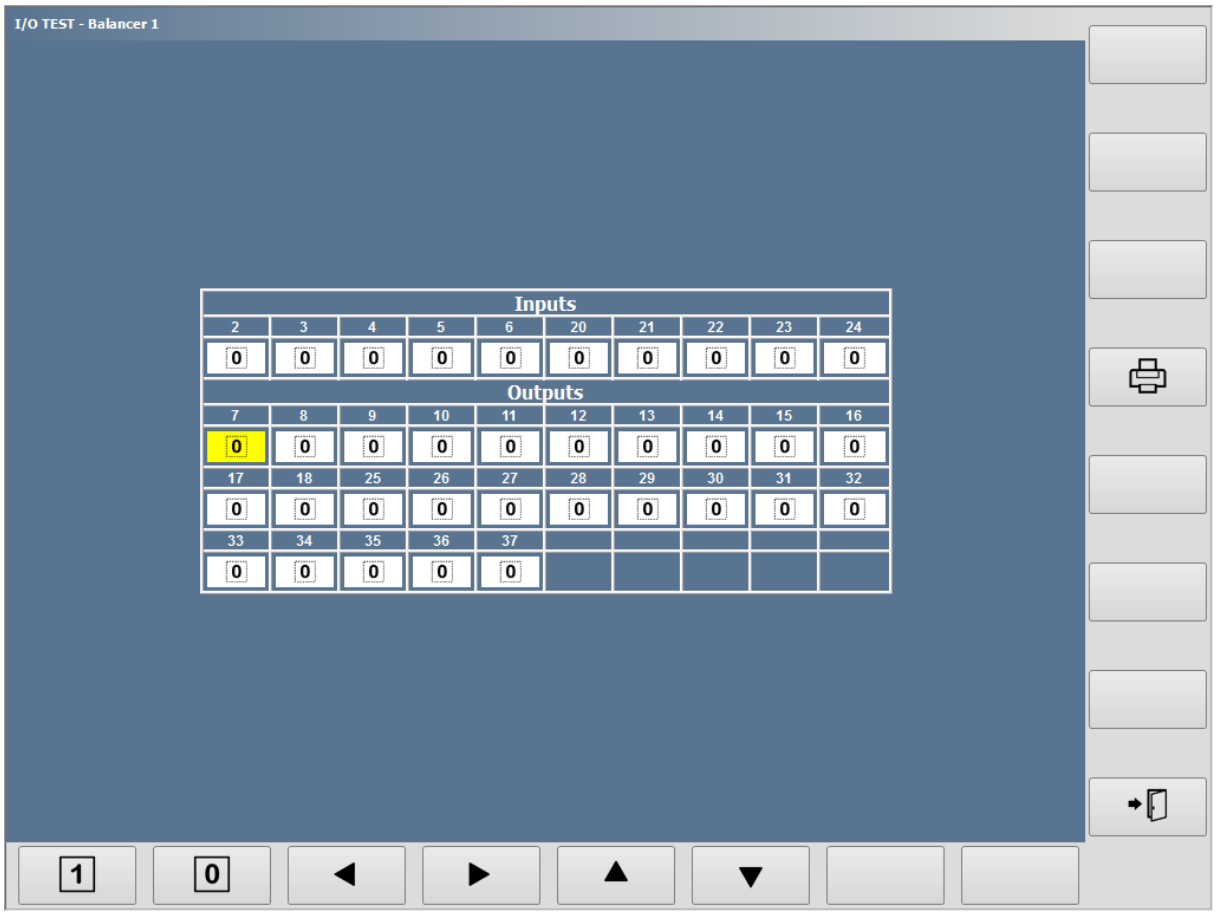
- BALANCER
- TOUCH DETECTOR
- GAUGE
- MULTINET



- Press the command **I/O Test** 

[F2]

  The test function displays the status of input signals to the function card and enables forcing the status of each output. In this way it is extremely easy to carry out a full test of the connections made. The figure below gives an idea of a typical screen page of the I/O test function.



System commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0011	Print	Shift+F4	Print the current parameter page
1	0040	Digital output enable	F1	Set the actual pin at high level
0	0039	Digital output disable	F2	Set the actual pin at low level
◀	0029	Left	F3	Select the previous pin
▶	0030	Right	F4	Select the next pin
▲	0027	Up	F5	
▼	0028	Down	F6	
	0017	Exit	Shift+F8	Exit

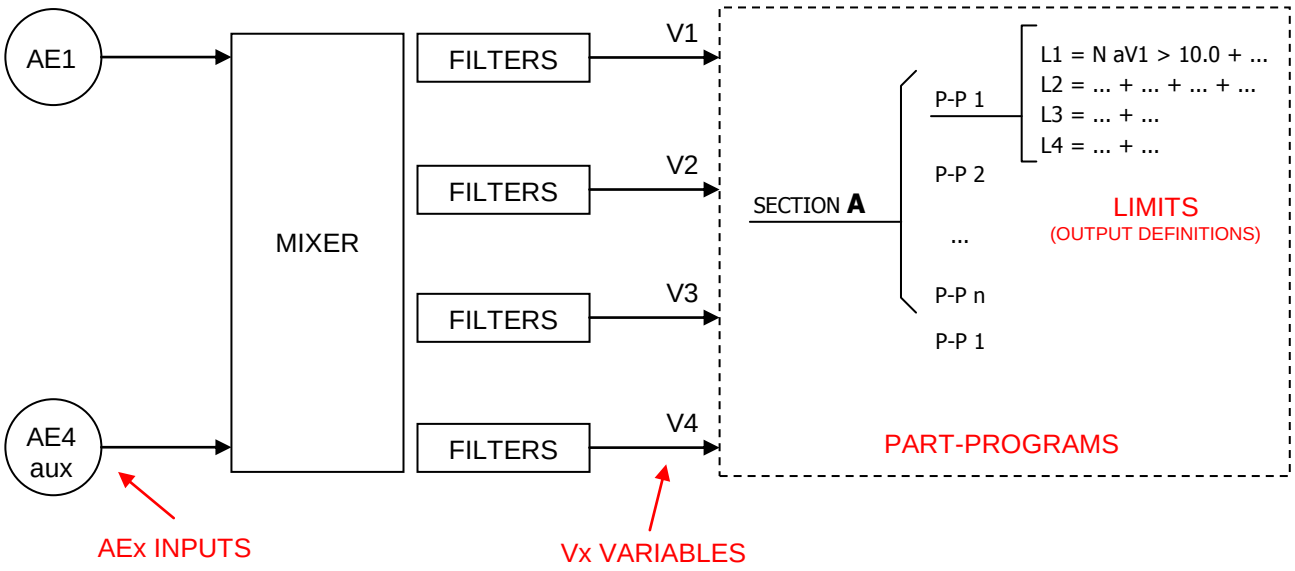
3.4. Touch detector [type TD]

3.4.1. Acoustic Emission Variables setup

3.4.1.1. Introduction

The best performances of the AE sensors require the setup of some parameters by the system installer.

The concept of the signal processing is shown in the picture below.



Starting from the AEx sensors connected to the inputs of the card (connectors D8, D5) it is necessary to define the Vx variables to perform the process control.

A Vx variable is the result of the processing performed on the analog and digital signal generated by an AEx sensor.

The default setting of the system requires that there is a direct correspondence between the sensors connected to the inputs and the variables, therefore:

AE1 sensor	connected to input connector D8	> Variable V1
AE4 sensor (AUX)	connected to input connector D5	> Variable V4

Depending on the characteristics of the process to be controlled and the type of sensors which equip the machine, it is possible to change the association. So, the same sensor (that means the same source signal) can be treated by different filtering to generate different variables, such as :

AE1 sensor	connected to input connector D8	> Variable V1
		> Variable V2
		> Variable V3

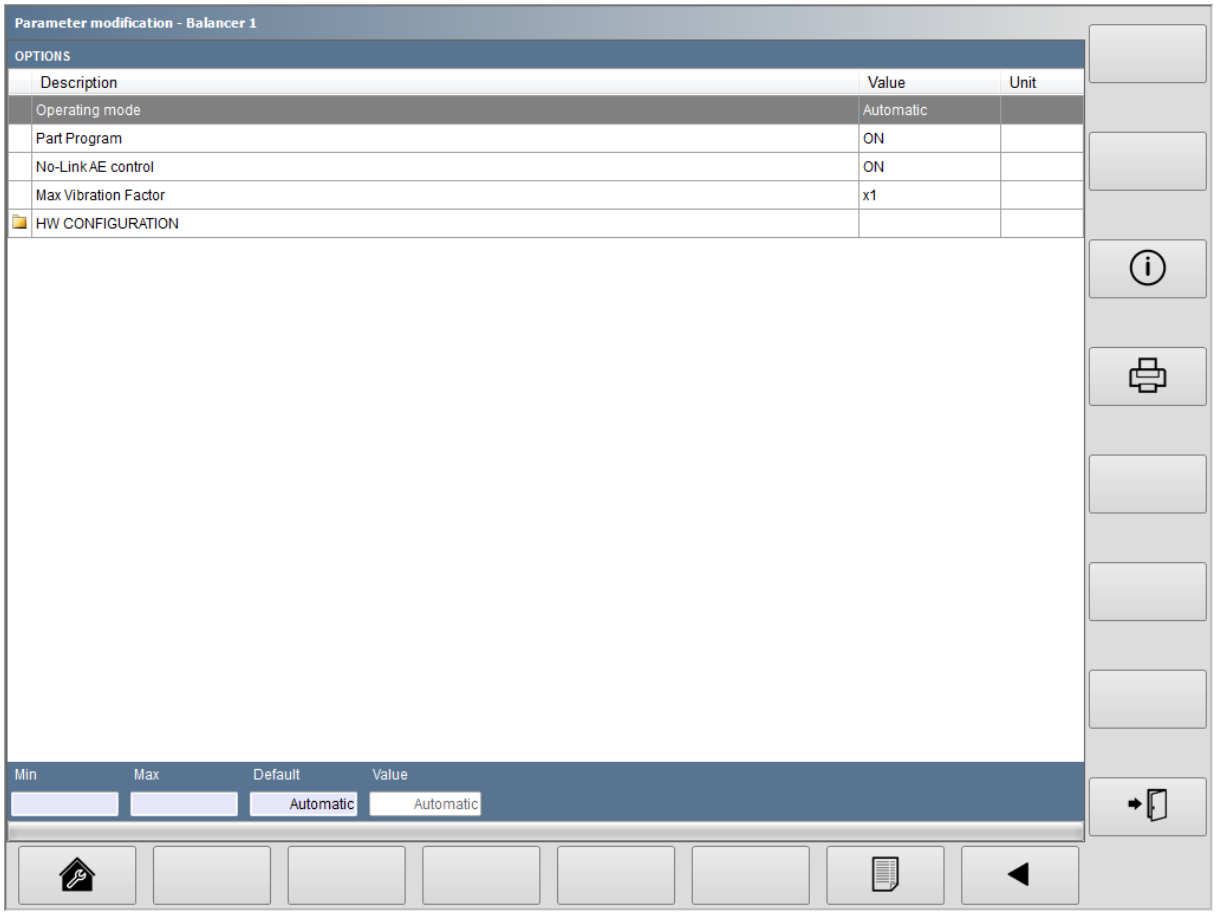
The Vx variables created, are used within the formulas of the part program to define the outputs L1, L2, L3, L4.

3.4.1.2. Configuration mode, Variable setup, Sections and Part-Program

Depending on the processes that have to be controlled, the system installer may want to enable, via the options menu, the following features:

a) Mode of operation of the frequency analysis
b) 4 setup of Vx VARIABLES: S1, S2, S3 e S4
c) Up to 4 sections, that means up to 4 processes simultaneously controlled: Section A, Section B, Section C and Section D
d) The use of the part-program, in a number depending on the number of sections enabled:

1 section:	Section A	> max 16 part-program
2 sections:	Section A and Section B	> max 8 part-program (per section)
4 sections:	Section A, Section B, Section C and Section D	> max 4 part-program (per section)



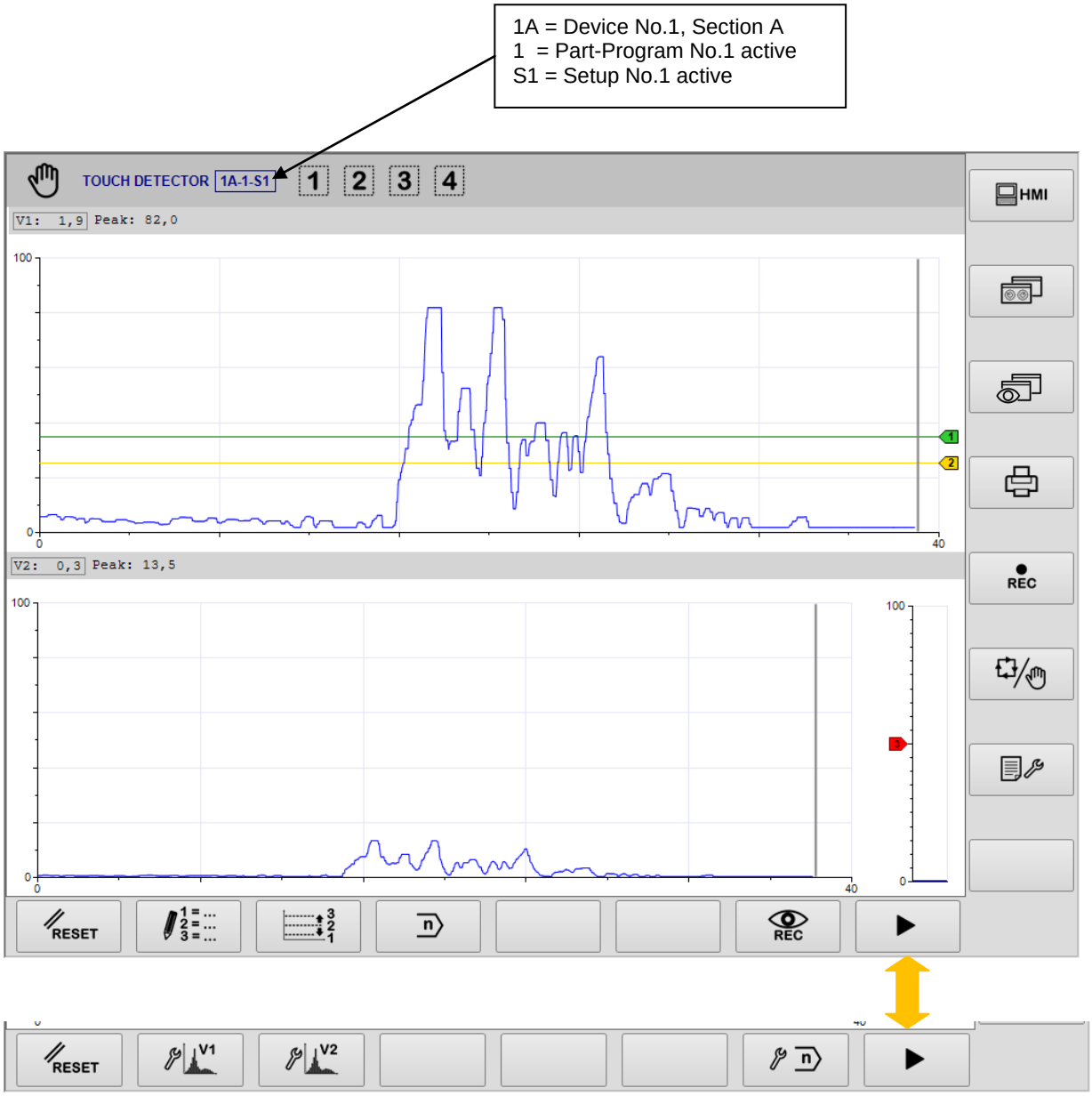
ID	Parameter	Description
	Configuration mode **[BASE]**	Depending on the hardware with which the card is configured and the type of sensor used, the acquisition system can work in 3 different ways with increasing complexity of programming. **BASE** mode **MULTIBAND** mode See the table below and next paragraphs for a complete description
	Vx Setup **[OFF]**	Enabling of multi setup variables **OFF**: Each Vx variable has one setup only **ON**: It is possible to define up to 4 different setup for the same Vx variable
	Part Program **[OFF]**	Enabling of Part-Program use **OFF**: Disabled. Part-Program No.1 is the only available. **ON**: Depending on the No. of sections enabled, a number of part-program are available: Section A > 16 Part-Program Sections A+B > 8 Part-Program per section Sections A+B+C+D > 4 Part-Program per section
	Sections **[A]**	Enabling of No. of Sections, means No. of simultaneous processes, to be controlled. **A**: 1 process **A+B**: 2 processes **A+B+C+D**: 4 processes

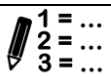
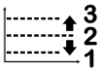
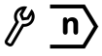
No.	Sensor	Mounting	Typical Setup	
			Configuration Mode	Frequency Window
1		Static mounting (machine table, work head body, tail stock body, blade dresser body, spindle housing, etc.)	BASE-BAND	n.a.
2		Static mounting (machine table, work head body, tail stock body, blade dresser body, spindle housing, etc.)	BASE-BAND MULTI- BAND	0 .. 4
3		Nose spindle mounting (grinding spindle OD - ID, dressing spindle, etc.)	MULTI-BAND	1..4
4		Built-in spindle mounting (grinding spindle OD - ID, dressing spindle, etc.)	MULTI-BAND	1..4
5		Built-in spindle mounting (grinding spindle OD - ID, dressing spindle, etc.)	MULTI-BAND	1..4
6		Rotating ring (grinding spindle, work-head, etc.)	MULTI-BAND	1..4
7		Hydrophone static mounting (working coolant through) (grinding area, dressing area, etc.)	BASE-BAND	n.a.

3.4.1.3. Preliminary operation for the system optimization

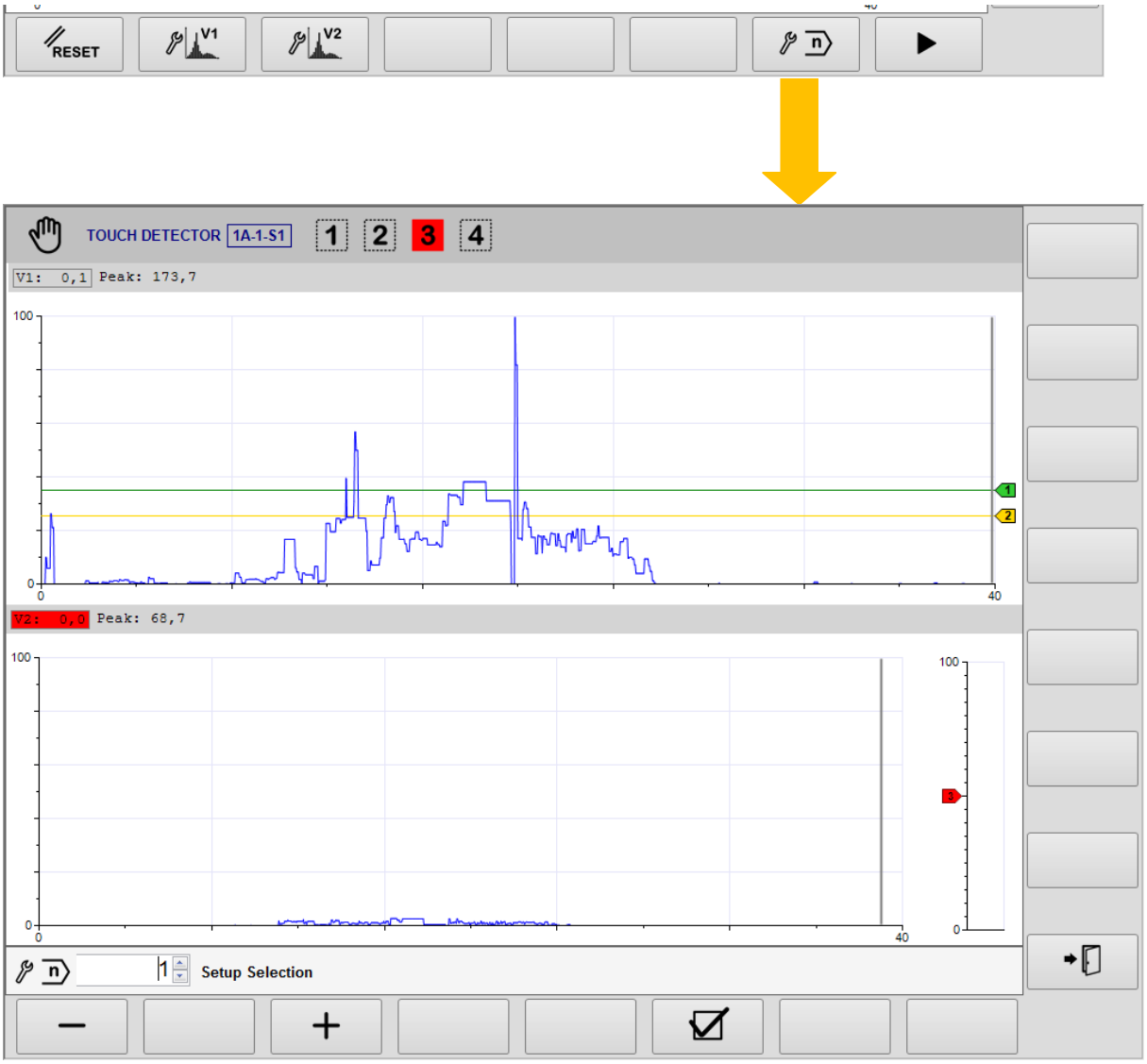
The following operations are common to all three configuration modes (basic, multi-band, enhanched) of the system.

Here are the commands available to access the setup.

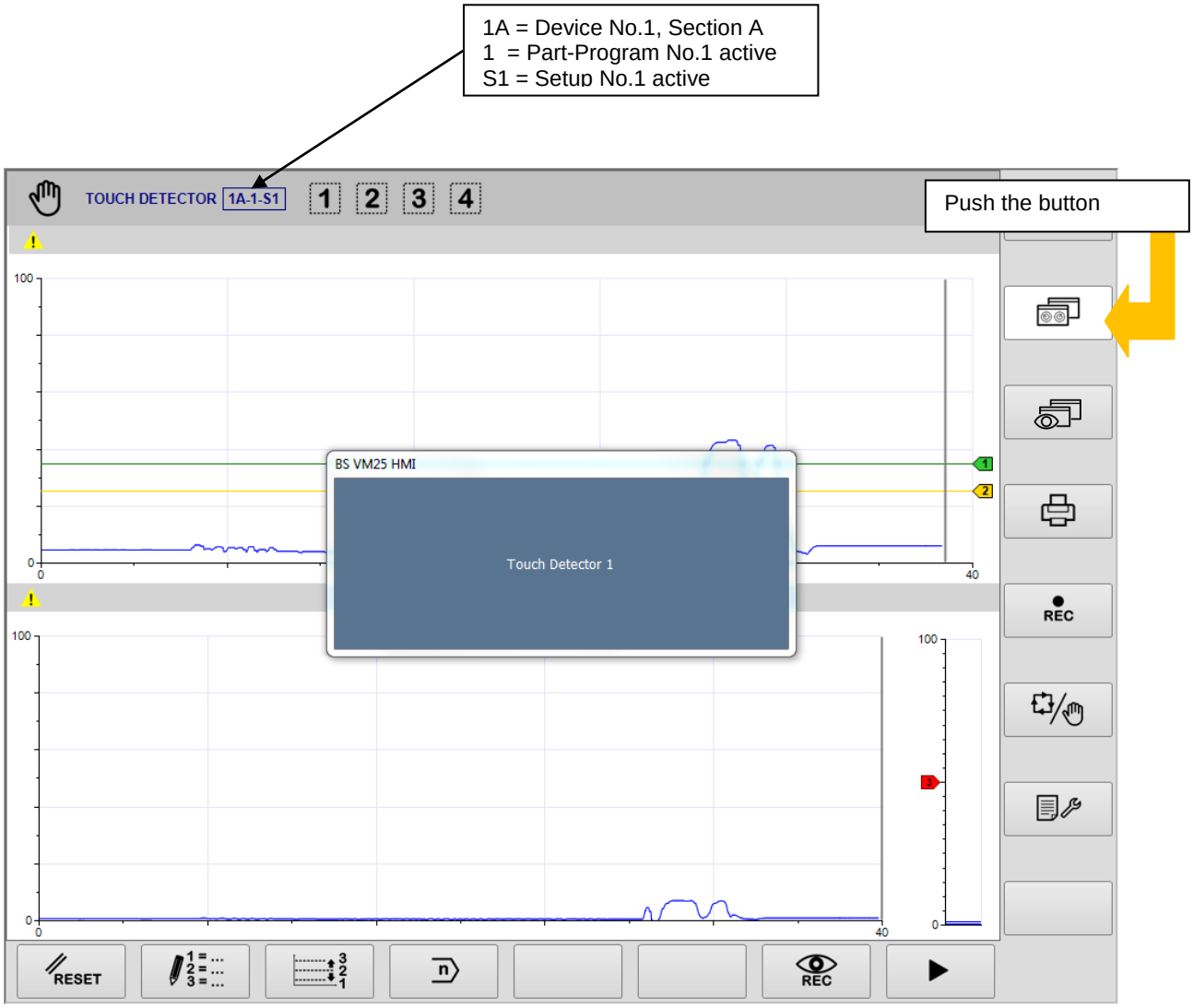


Commands				
Icon	**ID**	**Command Name**	**Button**	**Description**
	0042	Reset	F1	Status and Output signaling reset
	4006	Formula setup	F2	Access to formula editing
	4005	Quick Limits 1, 2, 3 & 4 correction	F3	Quick access to fine adjustment of the thresholds related to limits in the formula
	0041	Part program seect	F4	Part-Program selection for manual mode operations. With this parameter one imposes one of the available programs for the selection of the gap eliminator. The programs are numbered from 1 to n. By imposing 0, the program selected by the CNC of the machine will be activated. When selecting a number from 1 to n, a specific program will be imposed, which does not give the possibility to the CNC, to use a different program ***NOTE:*** *Operating in automatic mode the selection made by PLC/NCU has the priority.*
	0034	Next commands line	F8	Access to next commands line
	4061	Variable V1 setup	F2	Access to frequency analysis function to setup the V1 variable
	4064	Variable V2 setup	F3	Access to frequency analysis function to setup the V2 variable
	4067	Variable V3 setup	F4	Access to frequency analysis function to setup the V3 variable
	4070	Variable V4 setup	F5	Access to frequency analysis function to setup the V4 variable
	4079	Power sensor setup	F6	Direct access to setup parameter page of the POWER channel [Connector D4]
	4007	Change Vx Setup	F7	Vx Setup selection for manual mode operations. With this parameter one imposes one of the four available Vx Variables Setup. The setup are numbered from 1 to 4. By imposing 0, the setup selected by the CNC of the machine will be activated. When selecting a number from 1 to 4, a specific setup will be imposed, which does not give the possibility to the CNC, to use a different setup. ***NOTE:*** *Operating in automatic mode the selection made by PLC/NCU has the priority.*

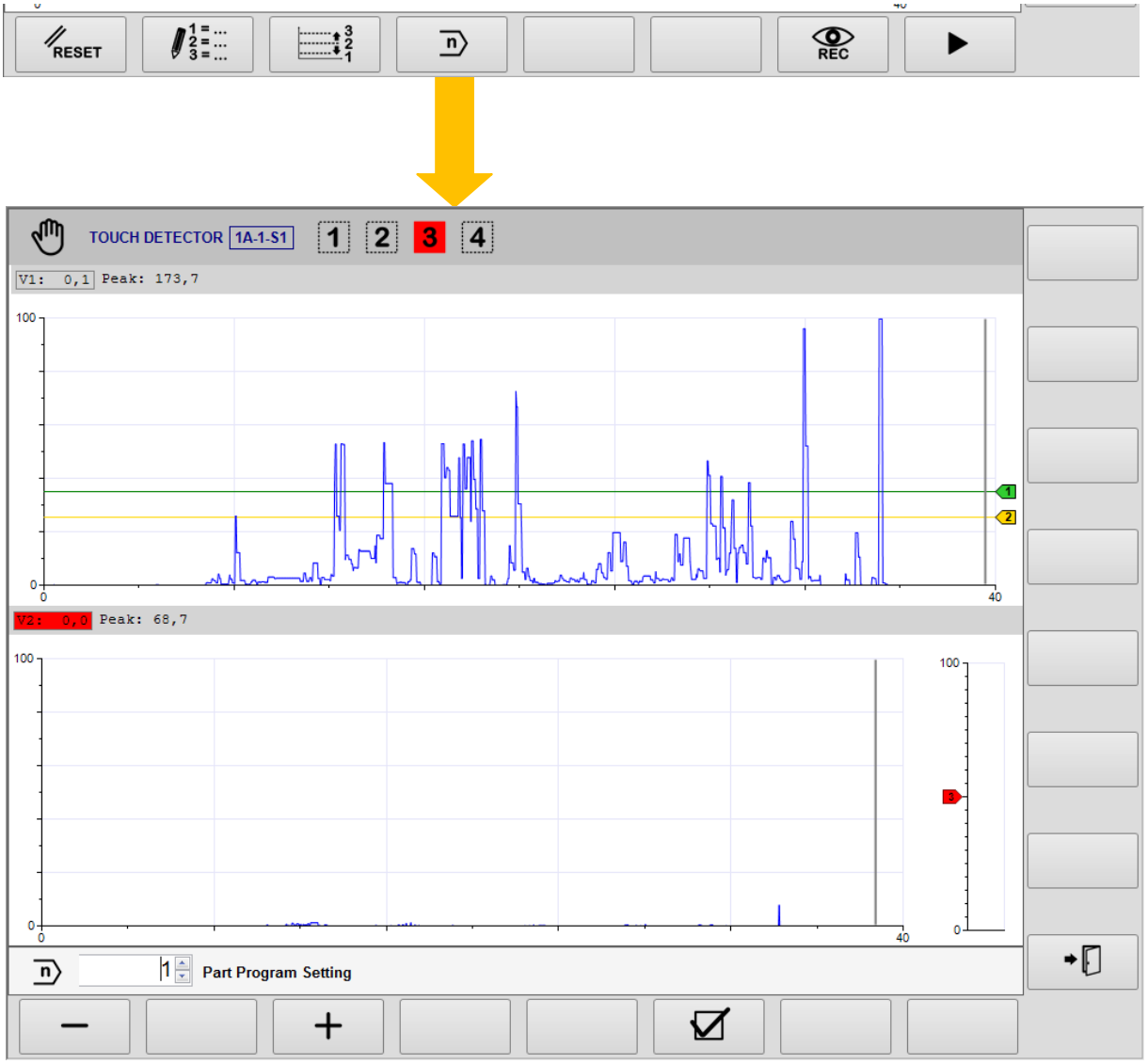
1. If enabled the management, select the setup of the variables among the 4 available (S1, S2, S3 or S4)



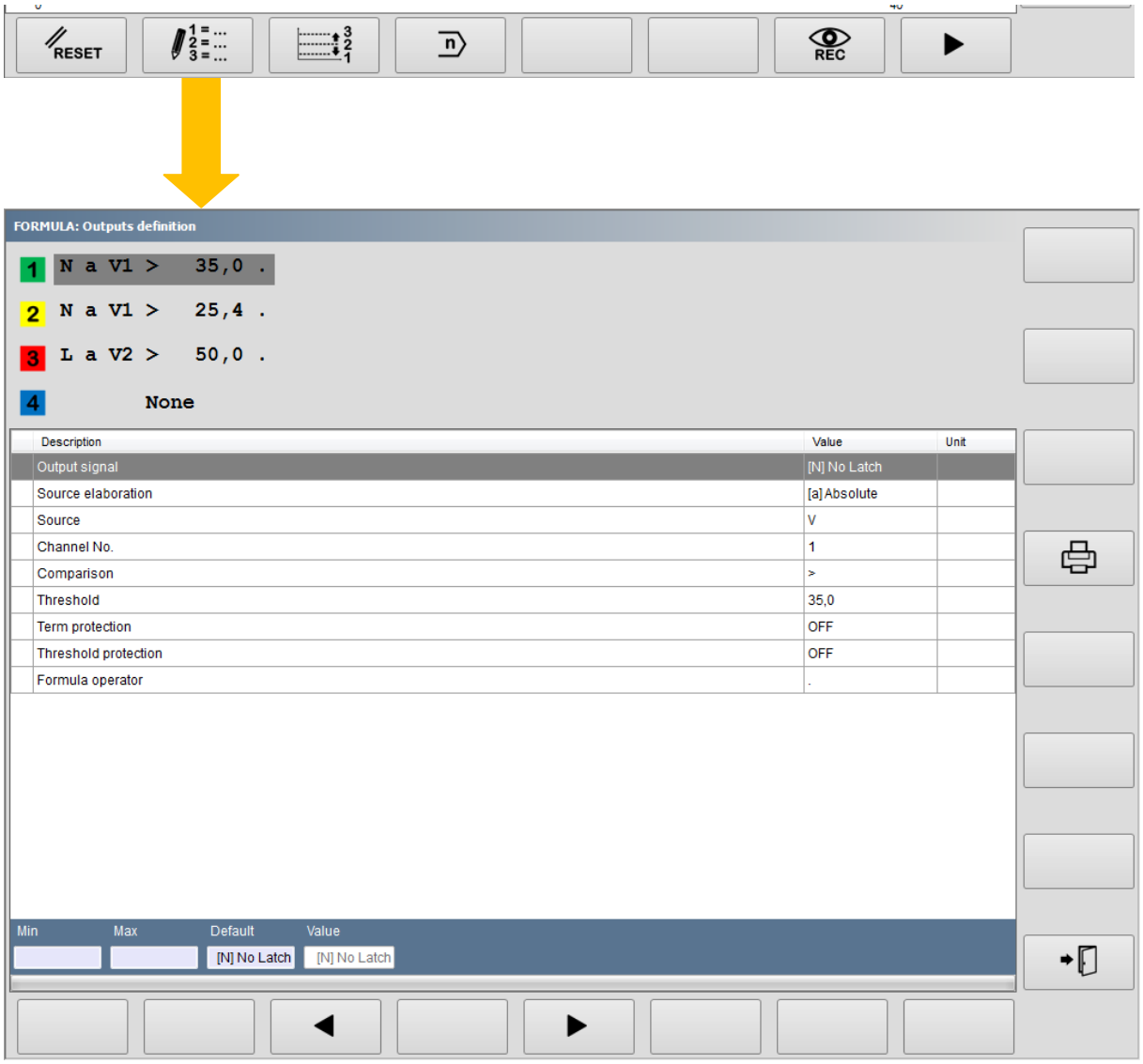
2. If enabled management, select the working section between the 4 available (A, B, C, or D)



3. If enabled the management, select the part program among those available based on the number of working sections defined (PP1, ..., PPn)



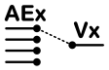
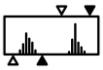
4. Fill the part program by introducing the desired variables, such as:



3.4.1.4. BASE mode optimization

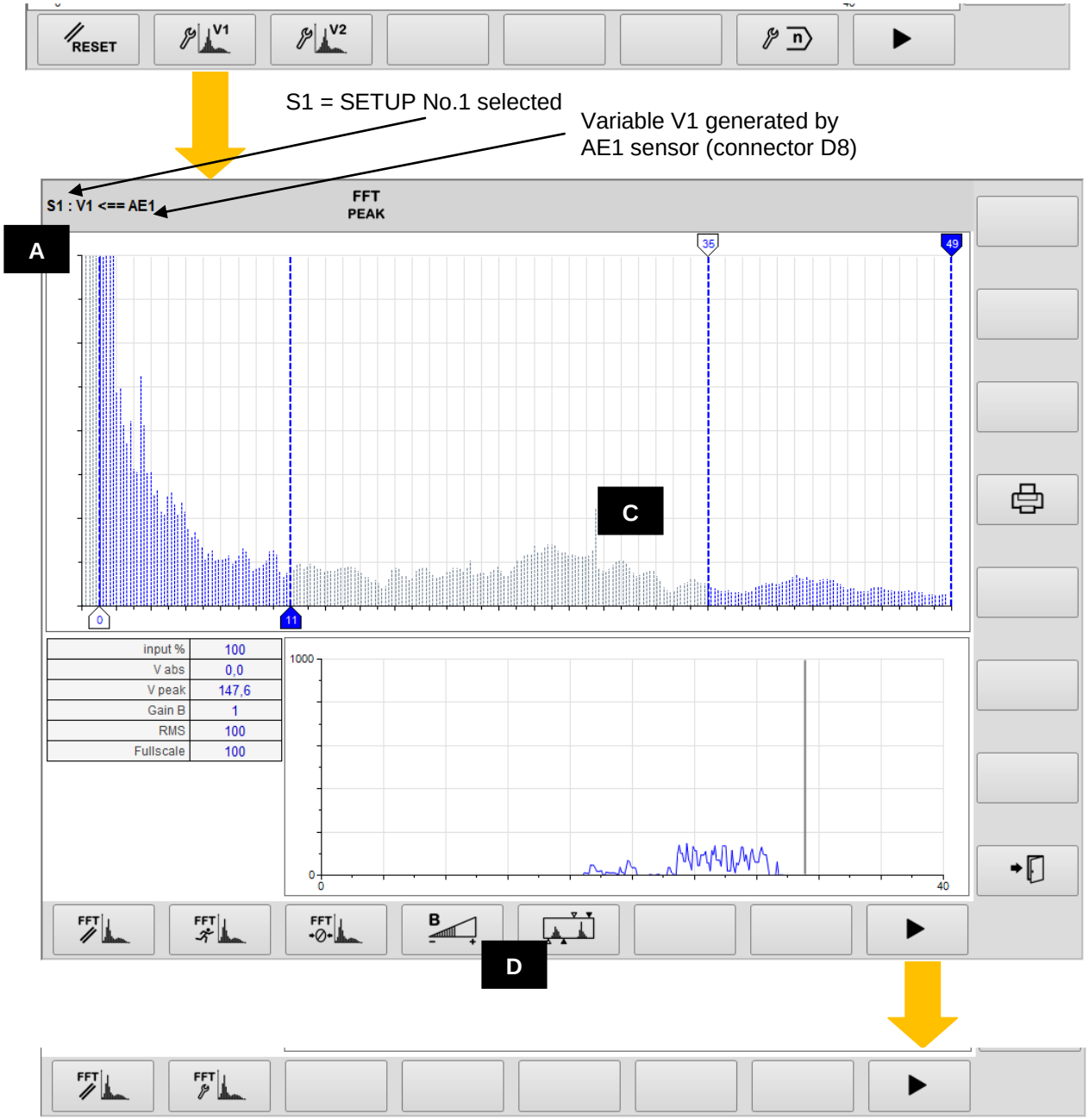
The system displays the entire available frequency band.

It is possible to progam:

Parameters				
Icon	**ID**	**Parameter name**	**Button**	**Description**
	4071	Source	F3	Choice of the AE sensor channel which generates the input signal
	4056	Gain B	F4	Amplification of the input signal.
	4030	Band Pass Filter	F5	Up to 2 Band Pass filters inside the selected window. The filters can be switched on/off and placed independently inside the selected window.
	4073	RMS Filter	F4	Low pass filter value which gives a reduction of disturbance, eliminating the high frequency components. The higher the value entered, the greater the attenuating effect of the high frequency which is achieved.
	4072	Fullscale	F5	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.

The setup page, based on frequency analysis, is designed to reach the best behaviour during the optimization task.
With few operations, it is possible to setup both the sensibility and the frequency range where the AE signals should be observed to avoid that background and environment noise generate false signalling.

1. Access to the setup of the variables used in the part program written above:



On screen are identified the following areas:

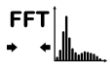
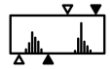
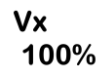
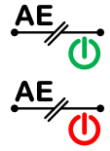
A. Selected channel

C. Diagrams area

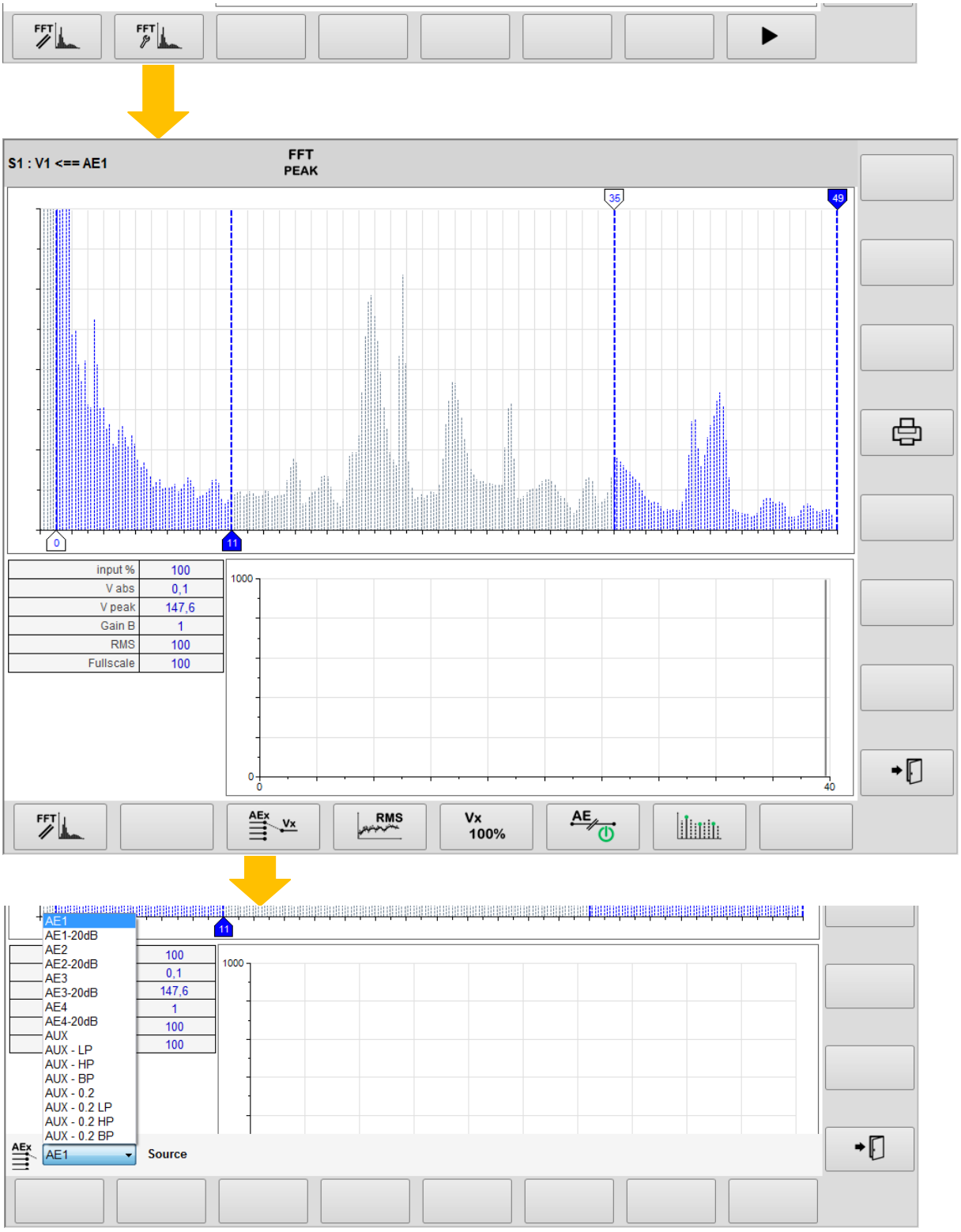
- Vx vs frequency diagram (spectrum)
- Vx vs time diagram
- **Input** signal level on A/D converter input [%]
- **Vabs** istantanous value of the Vx variable
- **Vpeak** Vx peak value (zeroed by reset)
- **Gain B** value of the input signal amplification
- **RMS** value of the RMS filter
- **Fullscale** value of fullscale

D. Command buttons [Fx]

The available commands are described in the table below.

Parameters				
Icon	**ID**	**Parameter name**	**Button**	**Description**
	4046	FFT Reset	F1	Status reset
	4047	FFT run-time	F2	FFT in run-time mode
	4045	FFT peak detector	F2	FFT in peak detector mode (default)
	4050	Zero FFT	F3	Background noise spectrum acquisition
	4049	Reset Zero FFT	F3	Background noise spectrum reset
	4056	Gain B	F4	Gain B setup. Gain of the input signal
	4030	Filters	F5	Digital filters setup
	4048	FFT Setup	F2	Other parameter setup
	4071	Link to source	F3	Choice of the AE sensor channel which generates the input signal
	4073	RMS Filter	F4	RMS FIlter
	4072	Fullscale	F5	Variable fullscale
	4076 4075	Sensor ready	F6	Sensor ready check enable / disable
	4074	Downsample filter	F7	Accesses the downsample filter setup
	0017	Exit	Shift+F8	Exit

2. Bind the Vx variable to the signal source (AEx sensor), example: V1 <=> AE1



- Set the value then press  **[Shift+F8]** to save it

3. Execute the optimization starting from the parameter suggested in the following table

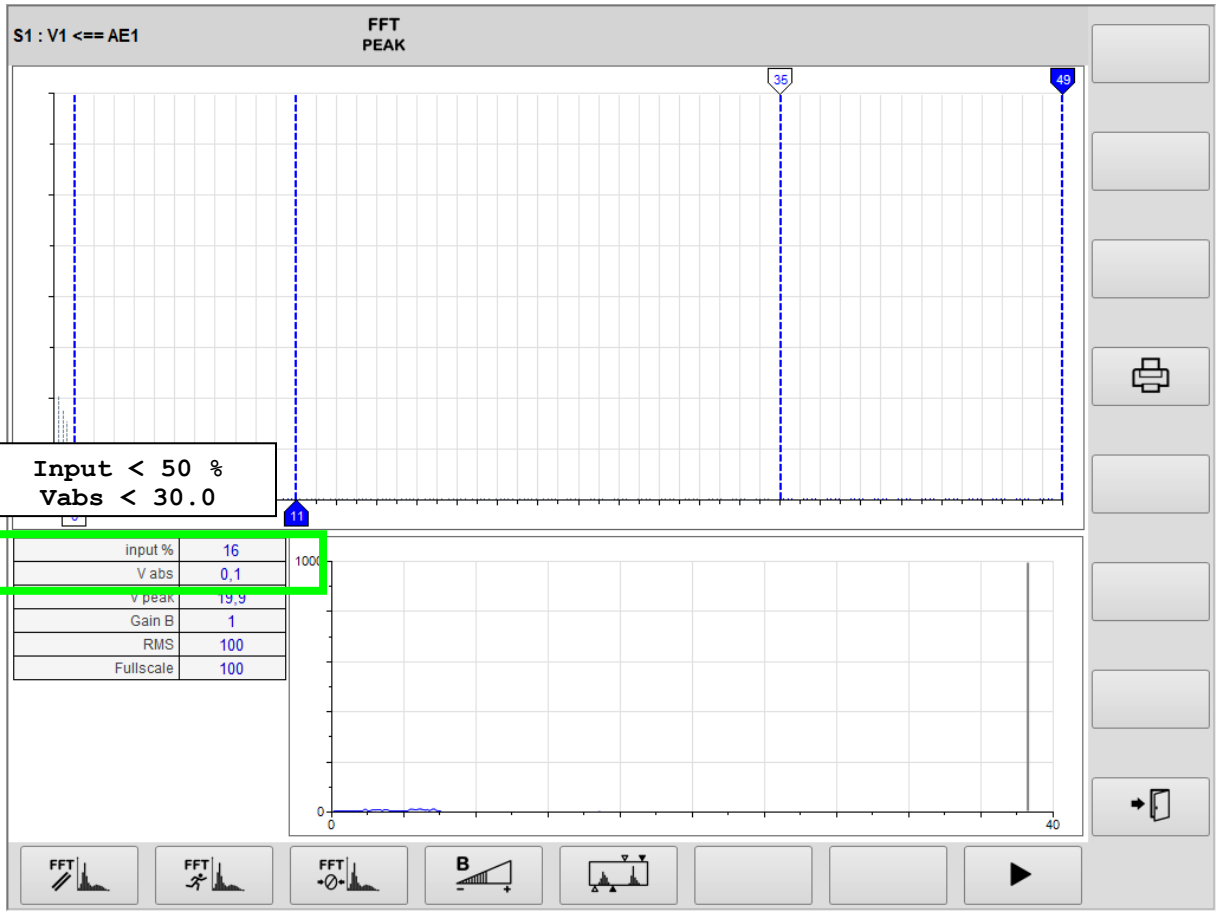
No.	Sensor	Typical Setup				
		Gain B	Digital Filters	RMS Filter	Full scale	FFT mode
1		4	OFF	100	100	FFT MAX
2		4	OFF	100	100	FFT MAX
7		4	OFF	50	100	FFT MAX

and operating as follow:

a. Run-up the spindle up to nominal speed and position the axis close to touch conditions (wheel-part or wheel-dresser)

b. Press one or more the button FFT **[F1]**

c. Verify that in such condition the background noise detected is:

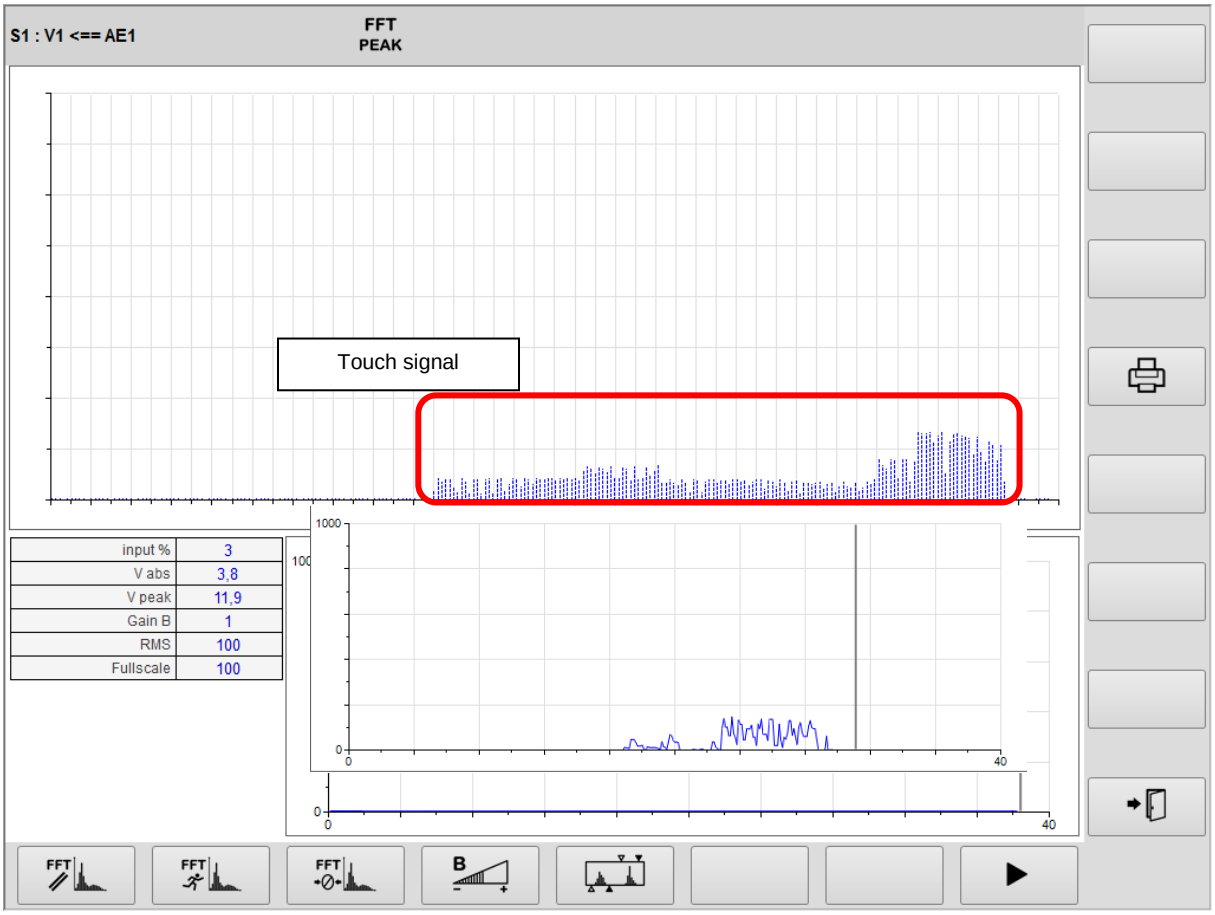


d. Eventually, change the "**Gain B**" (see the next point "i" to know how to do it) to be as close as possible to the indicated conditions.

e. Press the button 

[F1]

f. Execute a touch grinding



g. Watch on the frequency diagram where are the signals generated by the contact. At this purpose can be useful to execute a **Zero FFT** 

[F3] command. In this way, only the differences between the signal and the background noise will be displayed.

h. Repeat the touch grinding and press the button 

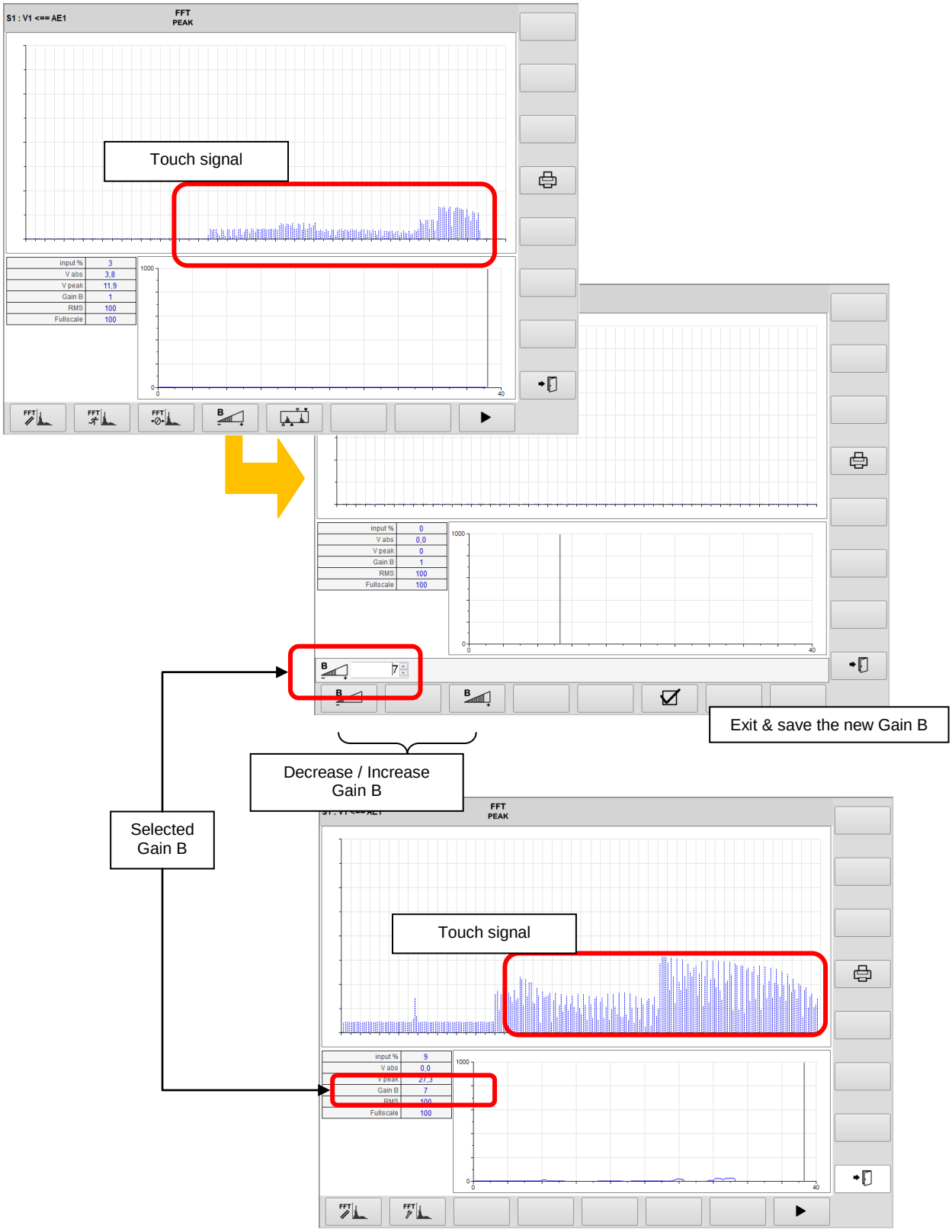
[F1] each time.

i. If necessary, to obtain the optimization it is possible to modify:

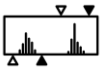
GAIN B

- Increase or decrease the **Gain B** 

[F4] to obtain a signal to noise ratio 2:1 at least.


S1 : V1 <== AE1
FFT
PEAK
Touch signal
input %
V abs
V peak
Gain B
RMS
Fullscale
Exit & save the new Gain B
Decrease / Increase
Gain B
Selected
Gain B
Touch signal

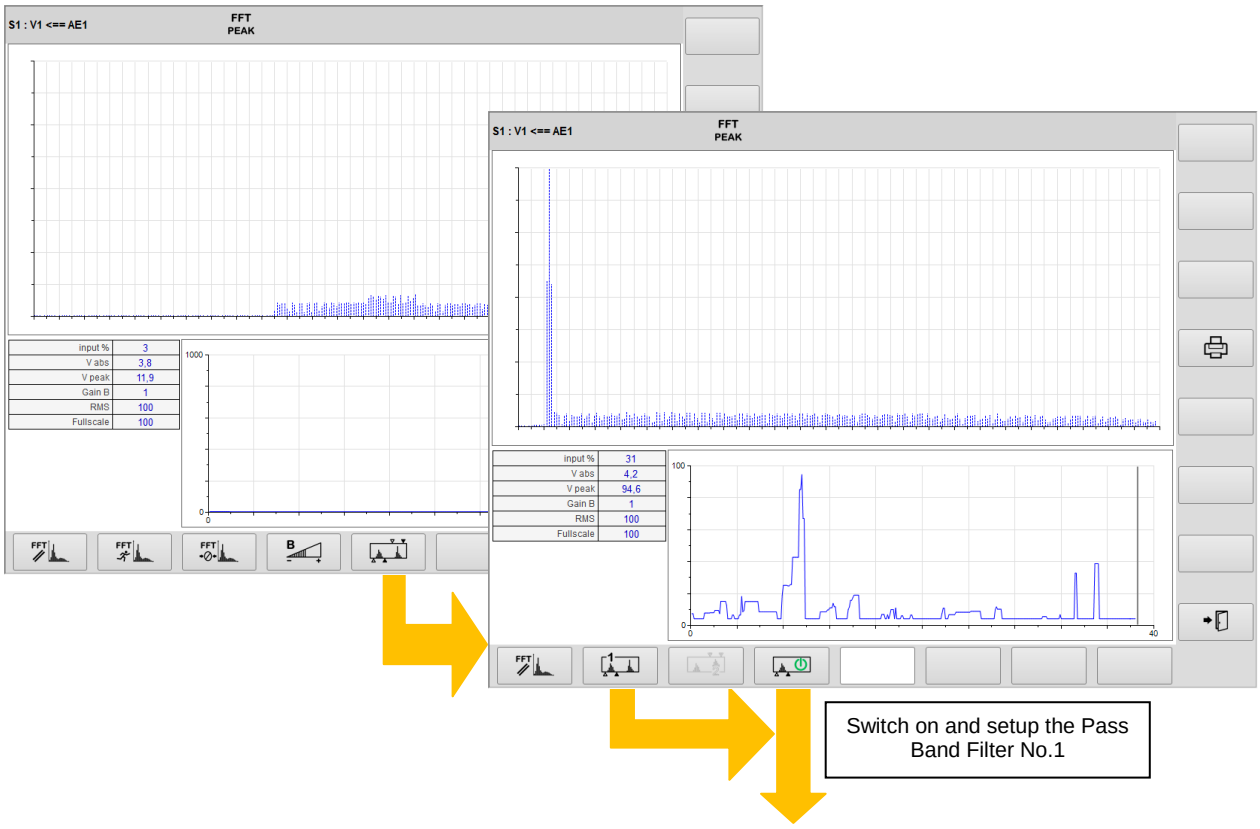
DIGITAL FILTERS

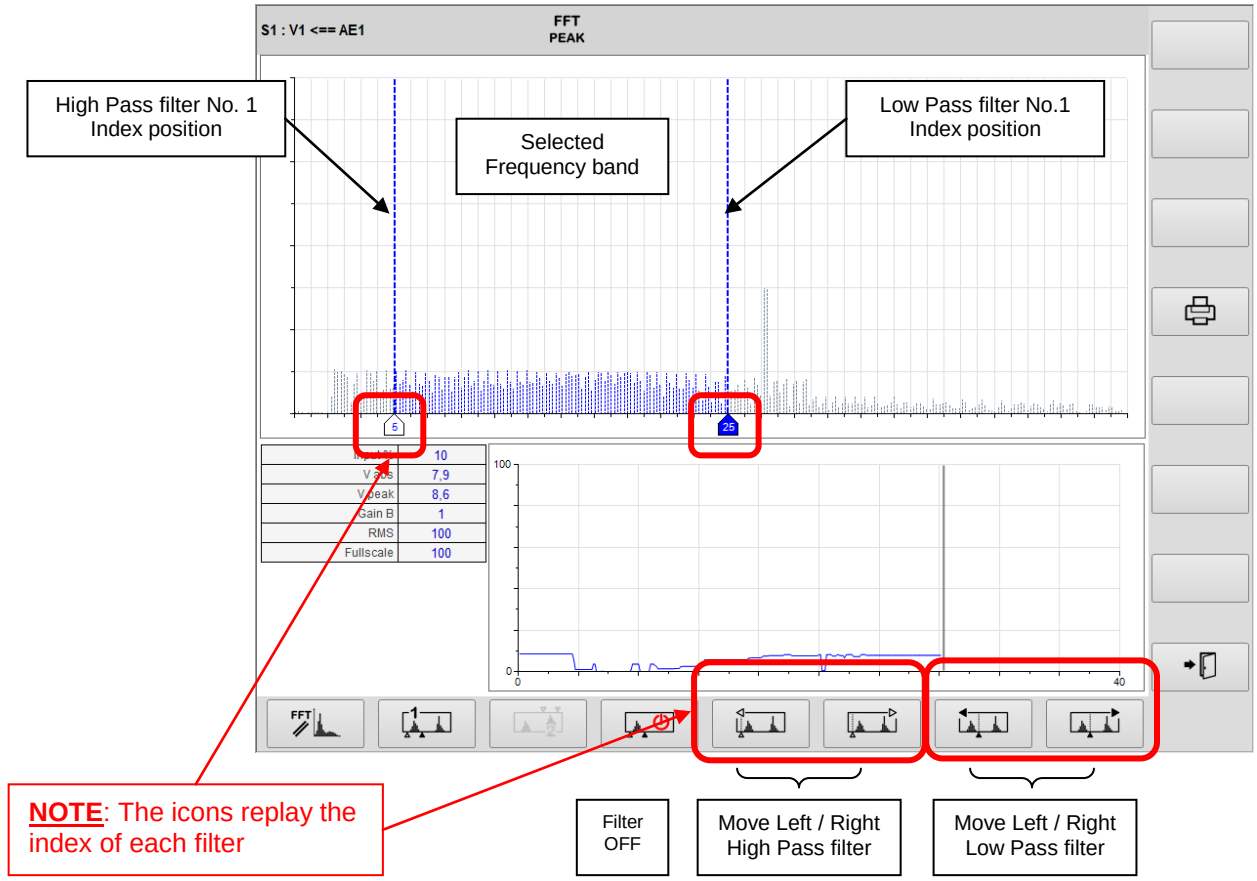
- Add or modify the position of the **Digital Filters**  **[F5]** to center the fequency range around the right signal. It is suggested to keep the range as wide as possible in comparision with the background noise.

  There are up to 2 programmable band-pass digital filters. Each band pass filter is composed of:

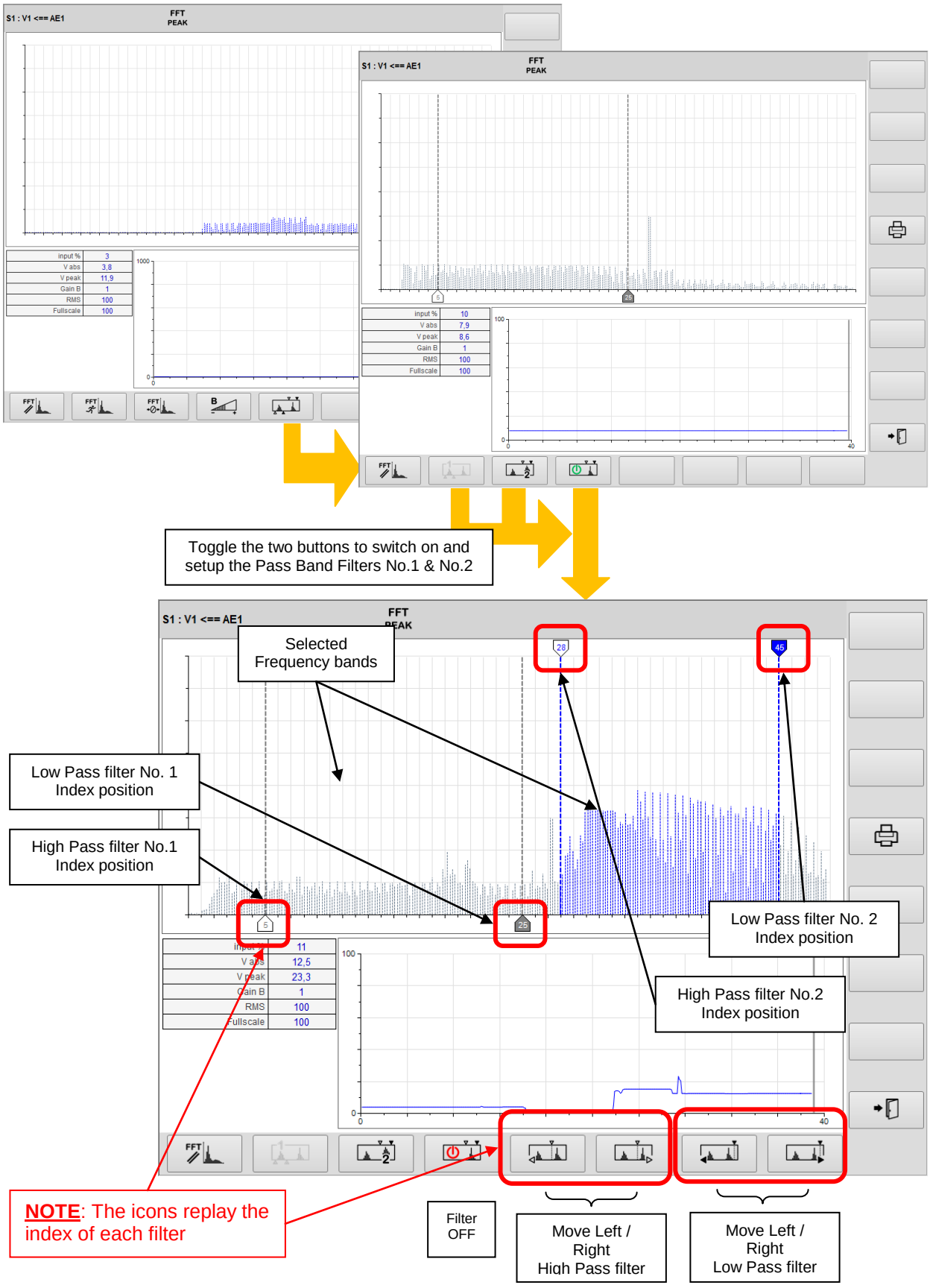
  - 1 Low Pass filter (LP)
  - 1 High Pass filter (HP)

  The filters can be switched on / off and placed over the entire available bandwidth.


S1 : V1 <== AE1
FFT
PEAK
Switch on and setup the Pass Band Filter No.1


S1 : V1 <== AE1
FFT
PEAK
High Pass filter No. 1 Index position
Selected Frequency band
Low Pass filter No.1 Index position
NOTE: The icons replay the index of each filter
Filter OFF
Move Left / Right High Pass filter
Move Left / Right Low Pass filter

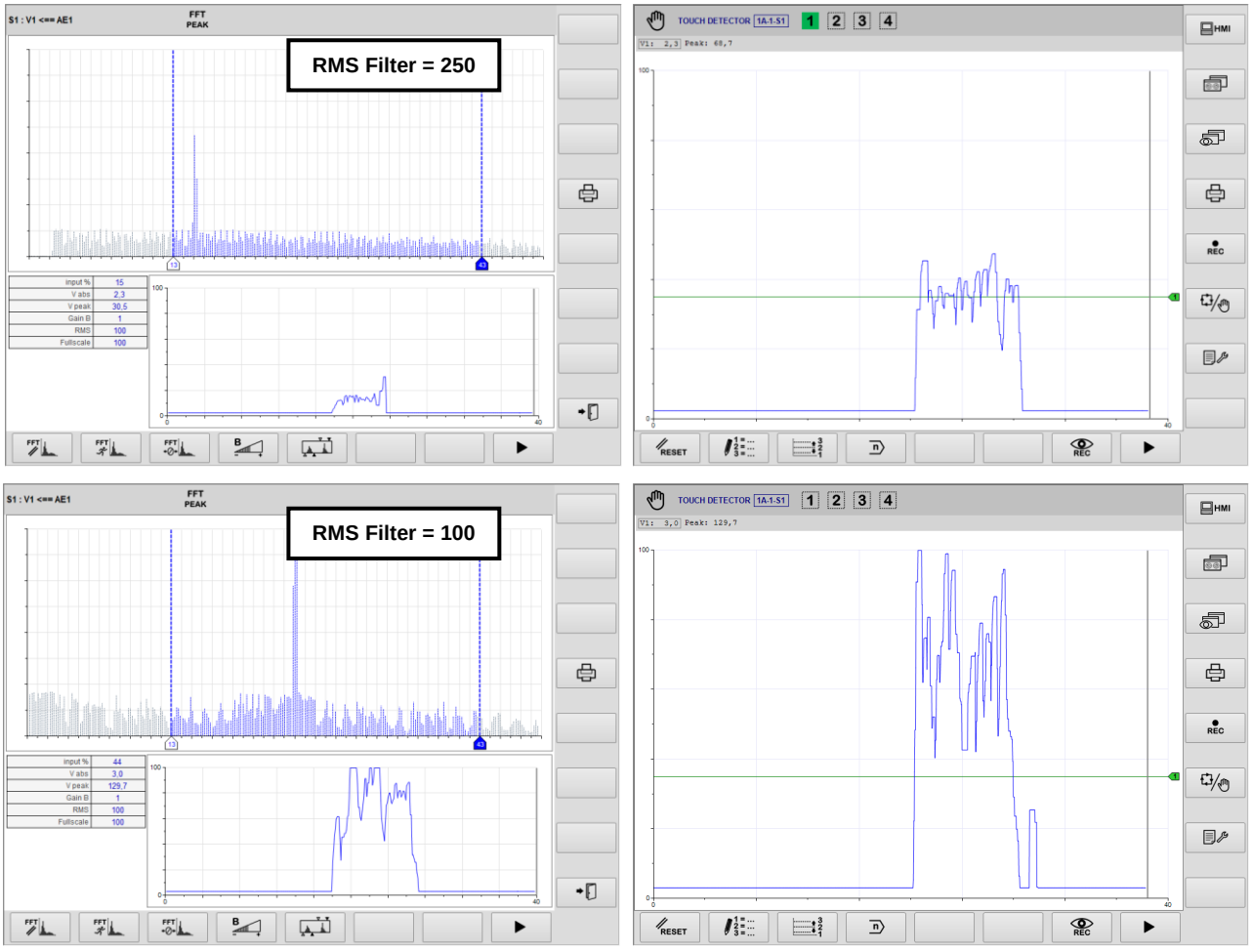
Use of 2 Band-Pass filters:



RMS FILTER and FULLSCALE

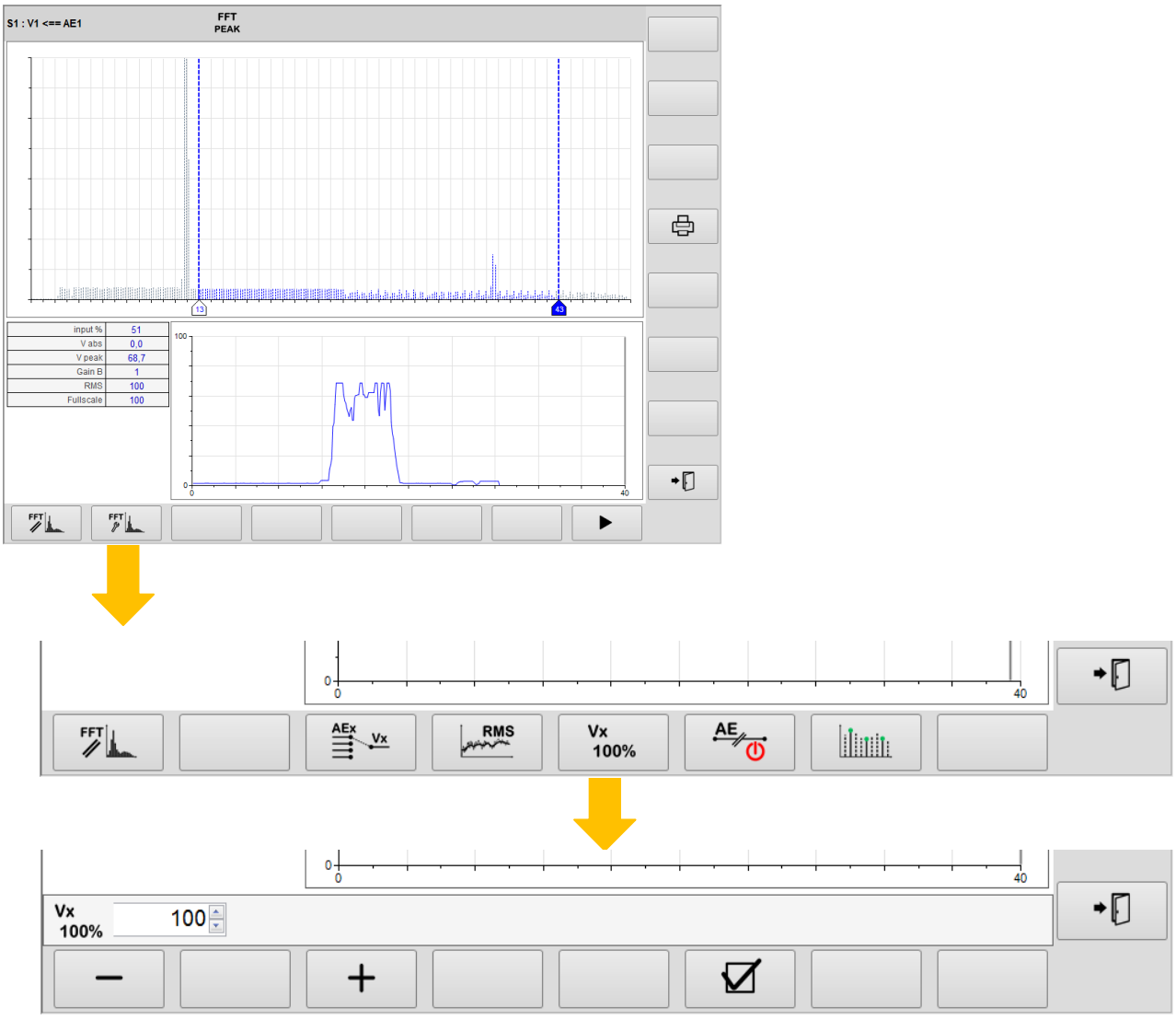
- Further optimizations can be obtained by changing the value of the **RMS Filter**. This will smooth the high frequency noise components. Be careful not to use too much high value for the filter to not affect the response time of the system.

ID	Parameter	Description
	RMS filter **[100]**	Low pass filter value which gives a reduction of disturbance, eliminating the high frequency components. The higher the value entered, the greater the attenuating effect of the high frequency which is achieved.

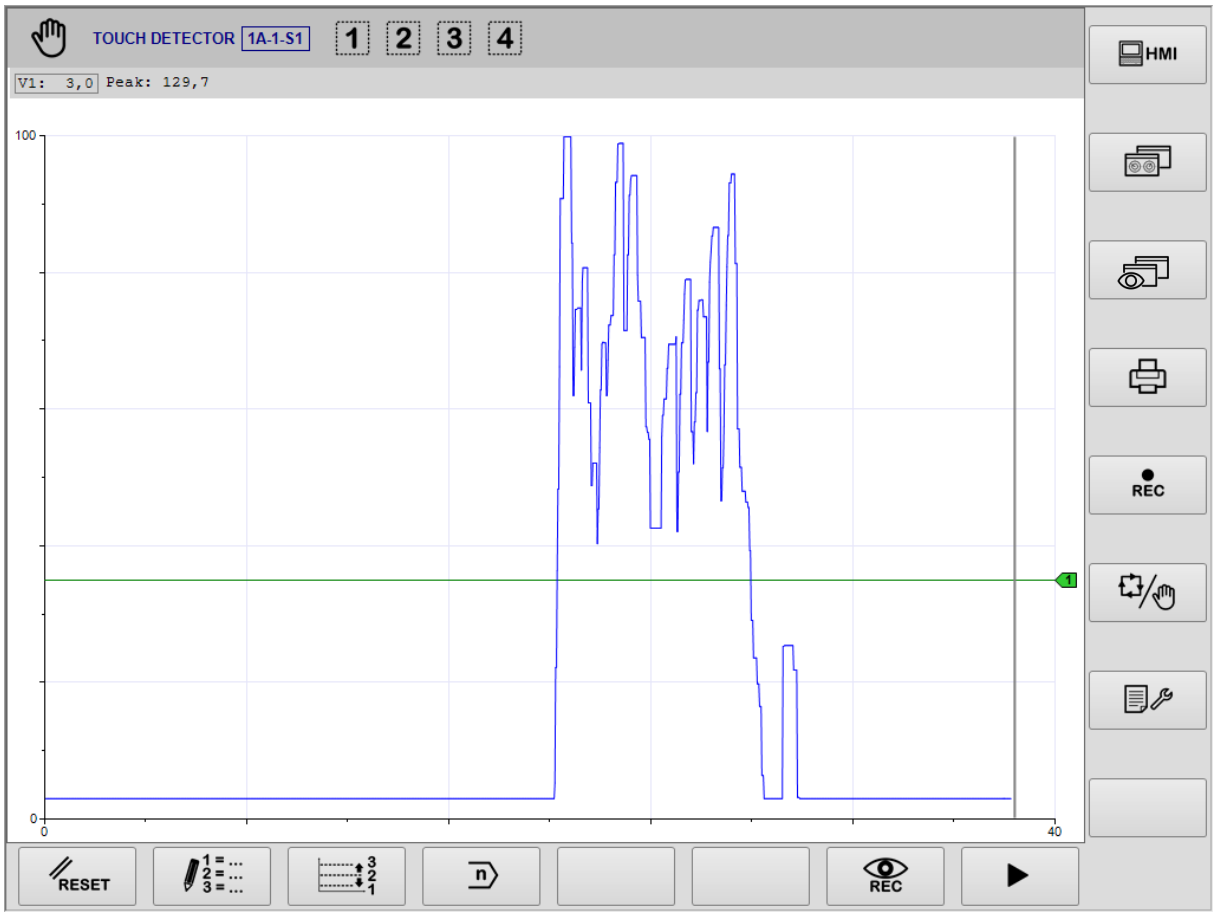


- Change the fullscale to vary the normalization of the Vx variable (this is normally not necessary).

ID	Parameter	Description
	Full-scale **[100]**	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.



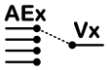
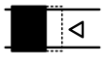
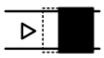
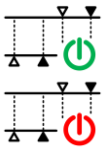
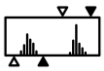
4. Once it is found a satisfactory setup in terms of signal / noise ratio, switch to the normal display mode (standard) and perform sufficient testing to verify the stability and repeatability of the calibration performed.



3.4.1.5. MULTI-BAND mode optimization

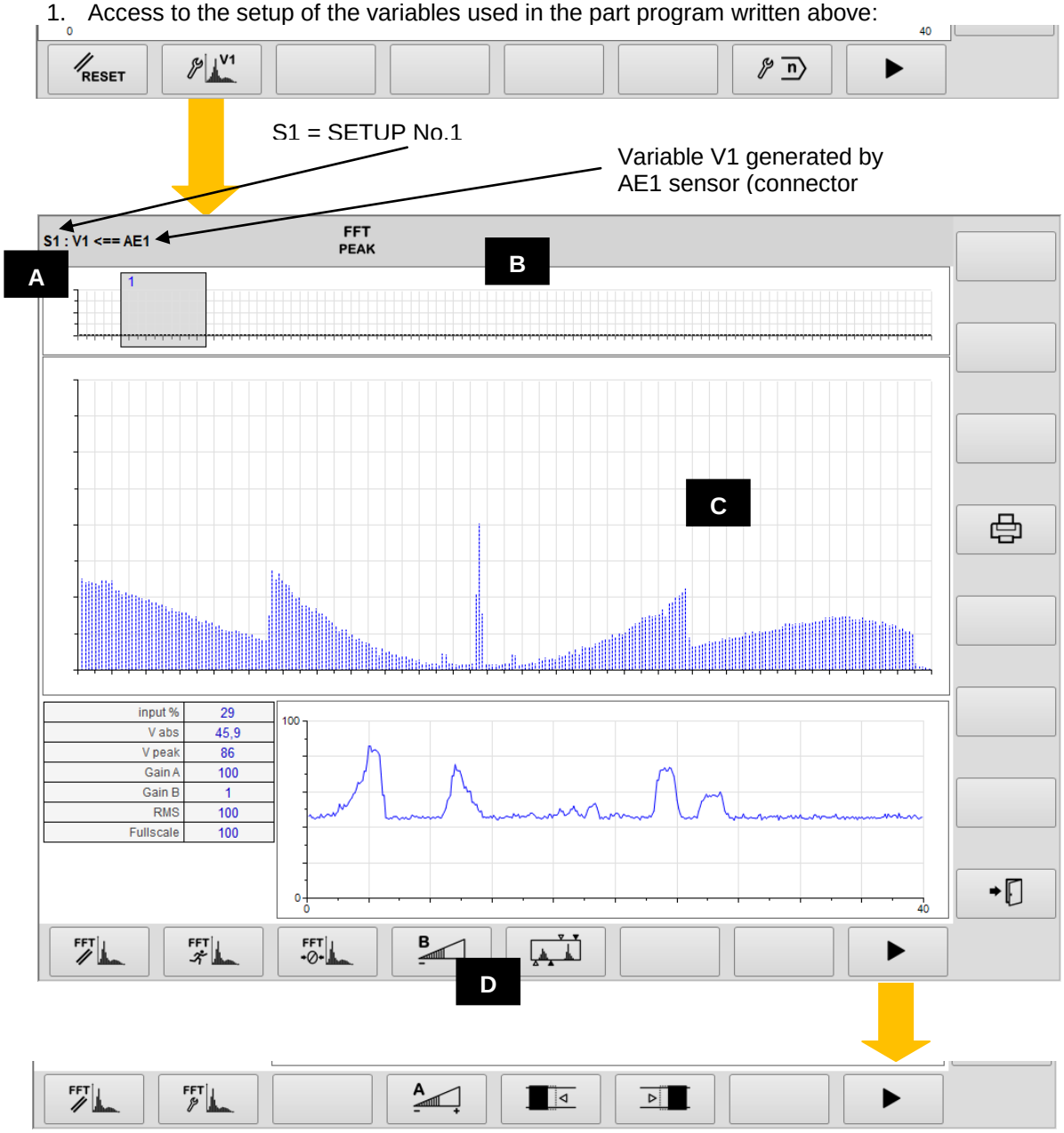
The system displays the entire available frequency band divided into 8 windows of observation. The pre-selected window is zoomed and analyzed in the working area.

It is possible to progam:

Parameters				
Icon	**ID**	**Parameter name**	**Button**	**Description**
	4071	Source	F3	Choice of the AE sensor channel which generates the input signal
 	4051 4052	Window	F5 F6	Window which define the frequency band observed. The selected window is then zoomed in the working area.
	4053	Gain A	F4	Amplification of the signal inside the selected window.
	4056	Gain B	F4	Amplification of the input signal.
	4010 4009	Filters Enable	F2	Filters setup enable / disable
	4030	Band Pass Filter	F5	Up to 2 Band Pass filters inside the selected window. The filters can be switched on/off and placed independently inside the selected window.
	4073	RMS Filter	F4	Low pass filter value which gives a reduction of disturbance, eliminating the high frequency components. The higher the value entered, the greater the attenuating effect of the high frequency which is achieved.
Vx 100%	4072	Fullscale	F5	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.

The setup page, based on frequency analysis, is designed to reach the best behaviour during the optimization task.
With few operations, it is possible to setup both the sensibility and the frequency range where the AE signals should be observed to avoid that background and environment noise generate false signalling.

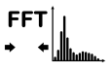
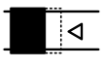
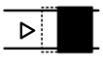
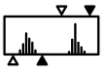
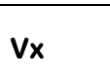
1. Access to the setup of the variables used in the part program written above:



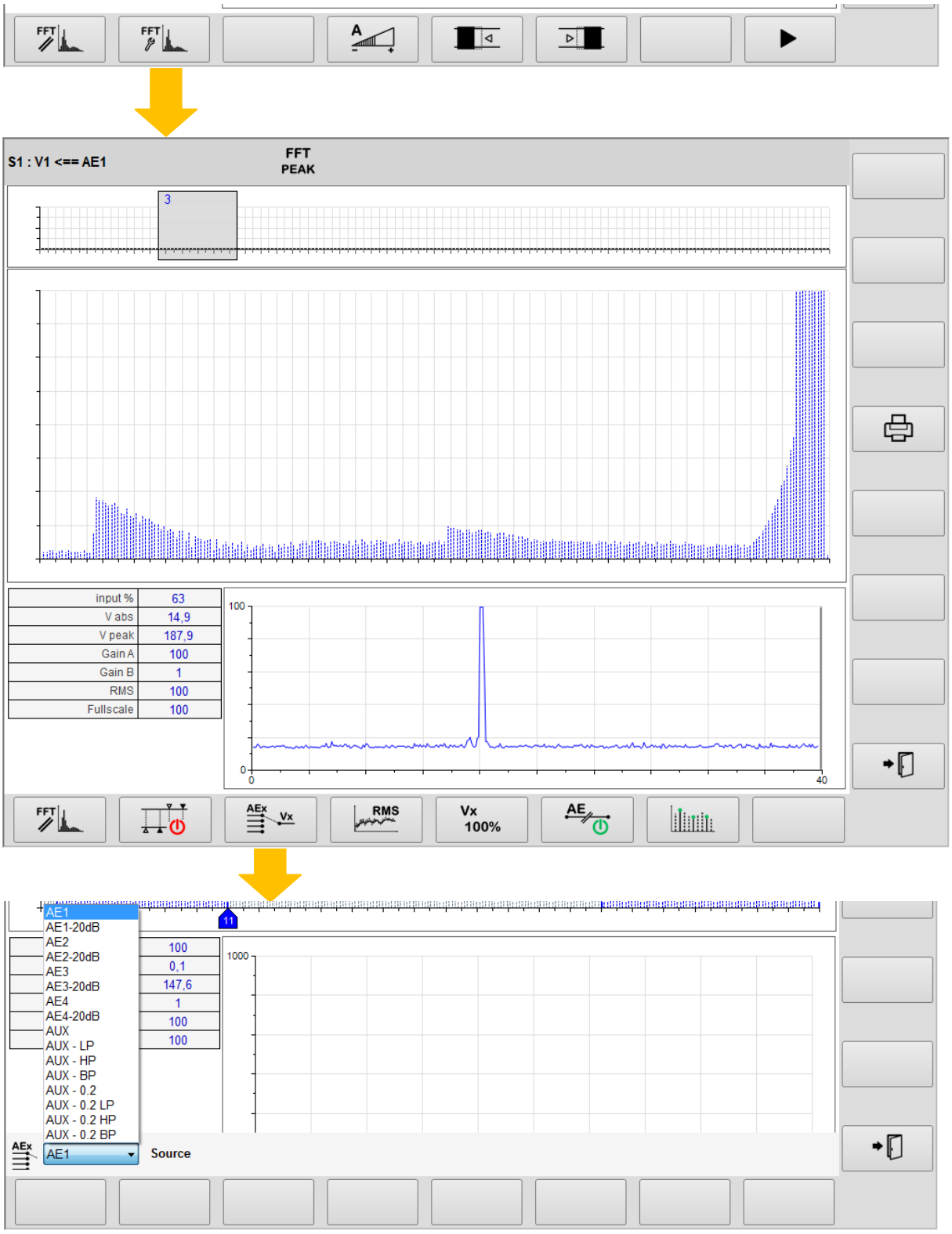
On screen are identified the following areas:

A. Selected channel
B. Full band width and selected window (example: No.2)
C. Diagrams area
   - Vx vs frequency diagram (spectrum)
   - Vx vs time diagram
   - **Input** signal level on A/D converter input [%]
   - **Vabs** istantanous value of the Vx variable
   - **Vpeak** Vx peak value (zeroed by reset)
   - **Gain A** value of the amplification in the selected window
   - **Gain B** value of the input signal amplification
   - **RMS** value of the RMS filter
   - **Fullscale** value of fullscale
D. Command buttons [Fx]

The available commands are described in the table below.

Commands				
Icon	**ID**	**Command name**	**Button**	**Description**
	4046	Reset	F1	Status reset
	4047	FFT run-time	F2	FFT in run-time mode
	4045	FFT peak detector	F2	FFT in peak detector mode (default)
	4050	Zero FFT	F3	Background noise spectrum acquisition
	4049	Reset Zero FFT	F3	Background noise spectrum reset
	4048	Parameter	F2	Other parameter setup
 	4076 4075	Sensor ready	F6	Sensor ready check enable / disable
	4074	Downsample filter	F7	Accesses the downsample filter setup
	4071	Source	F3	Choice of the AE sensor channel which generates the input signal
 	4051 4052	Window	F5 F6	Window which define the frequency band observed. The selected window is then zoomed in the working area.
	4053	Gain A	F4	Amplification of the signal inside the selected window.
	4056	Gain B	F4	Amplification of the input signal.
	4030	Band Pass Filter	F5	Up to 2 Band Pass filters inside the selected window. The filters can be switched on/off and placed independently inside the selected window.
	4073	RMS Filter	F4	Low pass filter value which gives a reduction of disturbance, eliminating the high frequency components. The higher the value entered, the greater the attenuating effect of the high frequency which is achieved.
	4072	Fullscale	F5	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.
	0017	Exit	Shift+F8	Exit

2. Bind the Vx variable to the signal source (AEx sensor), example: V1 <=> AE1



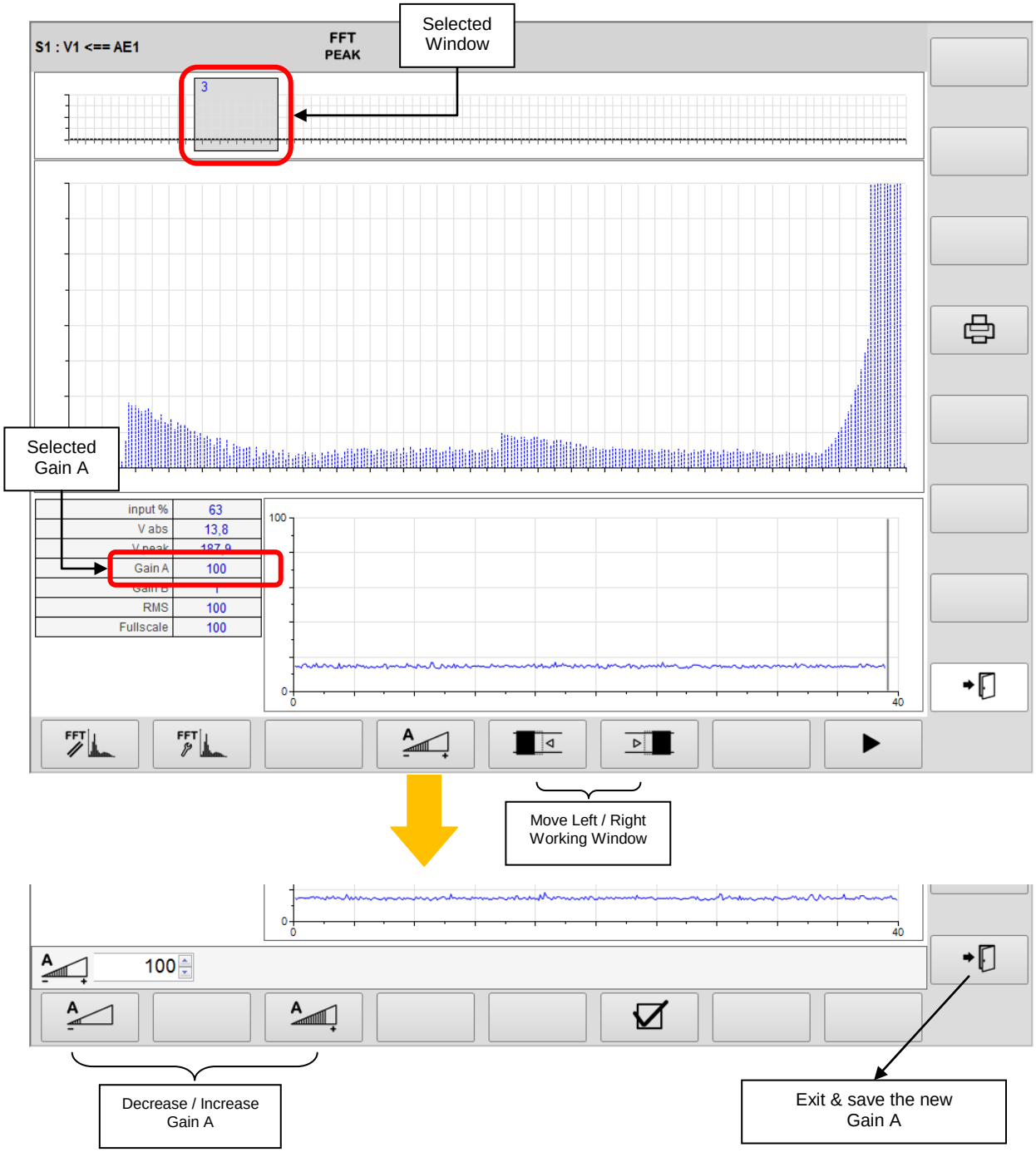
- Set the value then press  **[Shift+F8]** to save it

3. Execute the optimization starting from the parameter suggested in the following table

No.	Sensor	Typical Setup						
		Window	Gain A	Gain B	Digital Filters	RMS Filter	Full scale	FFT mode
2		0 .. 4	100	4	OFF	100	100	FFT PEAK
3		1..4	100	4	OFF	100	100	FFT PEAK
4		1..4	100	4	OFF	100	100	FFT PEAK
5		1..4	100	4	OFF	100	100	FFT PEAK
6		1..4	100	4	OFF	100	100	FFT PEAK

and operating as follow:

a. Select a suitable working WINDOW and GAIN A following the suggestions in the table above

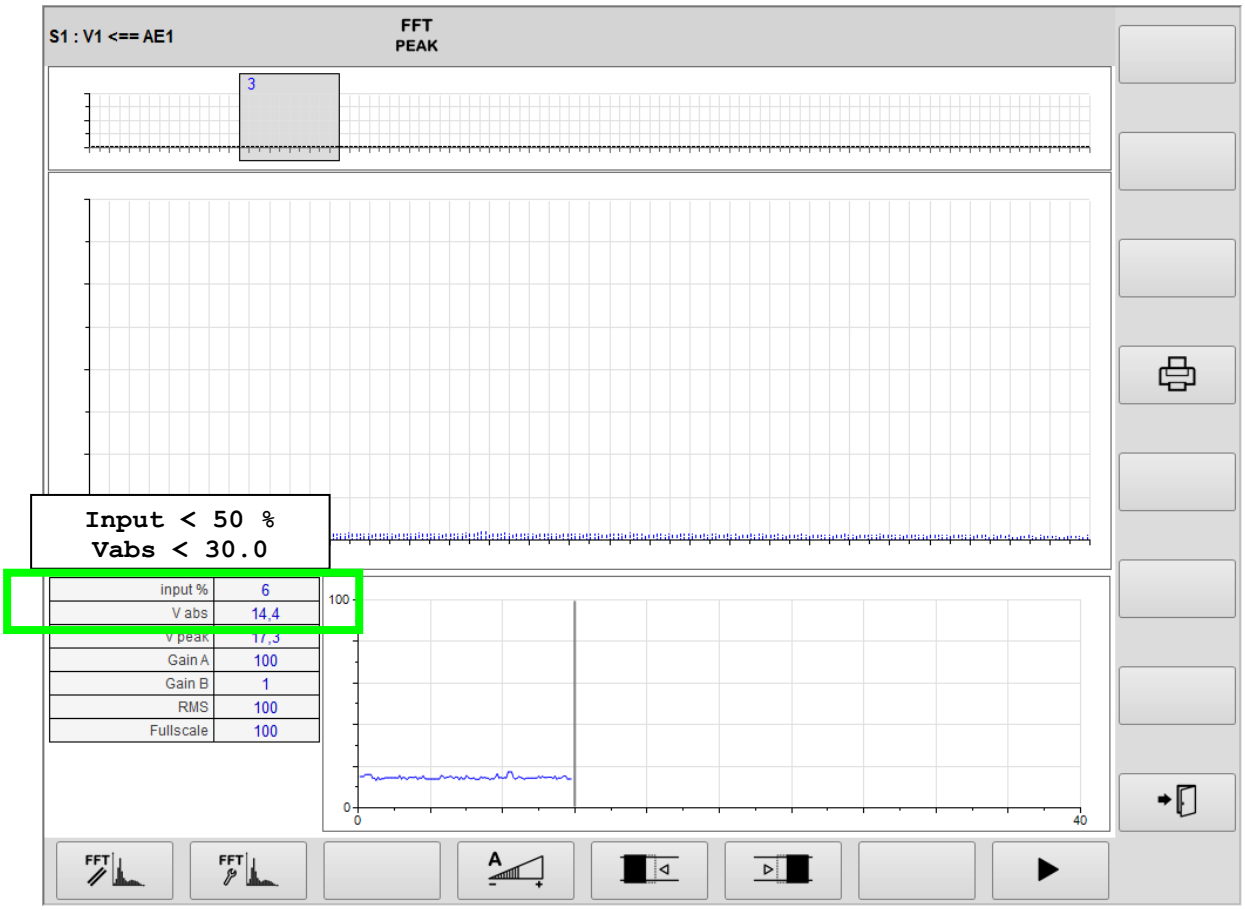


b. Run-up the spindle up to nominal speed and position the axis close to touch conditions (wheel-part or wheel-dresser)

c. Press one or more the button 

[F1]

d. Verify that in such condition the background noise detected is:

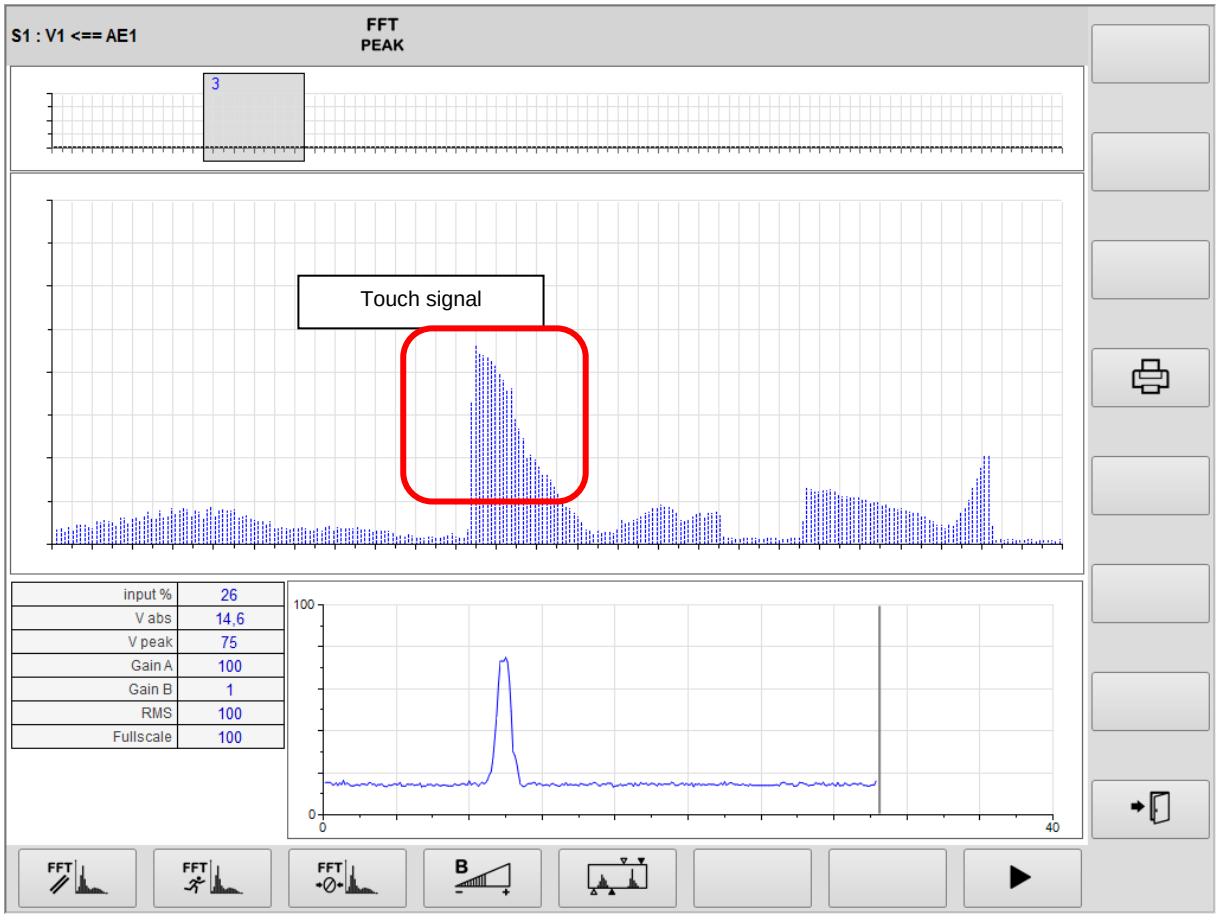


e. Eventually, change the "**Gain B**" (see the next point "j" to know how to do it) to be as close as possible to the indicated conditions.

f. Press the button 

[F1]

g. Execute a touch grinding



h. Watch on the frequency diagram where are the signals generated by the contact. At this purpose can be useful to execute a **Zero FFT**  **[F3]** command. In this way, only the differences between the signal and the background noise will be displayed.

i. Repeat the touch grinding and press the button  **[F1]** each time.

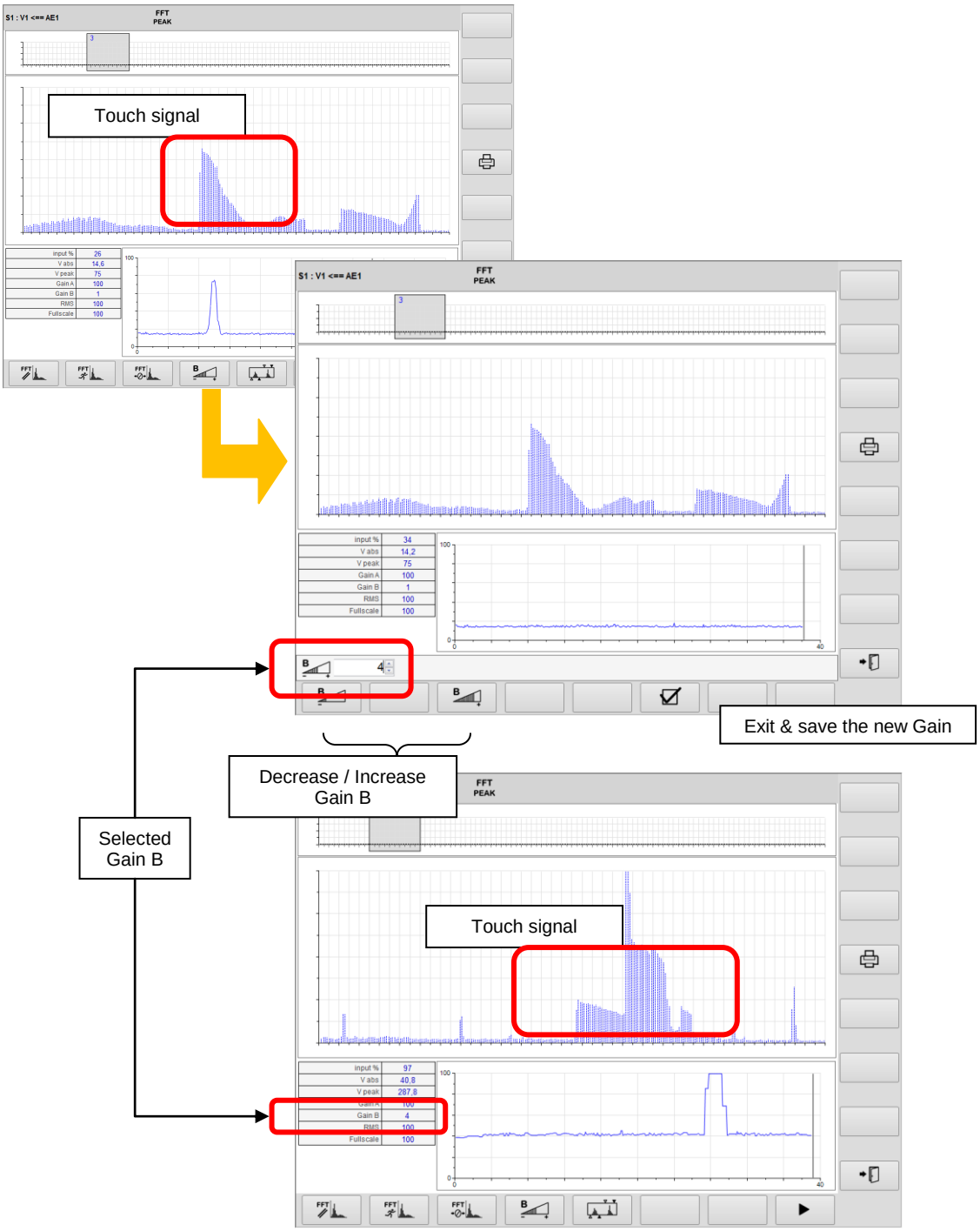
j. If necessary, to obtain the optimization it is possible to modify:

GAIN A & WORKING WINDOW

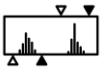
Restart with the step (a)

GAIN B

- Increase or decrease the **Gain B**  **[F4]** to obtain a signal to noise ratio 2:1 at least.


Touch signal
Exit & save the new Gain
Decrease / Increase Gain B
Selected Gain B
Touch signal

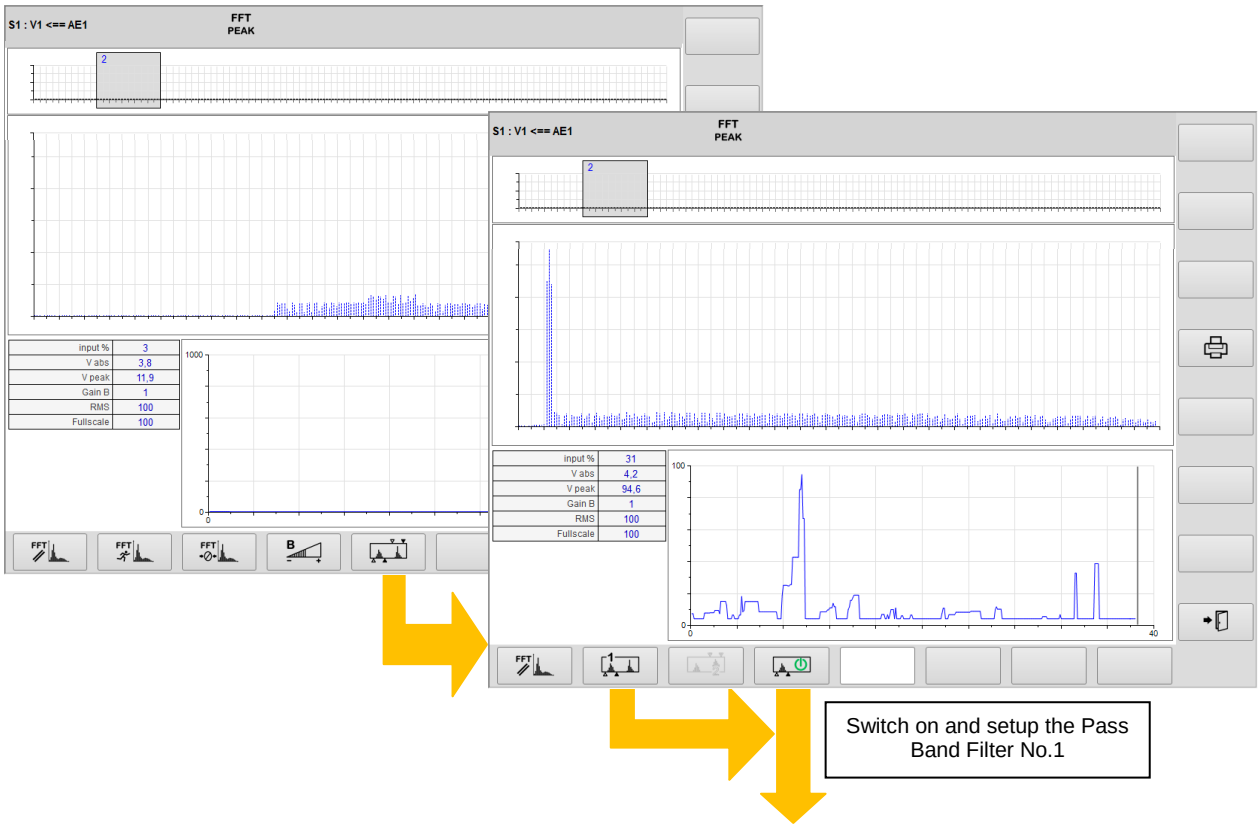
DIGITAL FILTERS

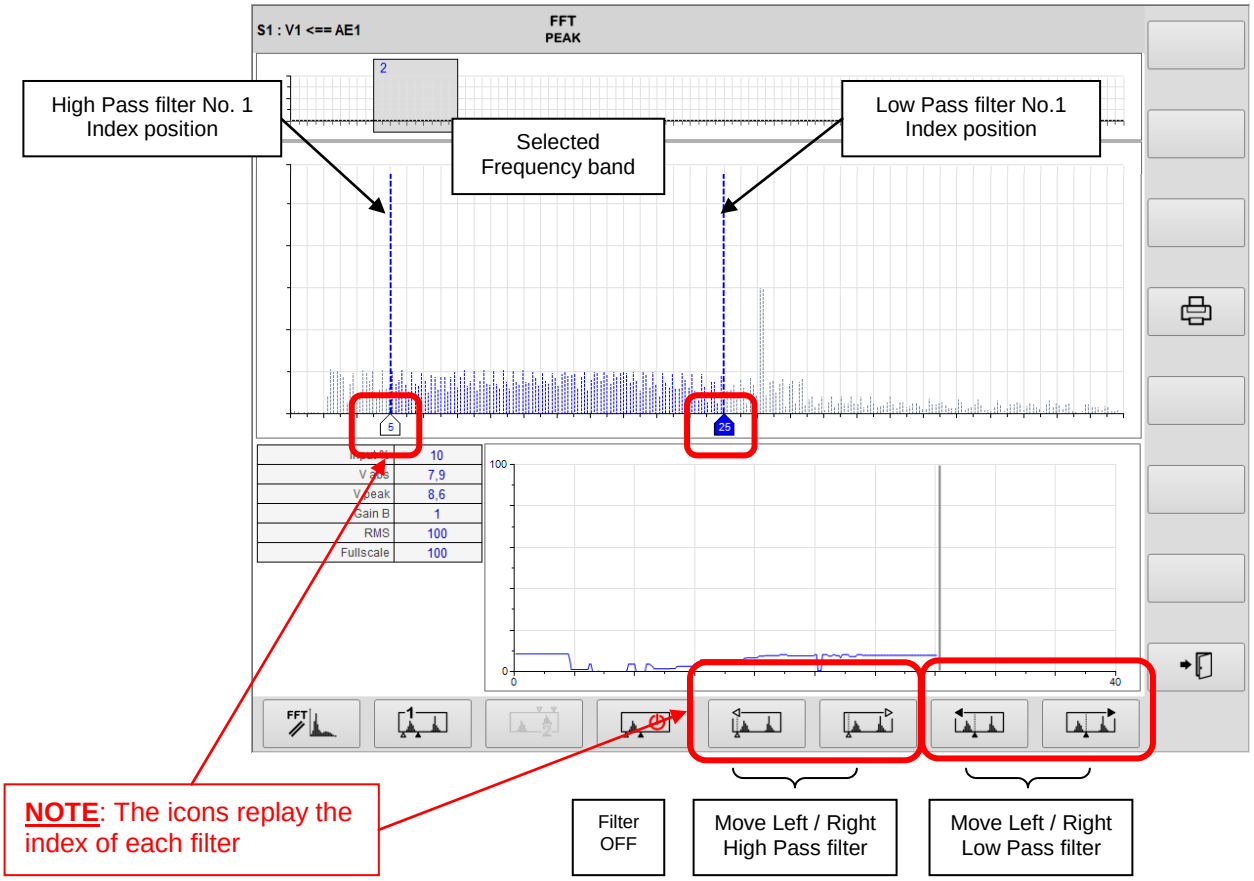
- Add or modify the position of the **Digital Filters**  **[F5]** to center the fequency range around the right signal. It is suggested to keep the range as wide as possible in comparision with the background noise.

  There are up to 2 programmable band-pass digital filters. Each band pass filter is composed of:

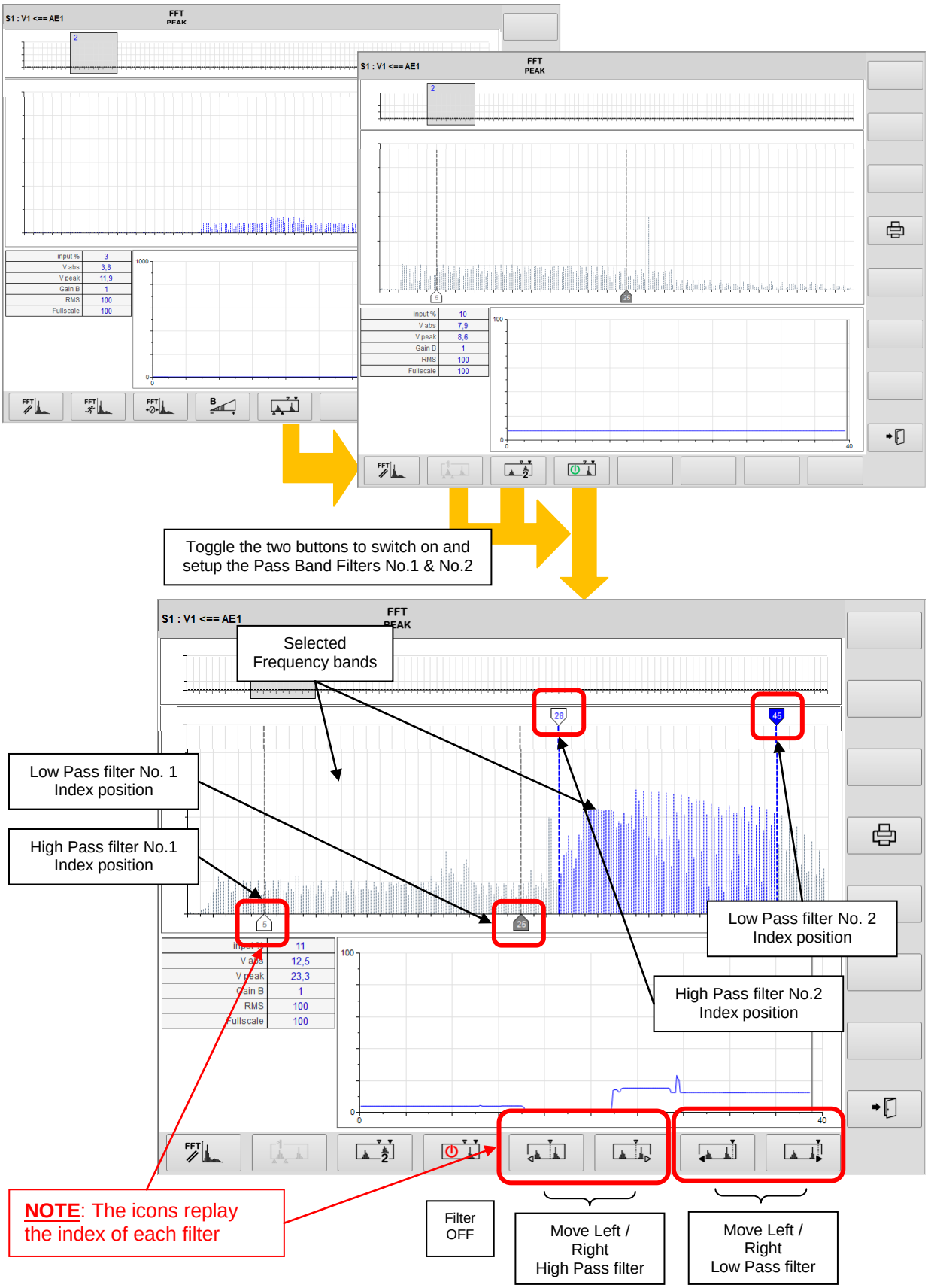
  - 1 Low Pass filter (LP)
  - 1 High Pass filter (HP)

  The filters can be switched on / off and placed over the entire available bandwidth.


S1 : V1 <== AE1
FFT
PEAK
Switch on and setup the Pass Band Filter No.1


S1 : V1 <== AE1
FFT
PEAK
High Pass filter No. 1 Index position
Selected Frequency band
Low Pass filter No.1 Index position
NOTE: The icons replay the index of each filter
Filter OFF
Move Left / Right High Pass filter
Move Left / Right Low Pass filter

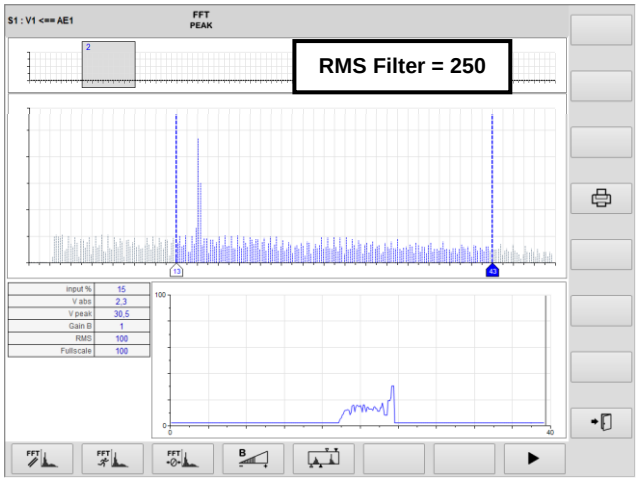
Use of 2 Band-Pass filters:

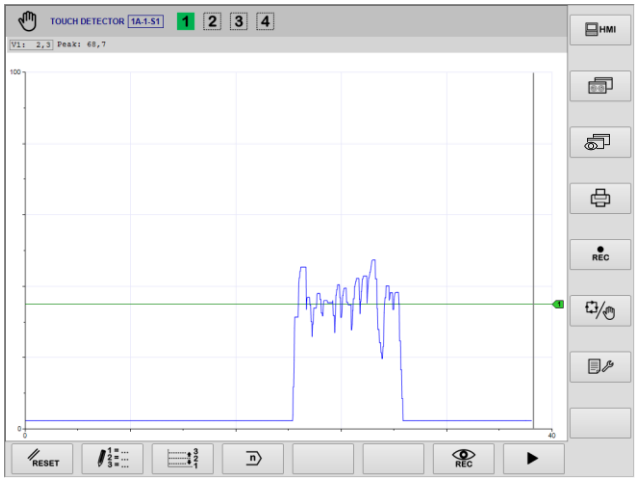


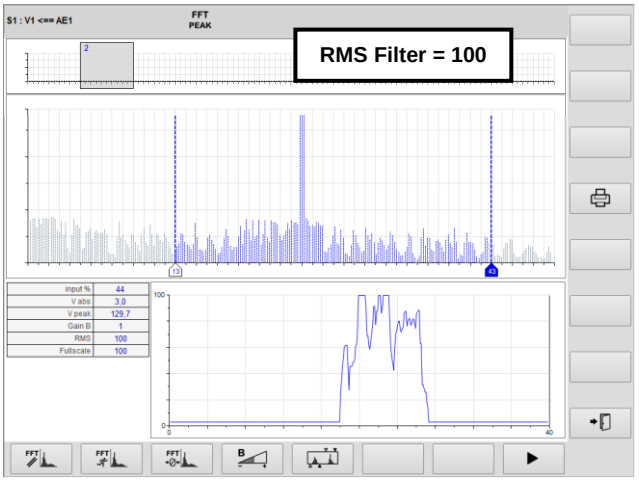
RMS FILTER and FULLSCALE

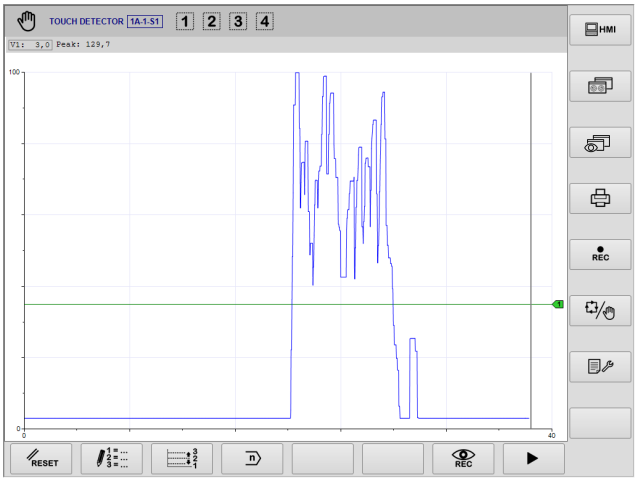
- Further optimizations can be obtained by changing the value of the **RMS Filter**. This will smooth the high frequency noise components. Be careful not to use too much high value for the filter to not affect the response time of the system.

ID	Parameter	Description
	RMS filter [100]	Low pass filter value which gives a reduction of disturbance, eliminating the high frequency components. The higher the value entered, the greater the attenuating effect of the high frequency which is achieved.
	RMS downsample [1]	RMS filter downsample



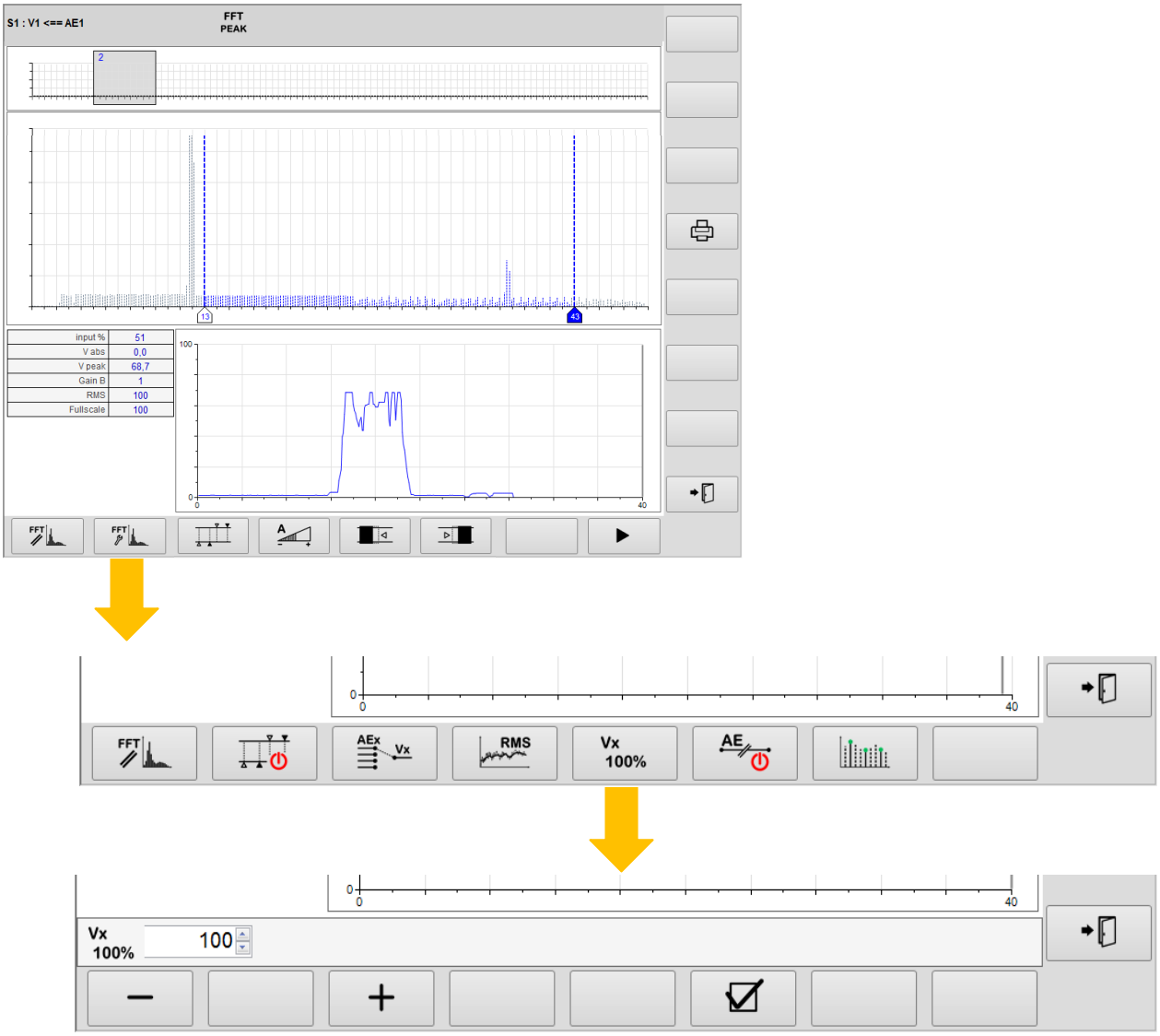




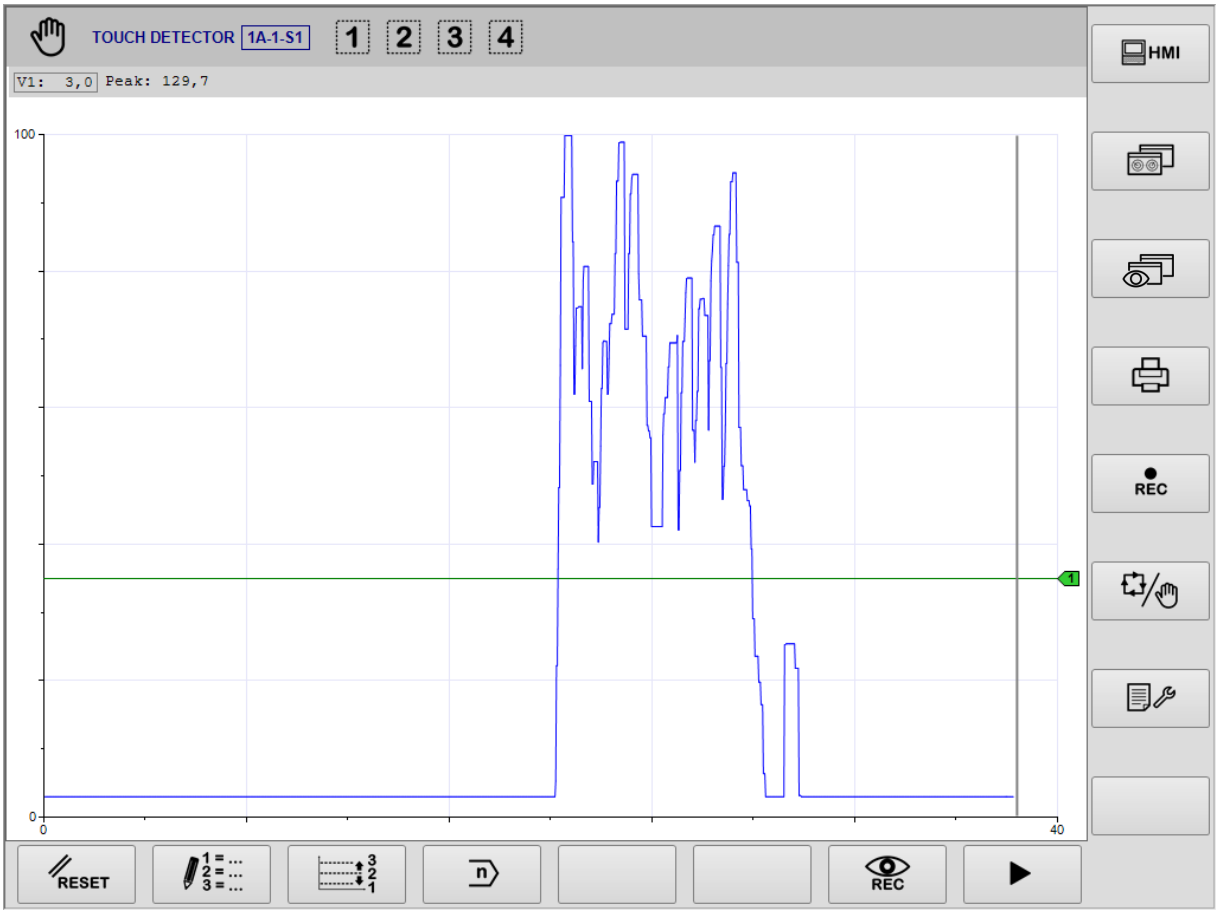


- Change the fullscale to vary the normalization of the Vx variable (this is normally not necessary).

ID	Parameter	Description
	Full-scale **[100]**	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.

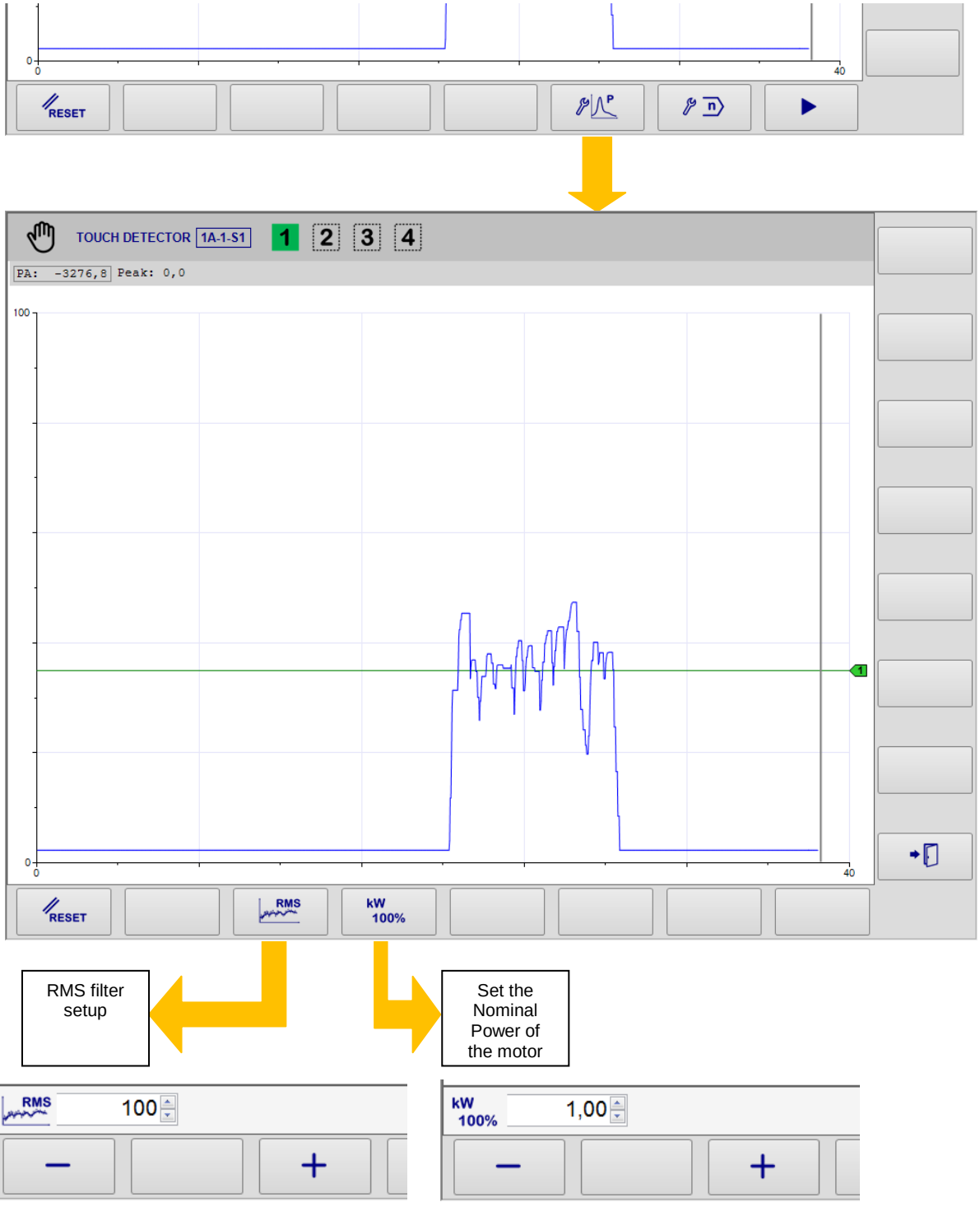


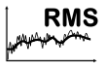
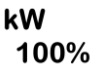
4. Once it is found a satisfactory setup in terms of signal / noise ratio, switch to the normal display mode (standard) and perform sufficient testing to verify the stability and repeatability of the calibration performed.



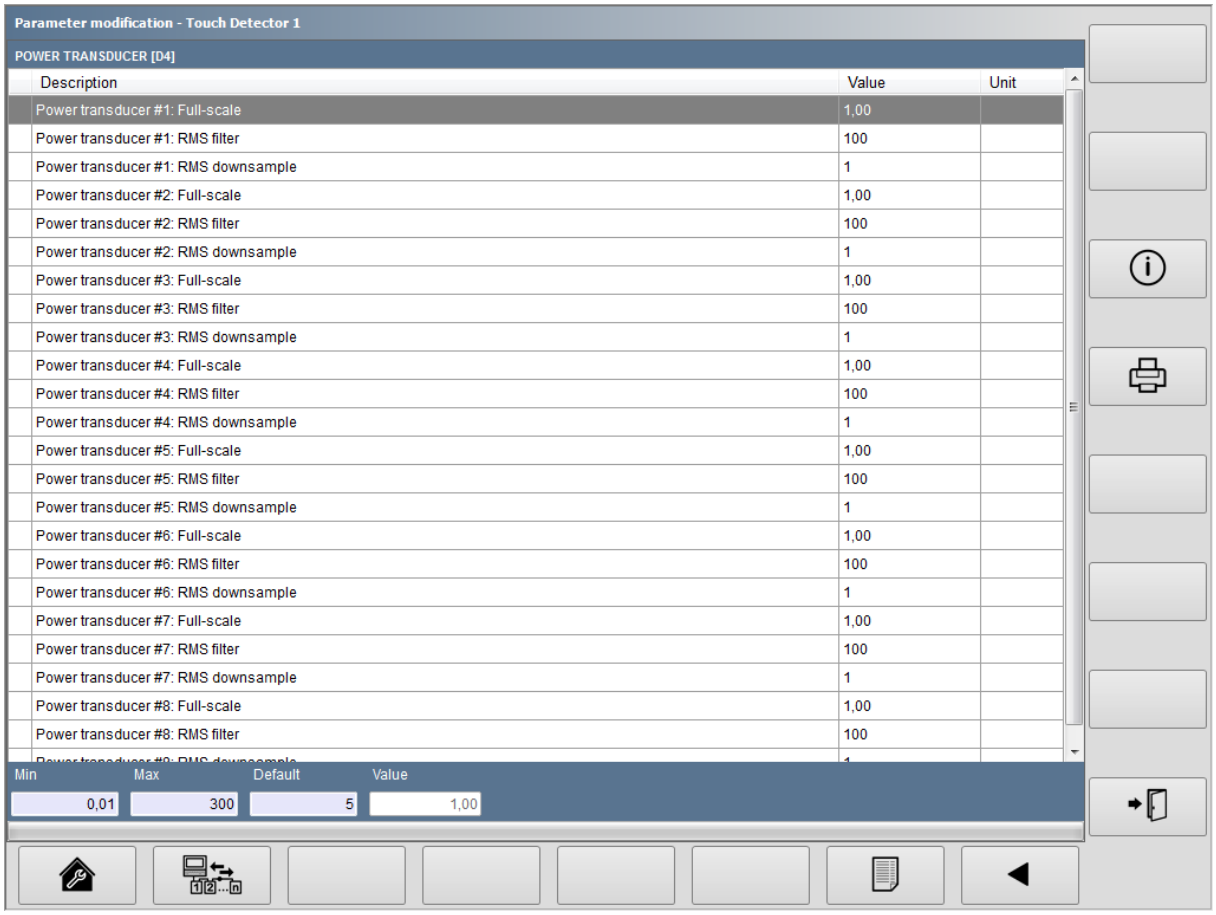
3.4.2. Power channel setup

To access the Power channel setup press the button  **[F6]**

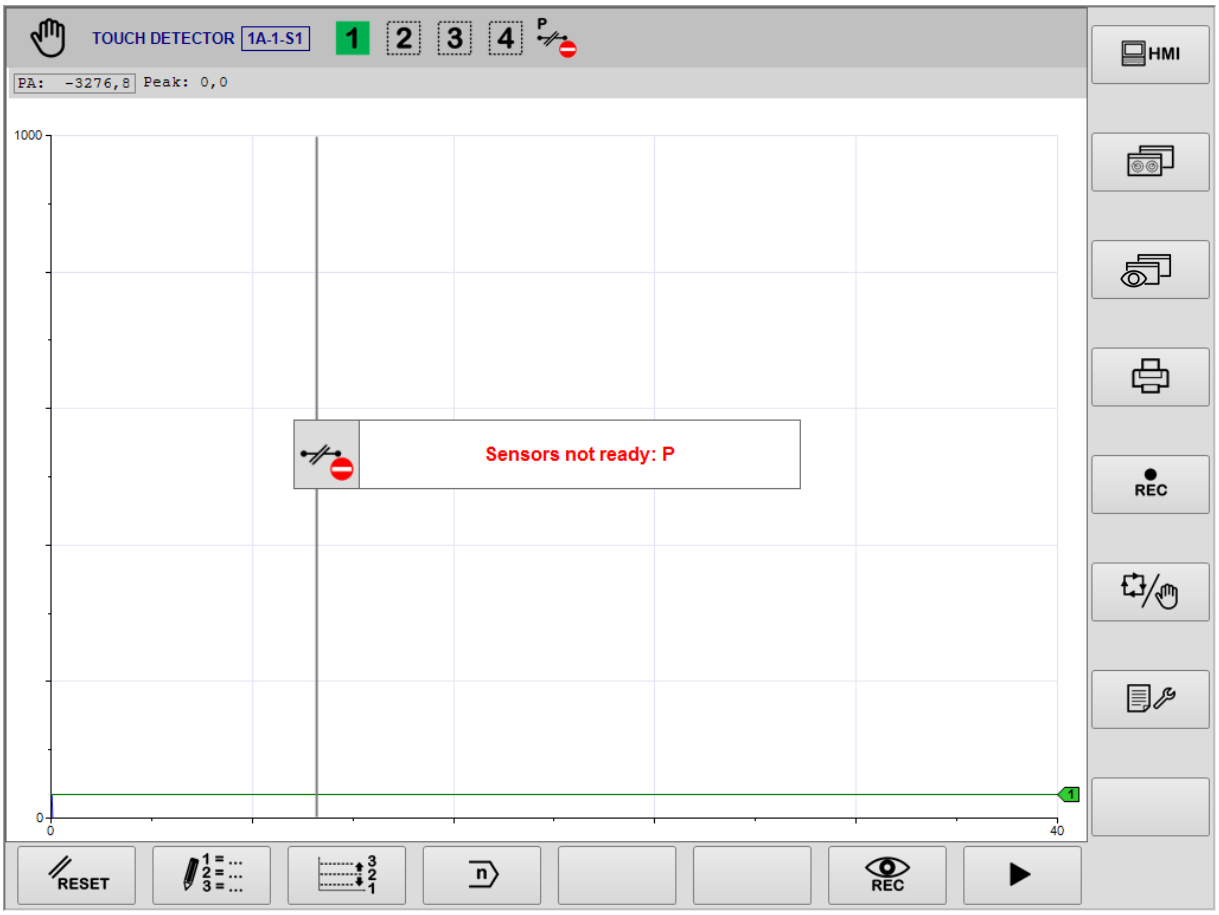


Commands				
Icon	**ID**	**Command name**	**Button**	**Description**
	4073	RMS filter	F3	Low pass filter value which gives a reduction of the noise, eliminating the high frequency components. The higher the value entered, the greater the attenuating effect of the high frequency which is achieved.
	4081	Fullscale	F4	Fullscale setup: set the value according to the nominal power of the motor [kW]

These two parameters are also accessible by the parameter setup page



NOTE
In case of power sensor not ready (faulty or not connected to the system), an on screen message will appear. The message will disppear as soon as the power sensor will be ready to work properly.


TOUCH DETECTOR
1A-1-S1
1
2
3
4
P
PA: -3276,8
Peak: 0,0
1000
0
0
40
Sensors not ready: P
HMI
REC
RESET
n
REC

4. Appendix

Documents referred to in the text		
Name document	**Paragraphs**	**Link**
Parameter setup	3.1, 3.3	9UMEN2505-1200 Parameter Setup.pdf
Components	3.2.3.1	9UMEN2506-1200
User Manual	3.3	9UMEN2518-1200 VMx5 HMI User.pdf”
Multinet	3.2.3.1	9UMEN2503-1200
SINUMERIK Operate	1.4.3.4	Embedding Solution Partner applications in SINUMERIK Operate.pdf