VM15

Panel installer

Installer manual
VM15 – Panel installer

9UMEN1515-1200
Release: 220128

VM15 – Panel installer

1. VM15 Panel

1.1 Introduction

The VM15 Panel is the operator panel of the modular multifunction VM15 system for machine tools. The unit comprises:

- The operator interface through which it is possible to monitor the correct evolution of the processes and devices enabled in the system (automatic balancing, touch detection, in-process measurement of the parts being machined).
- A set of commands at the operator's disposal for working with the system in manual mode.
- Parameter programming pages for both the system and each individual device so that the application can be completely customized.

This documentation concerns the installation and use of the VM15 Panel starting with version 10.0.

1.2 Installation

Two versions of VM15 Panel are available:

- 9PAVM1512CLxx0 – VM15 Panel unit with color display

xx = indicates hardware and mechanical options.

The cable for connecting the VM15 system to the panel is supplied separately, depending on the required length.

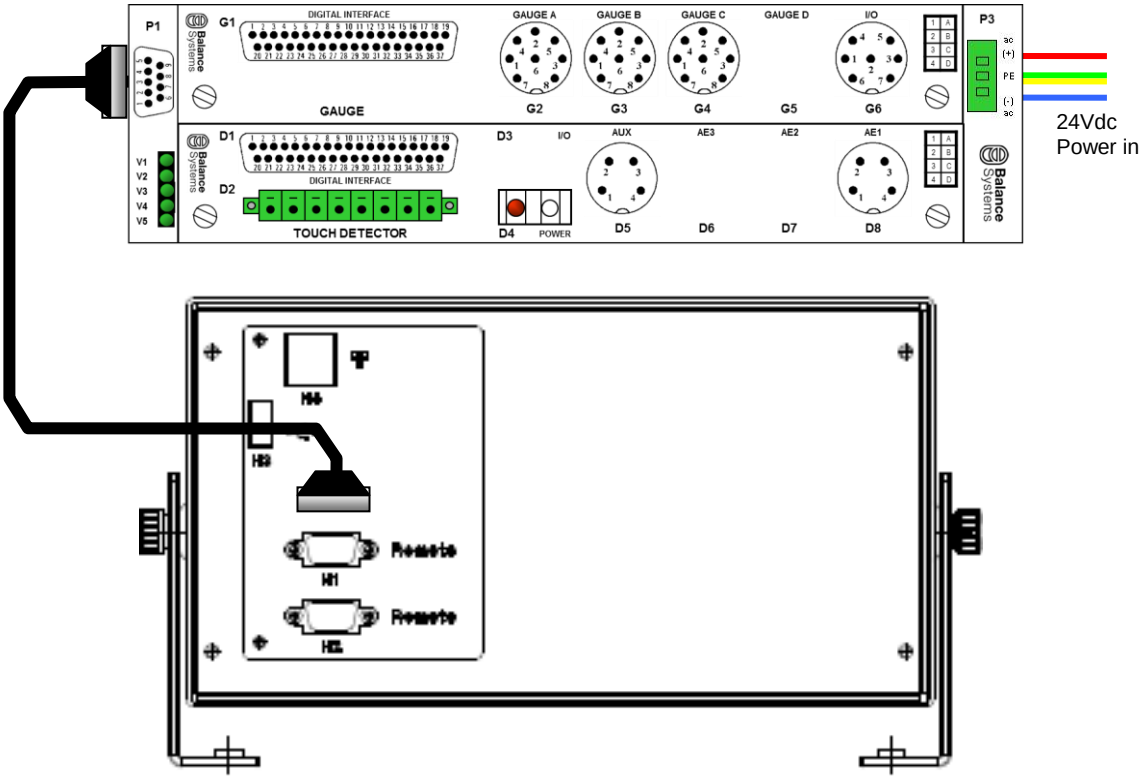
1.2.1 Mechanical installation

See document Components

1.2.2 Hardware connections

To startup the VM15 Panel it is necessary to connect to the rack of the VM15 system through a serial connection (see figure), following this sequence:

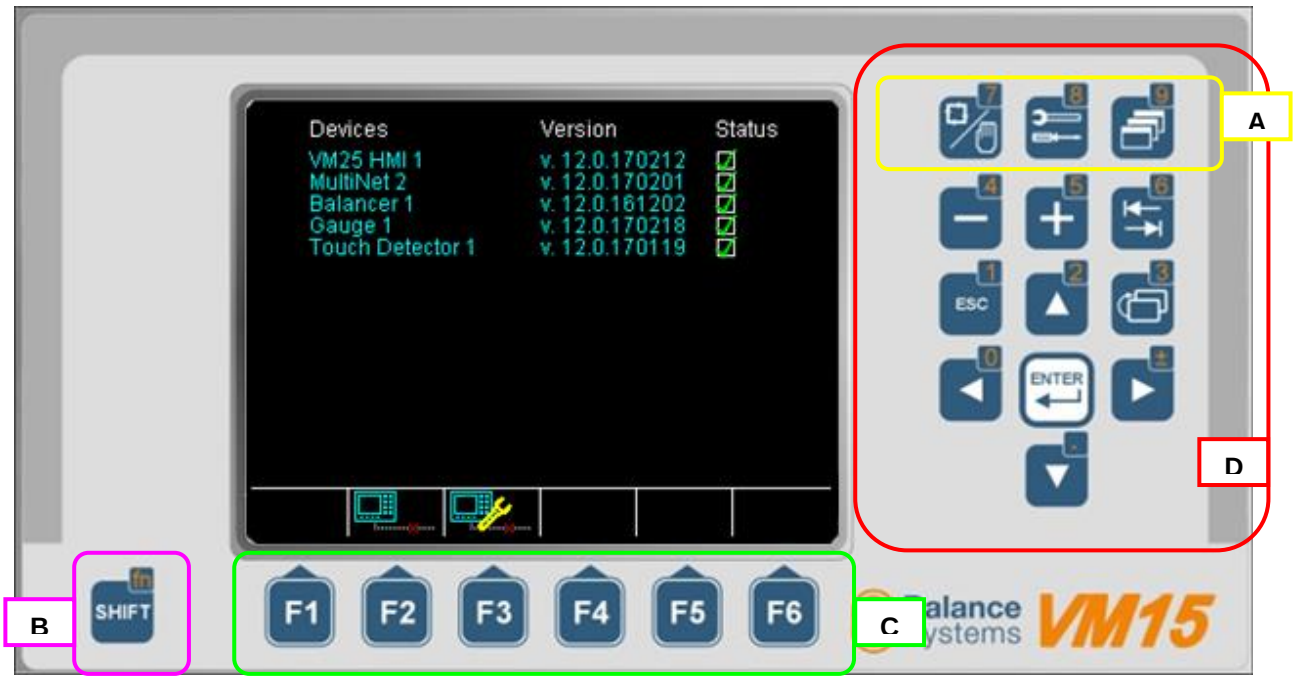
- Connect the remote cable on the VM15 rack side (P1 connector)
- Connect the other side of the cable to the VM15 Panel (H1 connector)
- Turn on the VM15 rack



1.3 Layout description

The VM15 Panel layout is as follows:

A. System commands
B. Numerical keyboard / 2nd (alternate) function button.
C. Device commands
D. Main keyboard



1.3.1 System commands

Button	Name	Description
	Automatic / Manual	Switches the displayed device between Automatic and Manual mode
	Parameter	Direct access to parameter pages
	Change page	Switches the displayed page between the installed devices

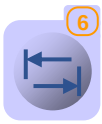
1.3.2 Numerical keyboard / 2nd function button

Button	Description
	Keep pressed to enable the numerical keyboard and the 2nd function commands.

1.3.3 Device commands

Button	Description
	Function commands F1..F6
	Function commands F7..F12

1.3.4 Main keyboard

Button	Description	Numerical keyboard description  + Button
	Decrease value	Select number 4
	Increase value	Select number 5
	Set default value (factory preset)	Select number 6
	Exit	Select number 1
	Move up	Select number 2
	Previous menu	Select number 3
	Move left	Select number 0
	Enter	---
	Move up	Select sign ±
	Move down	Select decimal point

2. Configuring the VM15 Panel application

To be able to correctly use the VM15 Panel application, it is necessary to configure some parameters.

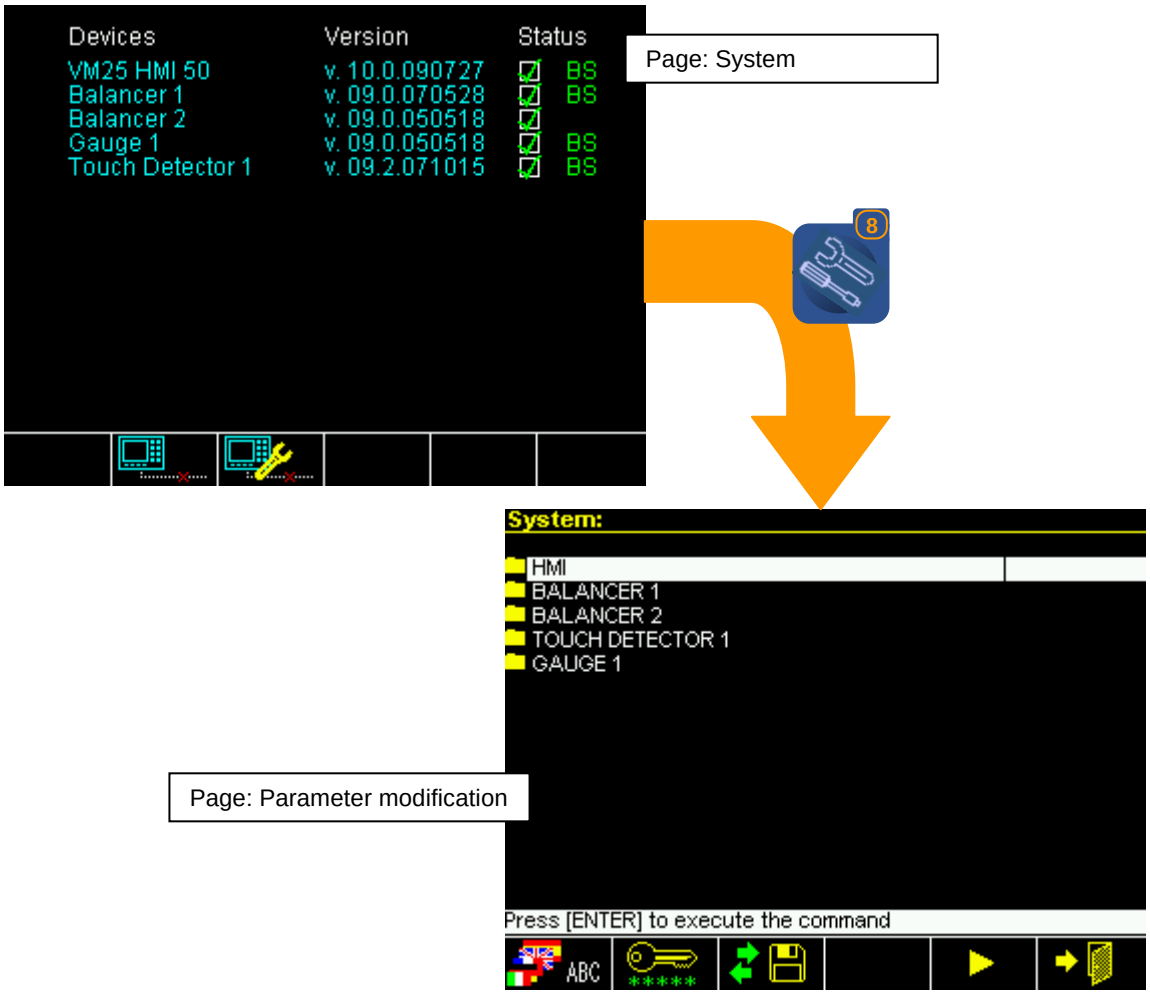
- Make sure that the VM15 rack is connected to the VM15 Panel
- Switch on the rack to start up the VM15 panel application

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

- User language
- Connection port
- IP address for remote operation (if used)
- VM15 system configuration

To access the configuration menu:

- Press the button **Change page**  until appears “System” on the screenbox
- Press the button **Parameters**  ;



All the system commands (Language, Login, Backup, etc.) are available through the 

buttons

Icon	Command name	Button	Description
	Language	F1	User language setup
	Login	F2	Select login level
	Backup / Up Grade	F3	Go to backup / restore /software up-grade functions. See the document Service
	Contrast	F4	Contrast and brightness adjustment (for monochrome display only)
	Next menu	F5	Next commands menu
	Previous menu	F1	Previous commands menu
	Reboot	F2	Restart VM15 Panel application
	Exit	F6	Exit

2.1 User language configuration

To access the user language page setup press the button **Language**  **[F1]**

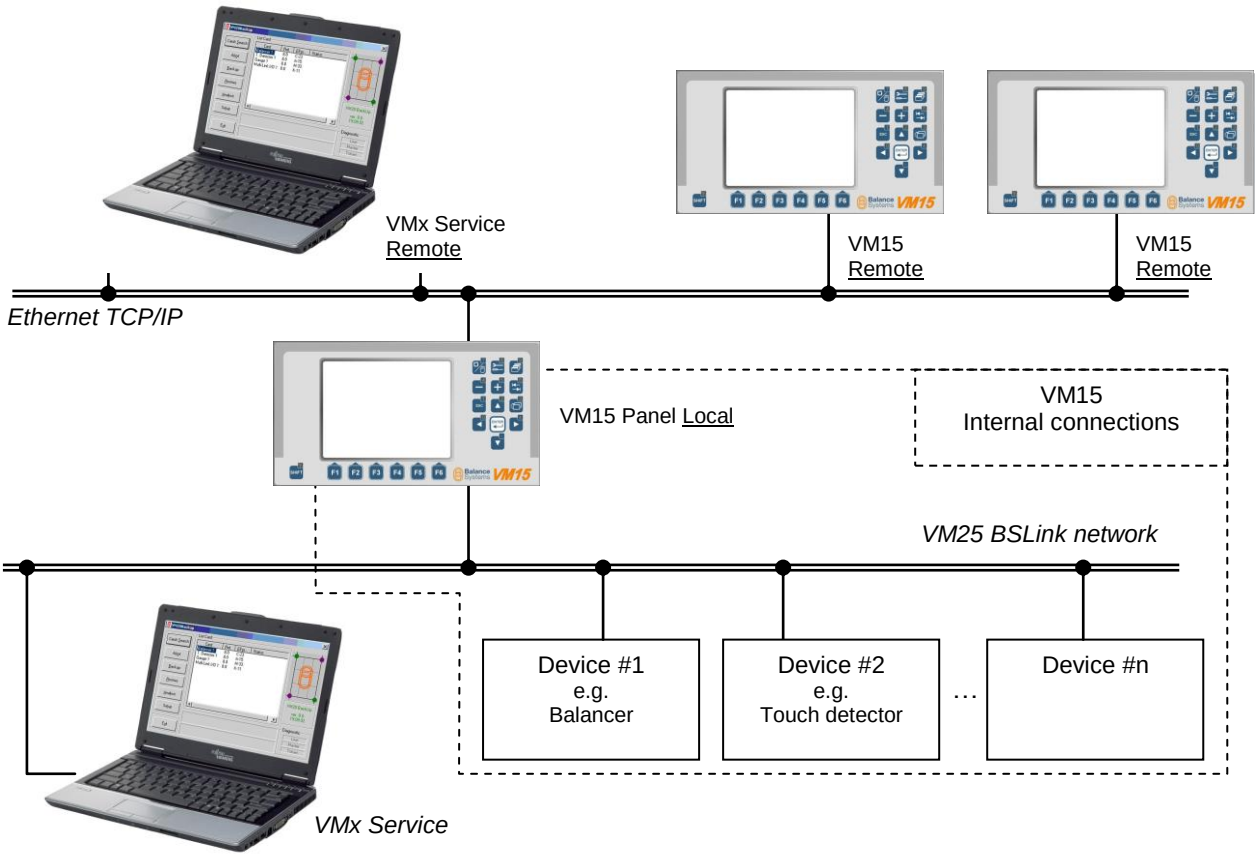
To setup the user language:

- Choose the language using the buttons  or 
- Press  to enable the new language

Icon	Command name	Button	Description
	Exit	F6	Exit

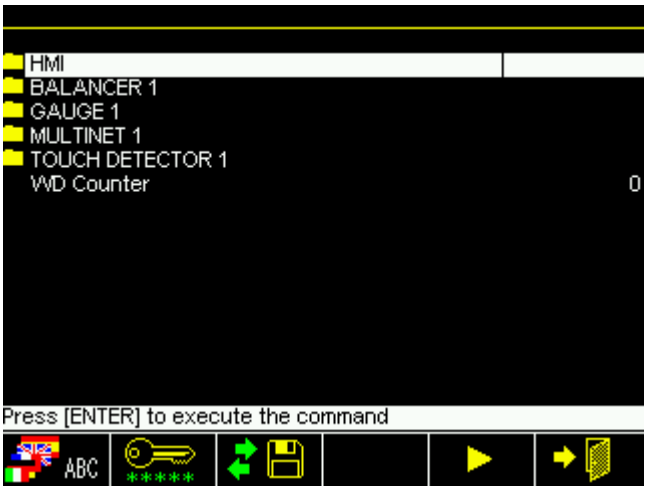
2.2 Connections configuration

2.2.1 VM15 System architecture

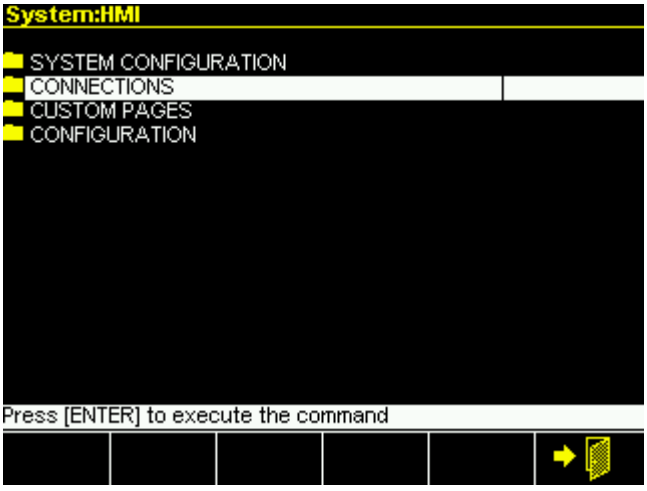


To access the connections configuration page:

- In the parameters page, select the **HMI** folder then press 



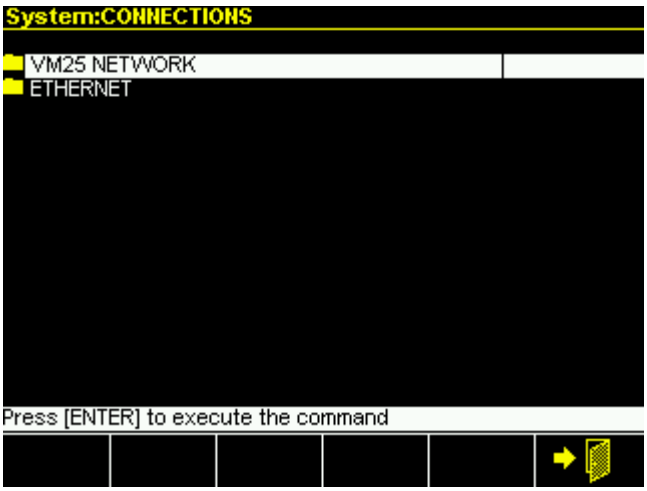
- Select the **CONNECTIONS** folder then press 



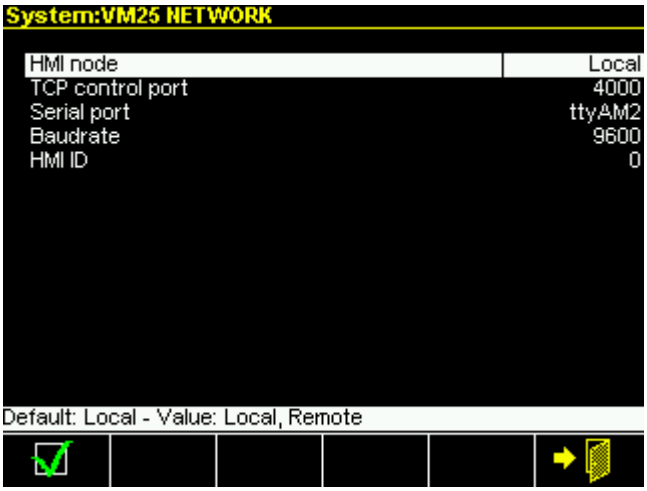
Icon	Command name	Button	Description
	Exit	F6	Exit

2.2.2 VM15 Network

- From the **CONNECTIONS** page, select the **VM15 NETWORK** folder, then press 

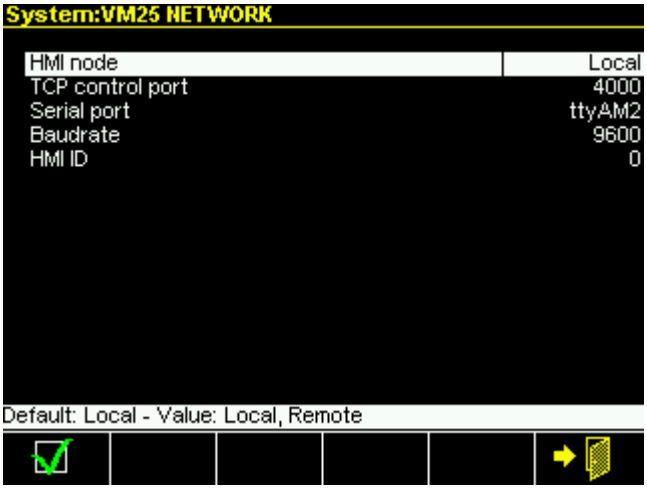


- The setup parameters are different depending upon the type of connection betwen the VM15 panel and the VM15 rack



Parameter	Description
HMI node **[LOCAL]**	Type of connection of the VM15 panel in the VM15 network. **LOCAL:** VM15 panel directly connected to the VM15 rack **REMOTE:** VM15 panel connected to another VM15 panel or to a PC Windows via Ethernet

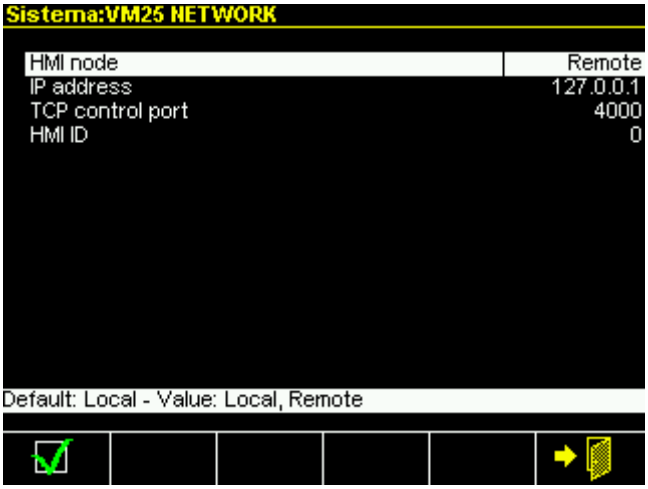
2.2.2.1 Direct connection to VM15 rack (HMI node = LOCAL)



Parameter	Description
HMI node = LOCAL	VM15 panel directly connected to the VM15 rack
TCP control port **[4000]**	Control port address on the VM15 Panel unit
Serial port **[TTYAM2]**	Serial port type used for the connection of the VM15 panel to the VM15 rack
Baud rate [bps] **[9600]**	Communication speed [bps] 9600, 19200, 38400, 57600, 115200
HMI ID **[1]**	Address of the actual VM15 Panel instance in the VM15 system (values from 1 to 49) Should be used when more than one VM15 HMI or VM15 Control Panel are connected to the same system Setting “0” the address is automatically assigned (values from 50 to 127)

Icon	Command name	Button	Description
	Apply	F1	Apply new settings
	Exit	F6	Exit

2.2.2.2 Remote connection via Ethernet (HMI node = REMOTE)



Parameter	Description
HMI Node = REMOTE	VM15 panel connected to another VM15 panel or to a PC Windows HMI via Ethernet
IP address **[192.168.0.1]**	IP address of the device to which the VM15 rack is physically connected. Example: **192.168.0.62**
TCP control port **[4000]**	Control port address on the VM15 Panel unit
HMI ID **[1]**	Address of the actual VM15 Panel instance in the VM15 system (values from 1 to 49) Should be used when more than one VM15 HMI or VM15 Control Panel are connected to the same system By setting “0” the address is automatically assigned (values from 50 to 127)

Icon	Command name	Button	Description
	Apply	F1	Apply new settings
	Exit	F6	Exit

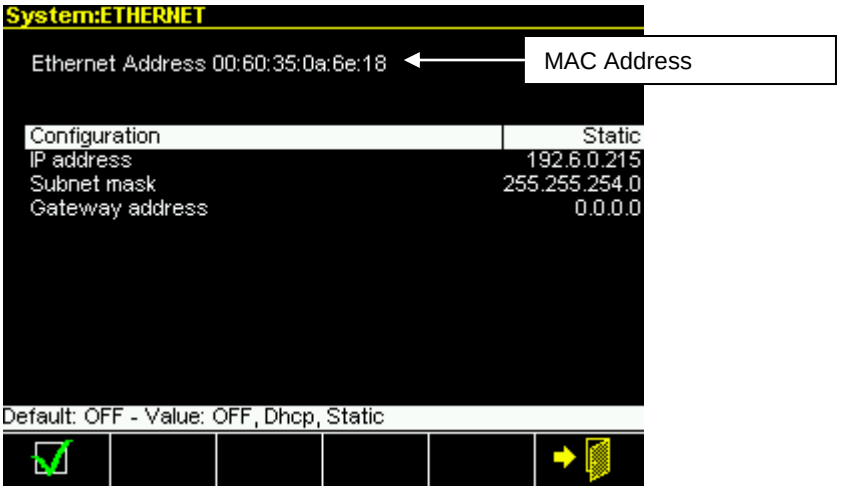
2.2.3 Ethernet port configuration

In case that the VM15 panel:

- is the host for remote connection of other VM15 Panels or PC Windows VM15 HMI,
- is configured to operate in remote mode,

it is necessary to configure the Ethernet port parameters.

- From the **CONNECTIONS** page, select the **ETHERNET** folder, then press 

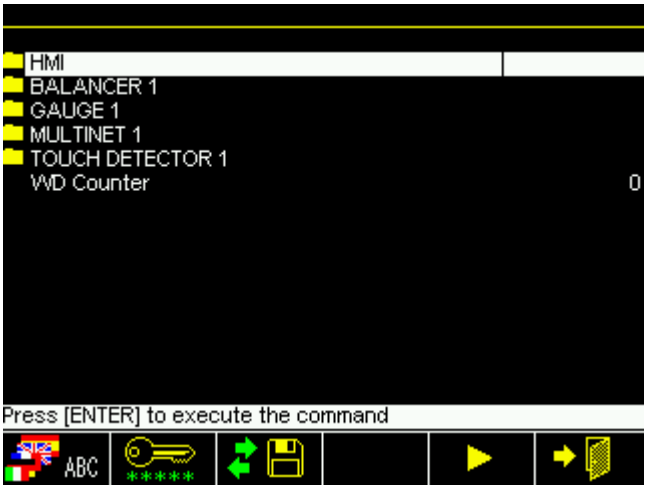


Parameter	Description
Configuration **[OFF]**	Type of connection of the panel in the VM15 network **OFF:** No connection **DHCP:** Automatic acquisition of the network parameters **STATIC:** Manual definition of the network parameters
IP address **[192.168.0.1]**	Acquired or preset IP address of the VM15 Panel
Subnet mask **[255.255.255.0]**	Acquired or preset subnet mask of the VM15 Panel
Gateway address **[0.0.0.0]**	Acquired or preset gateway address of the VM15 Panel

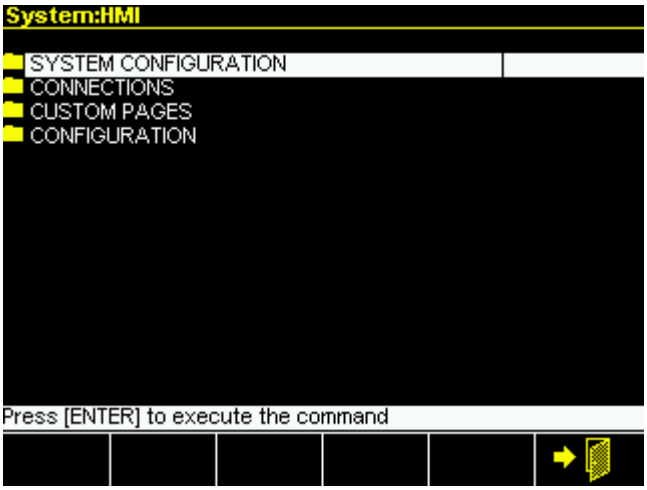
Icon	Command name	Button	Description
	Apply	F1	Apply new settings
	Exit	F6	Exit

2.3 VM15 system configuration

- In the parameters page, select the **HMI** folder then press 

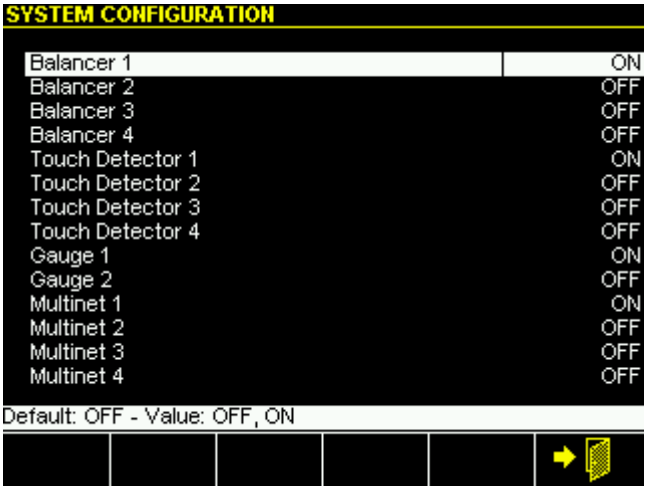


- Select the **SYSTEM CONFIGURATION** folder then press 



- Enable the devices. In the example: Balancer and Gauge

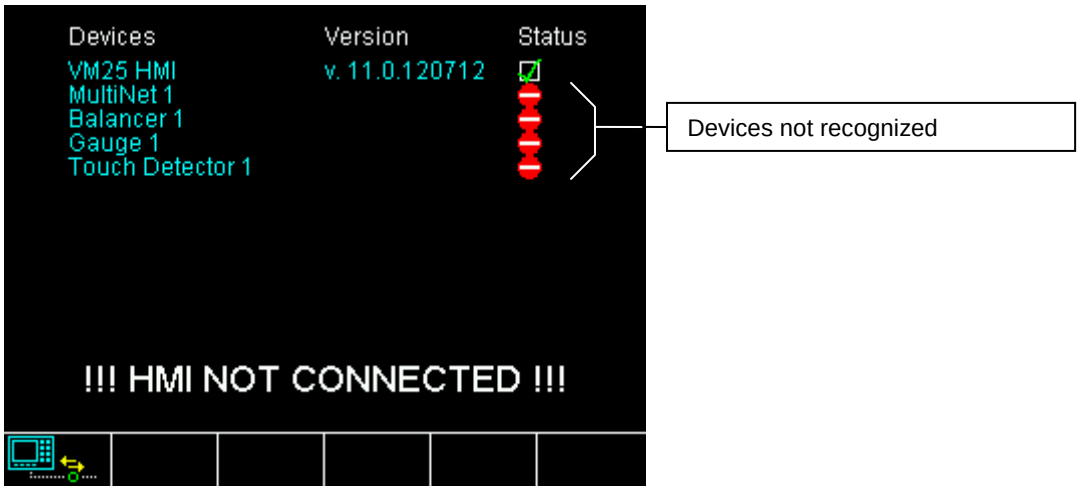
  NOTE: to optimise the startup phase when the system is turned on, enable only the devices actually installed in the system

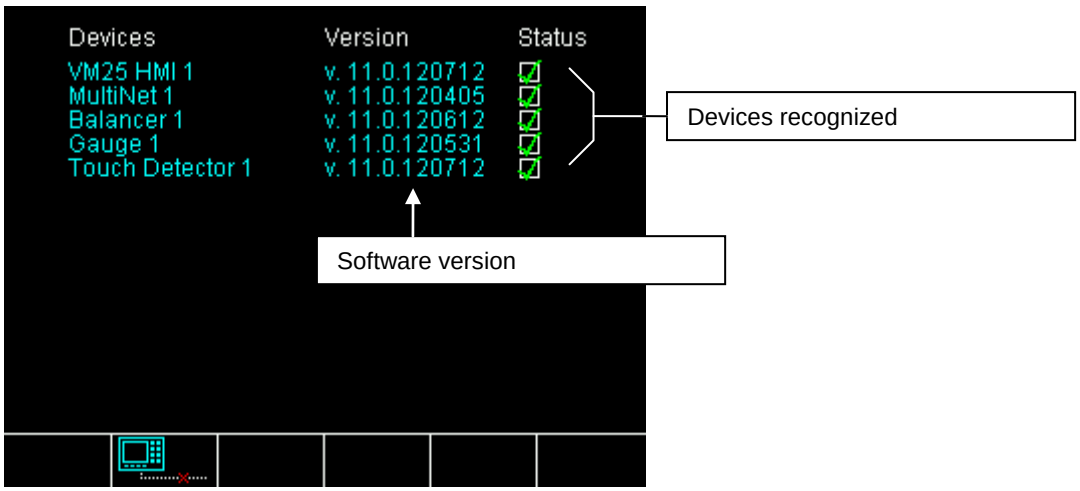


Icon	Command name	Button	Description
	Exit	F6	Exit

2.4 Connection and device recognition

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





Icon	Command name	Button	Description
	Connect	F1	Start the connection procedure between the VM15 Panel interface and the VM15 rack
	Disconnect	F2	Stop the communication between the VM15 Panel interface and the VM15 rack
	Service	F3	Switch to “**service**” mode for maintainance operations

3. Programming and Setup

3.1 Introduction

This chapter is devoted to describing configuration parameters regarding the VM15 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 VM15 rack
- The VM15 Panel application must be enabled for controlling every card installed

NOTE:

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

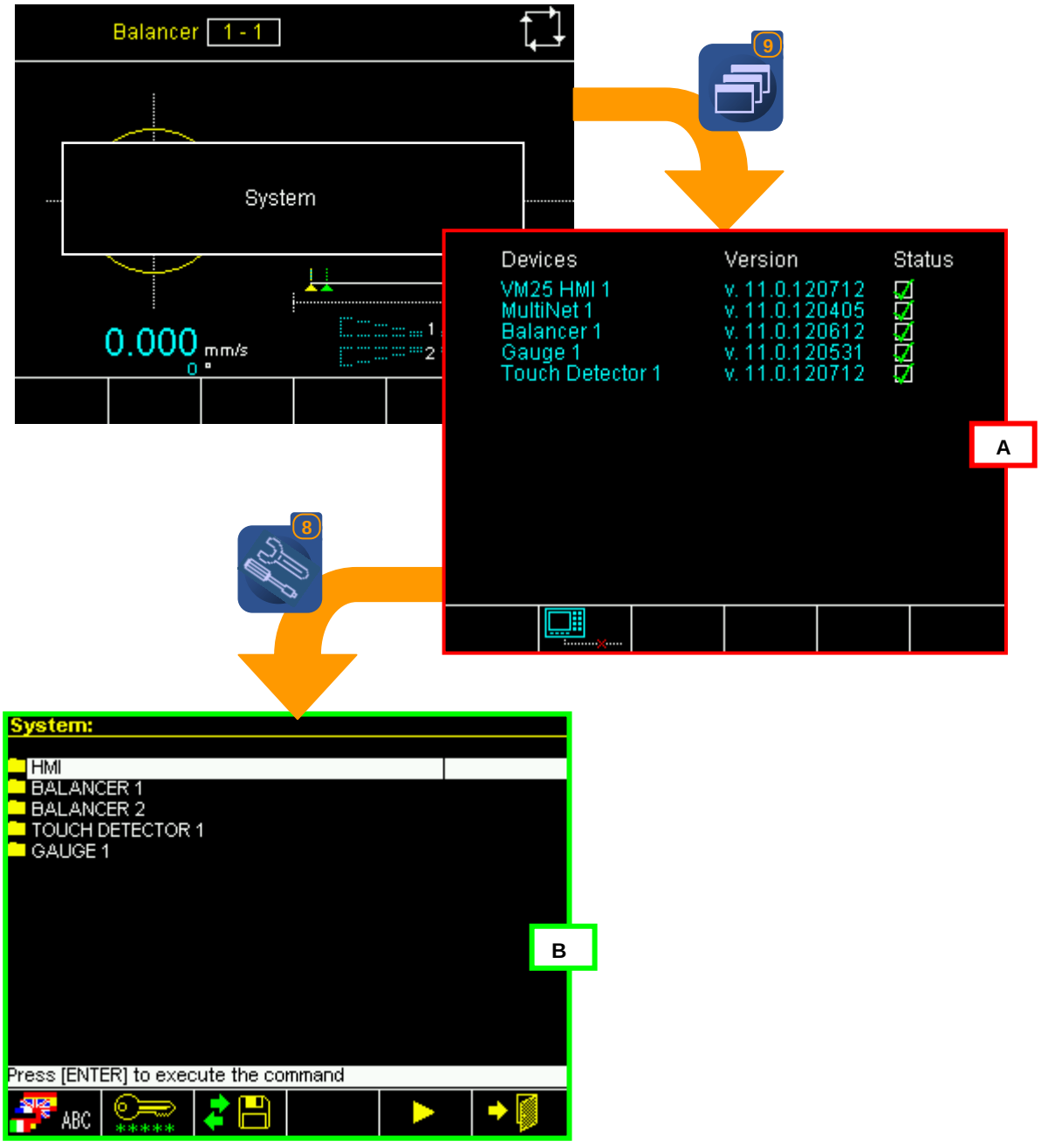
Typical work flow for starting and configuring the system:

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 level
6. Setting the VM15 Panel interface layout
7. Setting of each installed device
8. Backup execution

3.2 HMI settings

When the VM15 Panel application is started, to access to the system settings:

- Press the button **Change page**  until “System” appears in the screenbox
- Press the button **Parameters** 

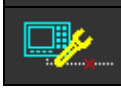


Screen A – System page

On the system page is displayed the list of the installed devices:

- Device name
- Software version
- Recognition status

The available commands are summarized in the following table:

Icon	Command name	Button	Description
	Connect	F1	Start the connection procedure between the VM15 Panel interface and the VM15 rack
	Disconnect	F2	Stop the communication between the VM15 Panel interface and the VM15 rack
	Service	F3	Switch to “**service**” mode for maintainance operations

Screen B – Parameters page

From the parameters page it is possible to access the HMI application setup.

The available command are summarized in the following table:

Icon	Command name	Button	Description
	Language	F1	User language setup
	Login	F2	Select login level
	Backup / Up Grade	F3	Go to backup / restore /software up-grade functions. See the document Service for all details.
	Contrast	F4	Contrast and brightness adjustment (for monochrome display only)
	Next menu	F5	Next commands menu
	Previous menu	F1	Previous commands menu
	Reboot	F2	Restart VM15 Panel application
	Exit	F6	Exit

3.2.1 Setting the Login level

The VM15 system is equipped with a login system, managed via enabling passwords, 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 defined for the different access levels:

Level	Password	Description
Observer	1	All of the enabled devices operate automatically without any possibility of intervention. The only active functions allow the display to be shifted between 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	All of the enabled devices 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	All of the enabled devices operate both automatically and manually with access to the Setup menu of the entire system. This level is reserved for technical personnel specialized in installing the VM15 system

To access the login level management:

- From the **System** page press **Parameters** 
- Press the **Login** command  **[F2]**
- Using the numerical keyboard, enter the password relative to the new level and press 

- Press **Save & Exit** command  **[F1]** to save the new level and exit
- Alternatively, press **Exit** command  **[F6]** to enable the new level and exit witout saving it.

Icon	Command name	Button	Description
	Save & Exit	F1	Save the new level and exit
	Exit	F6	Apply the new level and exit without saving

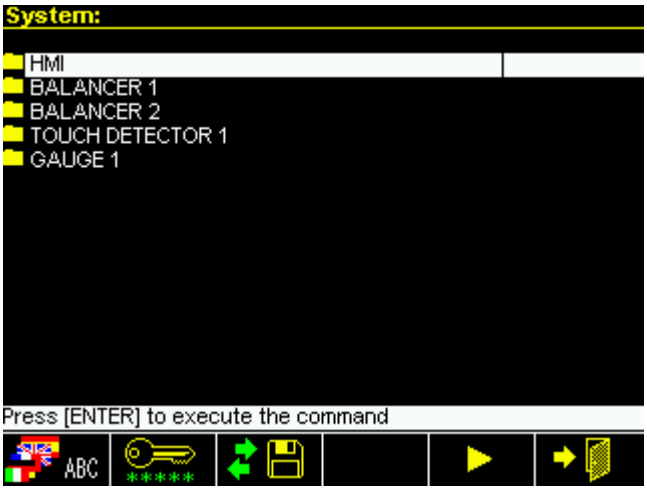
3.2.2 Custom pages

It is possible to define up to 8 custom pages on which display simultaneously the status of different devices. The layout of these pages is automatic.
The custom pages are included in the list of the displayed pages when the related devices are working in automatic mode only.

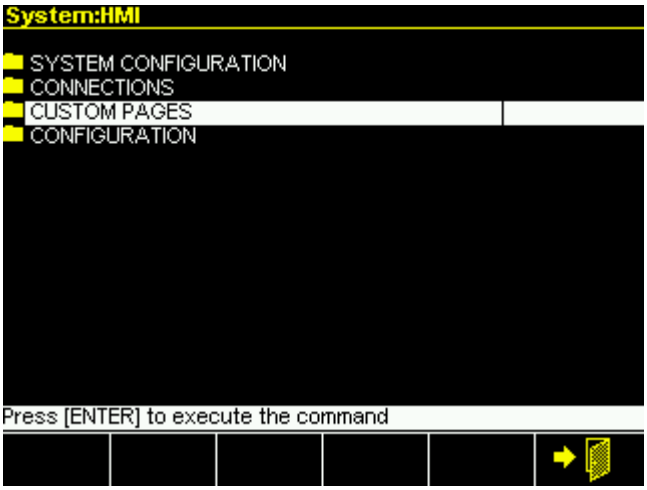
To define the custom pages:

- From the **System** page press **Parameters** 

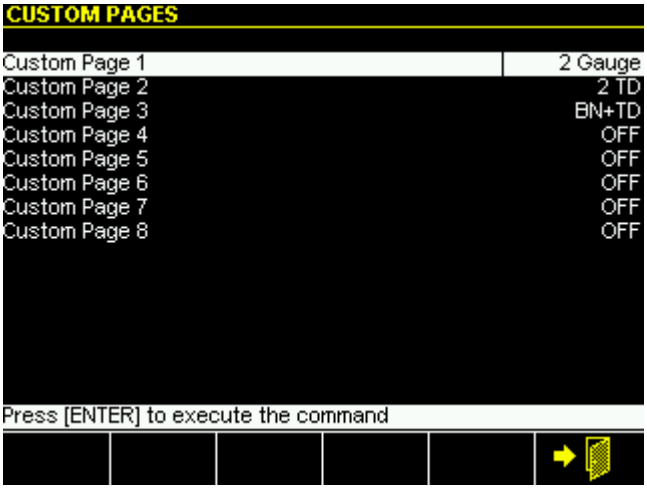
- Select the **HMI** folder then press 



- Select **CUSTOM PAGE** folder then press 

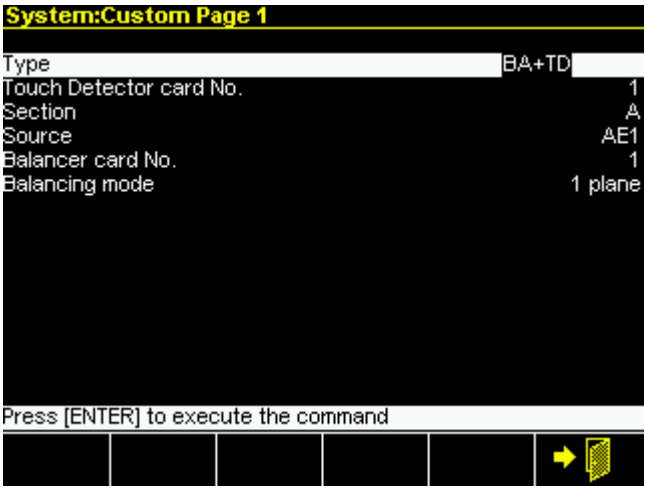


- Select the **Custom Page "n"** to be defined, then press 



- Setup all the parameters as indicated in the next tables (device type, sections, sources, etc.)

Parameter	Description
Type **[OFF]**	Custom page type **OFF**: page disabled **BN+TD**: the custom page is generated by a BALANCER and a TOUCH DETECTOR device



Parameter	Description
Type = BN + TD	
Touch detector card No. **[1]**	Touch detector card to be displayed
Section **[A]**	Touch detector section to be displayed
Source **[AE1]**	Touch detector source to be displayed
Balancer card No. **[1]**	Balancer card to be displayed
Balancing mode **[1 PLANE]**	1 plane balancing

Icon	Command name	Button	Description
	Exit	F6	Exit

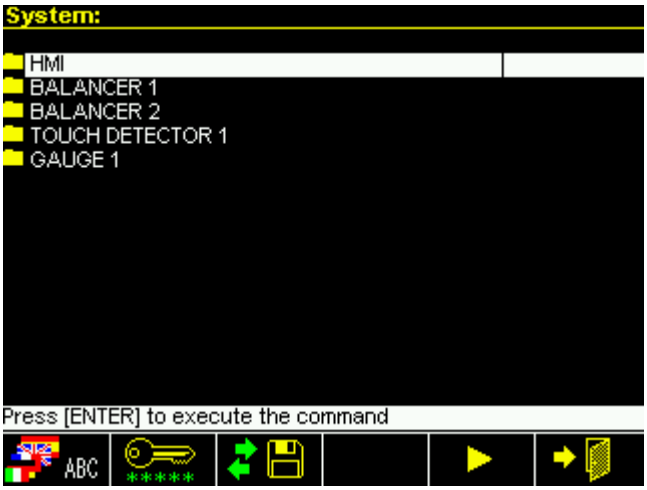
To display the configured custom pages:

- The related devices should be switched to **AUTOMATIC mode**
- A new connection procedure should be launched: **Disconnect**  **[F2]** then **Connect**  **[F1]**

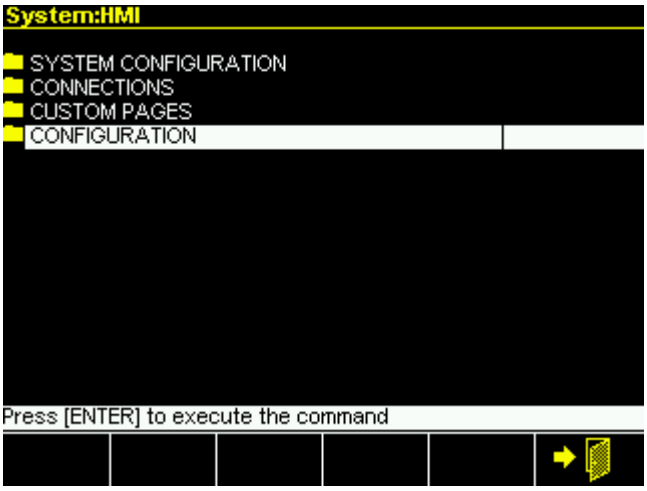
3.2.3 Configuration

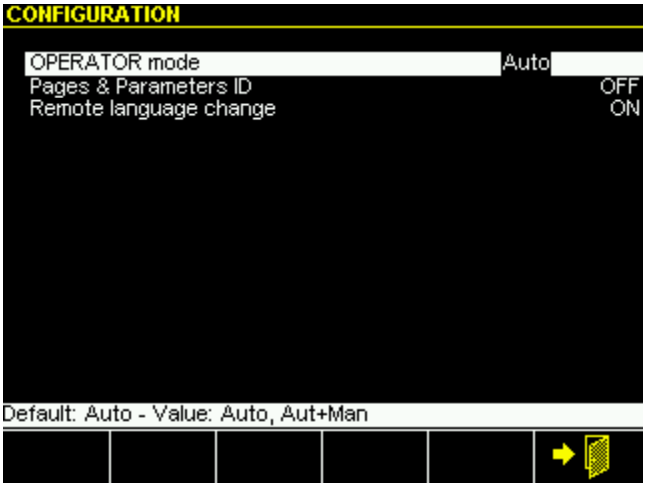
- From the **System** page press **Parameters** 

- Select the **HMI** folder then press 



- Select the **CONFIGURATION** folder then press 





Parameter	Description
OPERATOR mode **[AUTO]**	Define the device operating mode in the case of "OPERATOR" login level **AUTO**: The devices work in automatic mode only **AUTO+MAN**: The devices work both in automatic and in manual mode
Pages & Parameters ID **[OFF]**	Enable the display of the Pages & Parameters ID number
Remote change language **[OFF]**	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"*

Icon	Command name	Button	Description
	Exit	F6	Exit

3.3 Devices software setup

The correct use and operation of the devices

- Balancer
- Touch detector
- Gauge
- Multinet

requires the definition of a set of parameters. Device parameters are divided in three groups:

Two are defined by system's installer

- **Options** Enabling of 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 to manual mode.

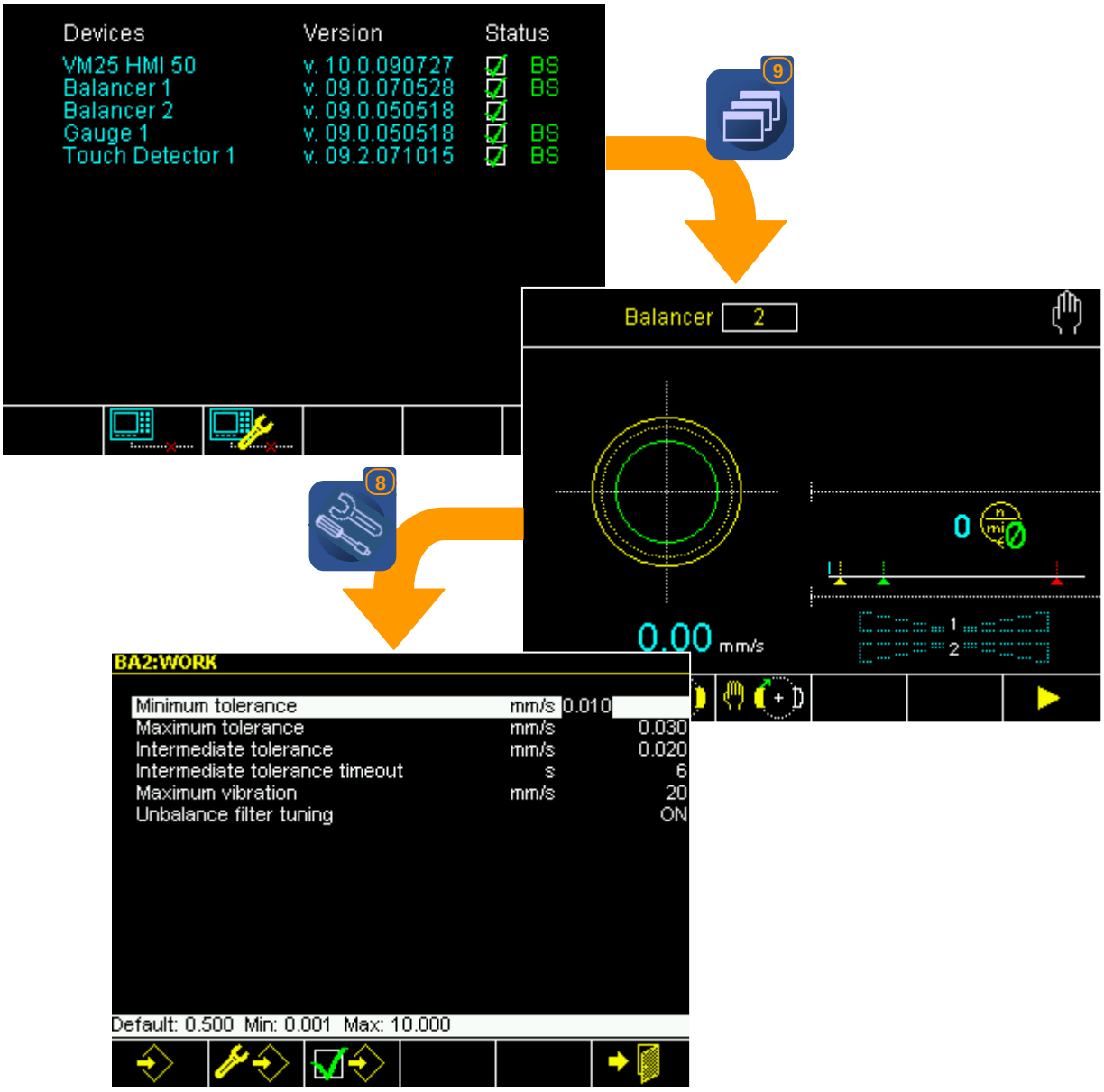
NOTE
For the description of the setup parameters of each installed device refer to the document Parameter Setup

3.3.1 Parameter modification

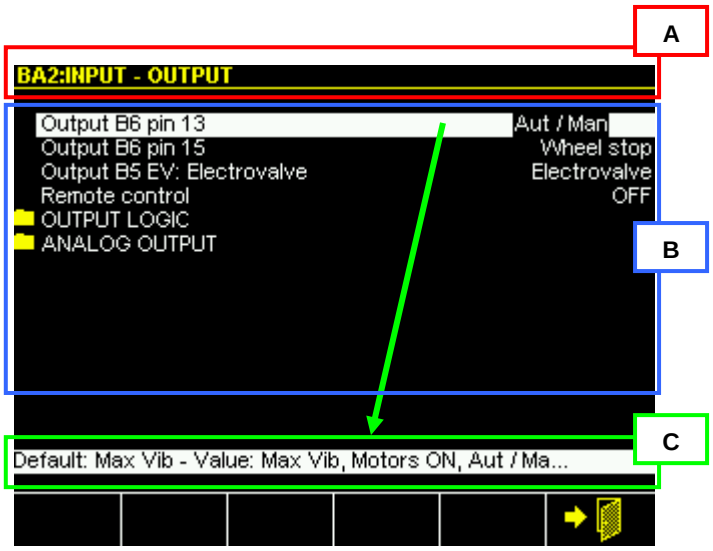
- Use the button **Change page** 

, to reach the desired device (i.e. “Balancer 2”)
- Switch to MANUAL MODE: use the command **Automatic** / **Manual** 

- Press the button **Parameters** 



Icon	Command name	Button	Description
	Work	F1	Access to working parameters
	Setup	F2	Access to setup parameters
	Option	F3	Access to option parameters
	I/O Test	F4	Access to the I/O Test function to check the device digital interface wiring.
	Exit	F6	Exit

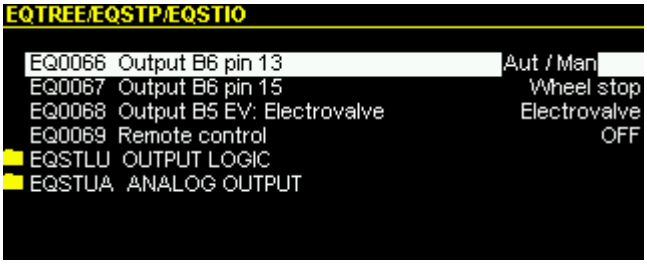


In the parameter modification page are present the following areas:

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

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

In case of extended information through the parameter **Pages & parameters ID = ON**



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

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

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

- Default value (factory preset)
- Actual value

3.3.2 Parameters Backup and Restore

For the complete instruction about Parameters Backup and Restore, use the VMx Service package and refer to the document Service

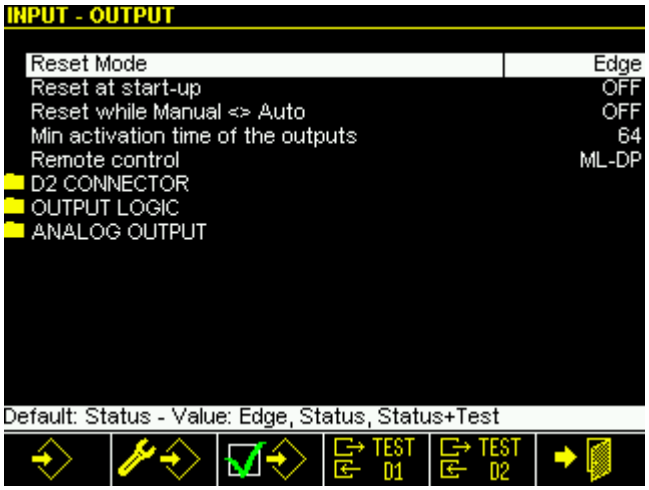
3.3.3 Software Up-grade

For the complete instruction about Software Up-grade, use the VMx package and refer to the document Service

3.3.4 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 page of each of the following function cards:

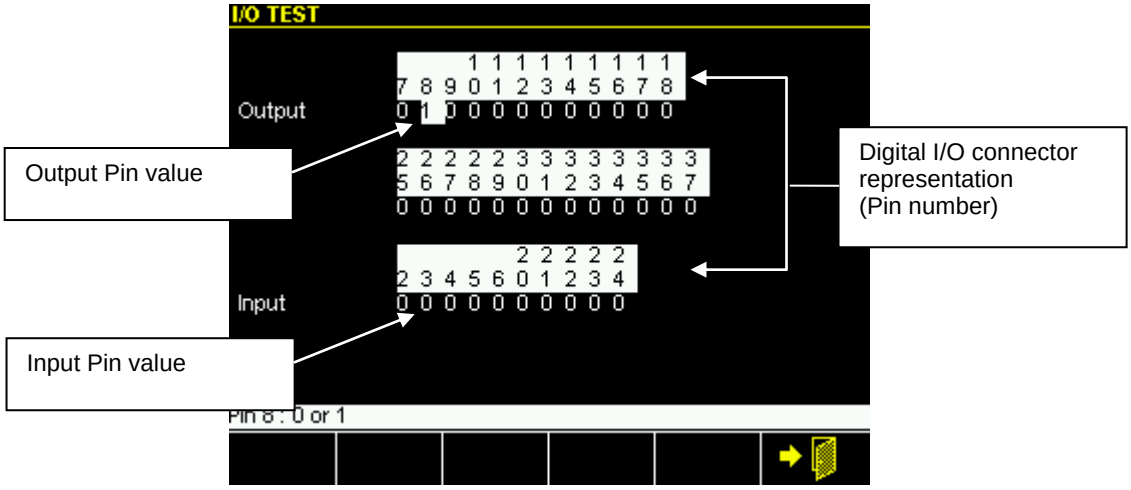
- BALANCER
- TOUCH DETECTOR
- GAUGE
- MULTINET

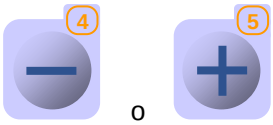


- Press the command **I/O Test** 

[F4 or F5]

  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.



Button	Description
 o	PIN value modification 0 = set the current Pin to low level 1 = set the current Pin to high level
	Apply the new value on the selected output Pin
	Select previous Pin
	Select next PIN

Icon	Command name	Button	Description
	Exit	F6	Exit from I/O test mode

4. Devices setup

The contents of this chapter should be integrated reading the documents
Panel User
Parameter Setup

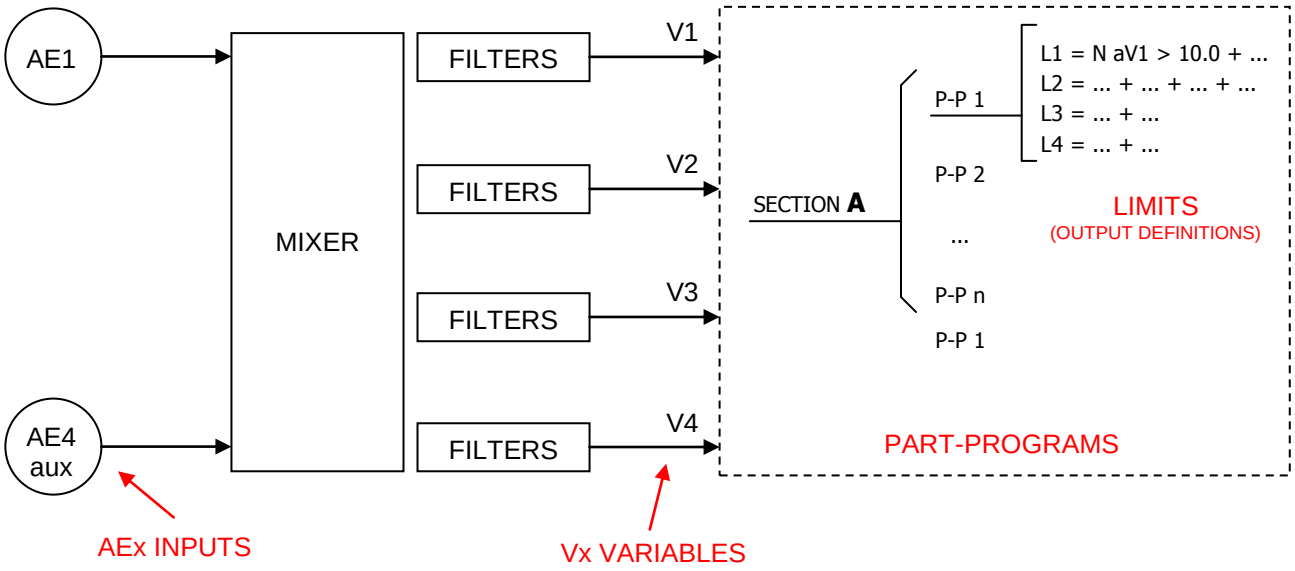
4.1 Touch detector [type TD]

4.1.1 Acoustic Emission Variables setup

4.1.1.1 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

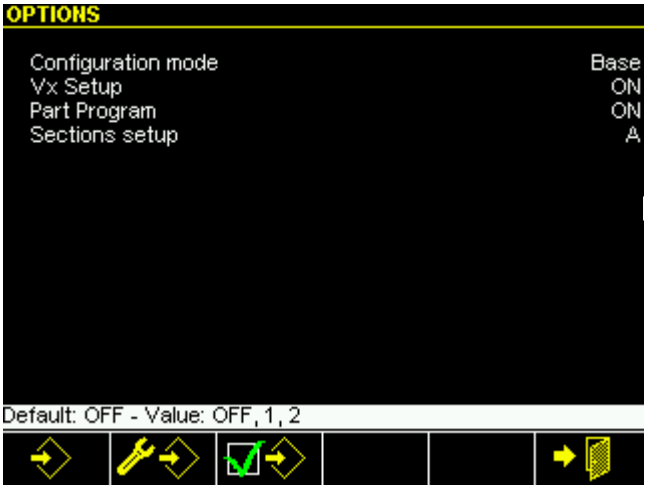
The Vx variables created, are used within the formulas of the part program to define the outputs L1, L2, L3, L4.

4.1.1.2 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)



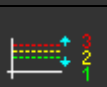
ID	Parameter	Description
	Configuration mode **[BASE]**	Depending on the hardware with which the card is configured and the type of sensor used, the acquisition system can work in 3 different ways with increasing complexity of programming. **BASE** mode **MULTIBAND** mode **ENHANCHED** mode (for special application supported by BS Application Engineers) See the table below and next paragraphs for a complete description
	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

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.

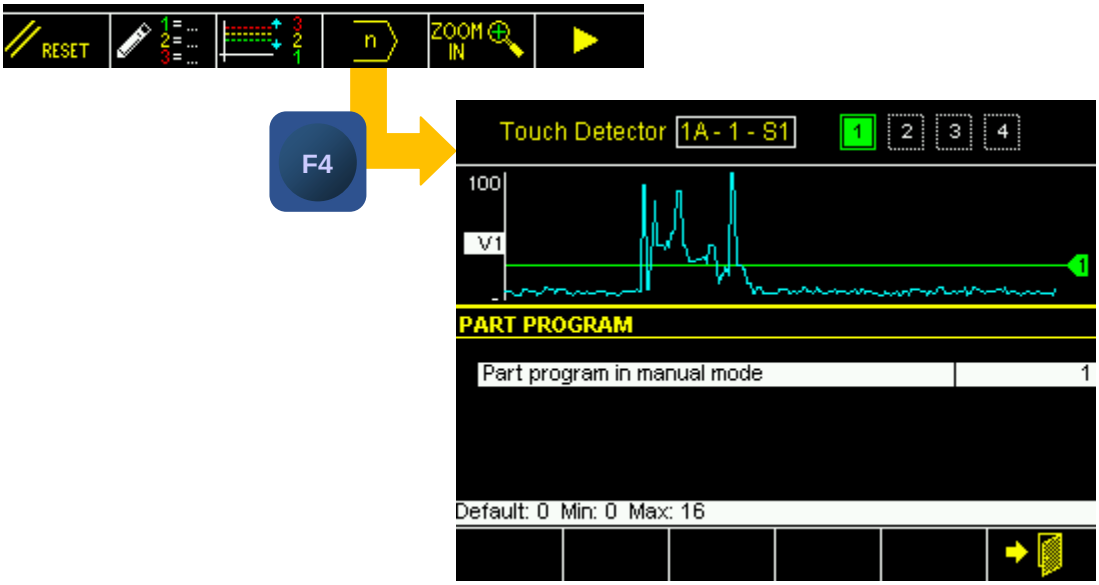
4.1.1.3 Preliminary operation for the system optimization

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

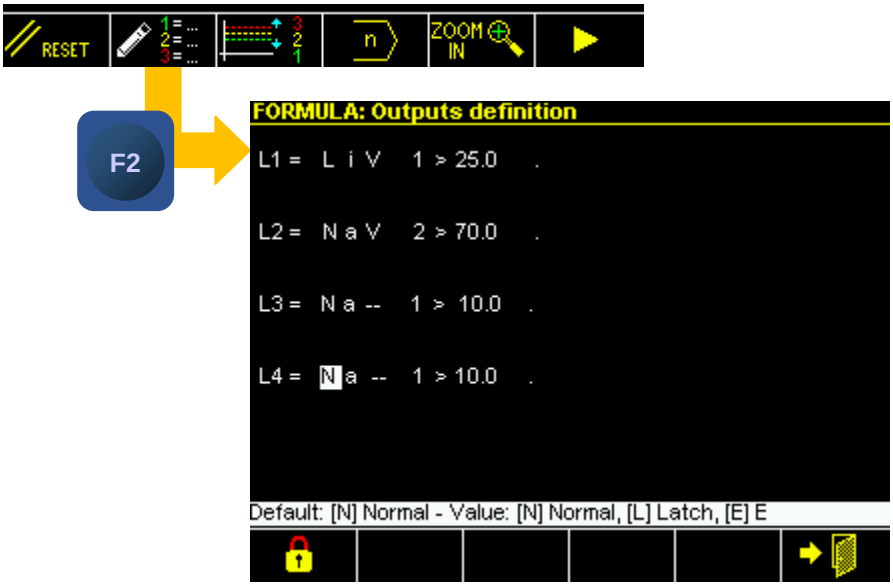
Here are the commands available to access the setup.

Commands			
Icon	**Button**	**Name**	**Description**
	F1	Reset	Status and Output signaling reset
	F2	Formula	Access to formula editing
	F3	Limits 1, 2, 3 & 4 correction	Quick access to fine adjustment of the thresholds related to limits in the formula
	F4	Change Part Program	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.*
	F5	Zoom + / Zoom -	Access to diagrams selection
	F6	Next commands line	Access to next commands line
	F1	Previous commands line	Access to previous commands line
	F2	Variable V1 setup	Access to frequency analysis function to setup the V1 variable
	F3	Variable V2 setup	Access to frequency analysis function to setup the V2 variable
	F4	Variable V3 setup	Access to frequency analysis function to setup the V3 variable
	F5	Variable V4 setup	Access to frequency analysis function to setup the V4 variable
	F2	Power channel setup	Direct access to setup parameter page of the POWER channel [Connector D4]

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



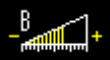
2. Fill the part program by introducing the desired variables, such as:



4.1.1.4 BASE mode optimization

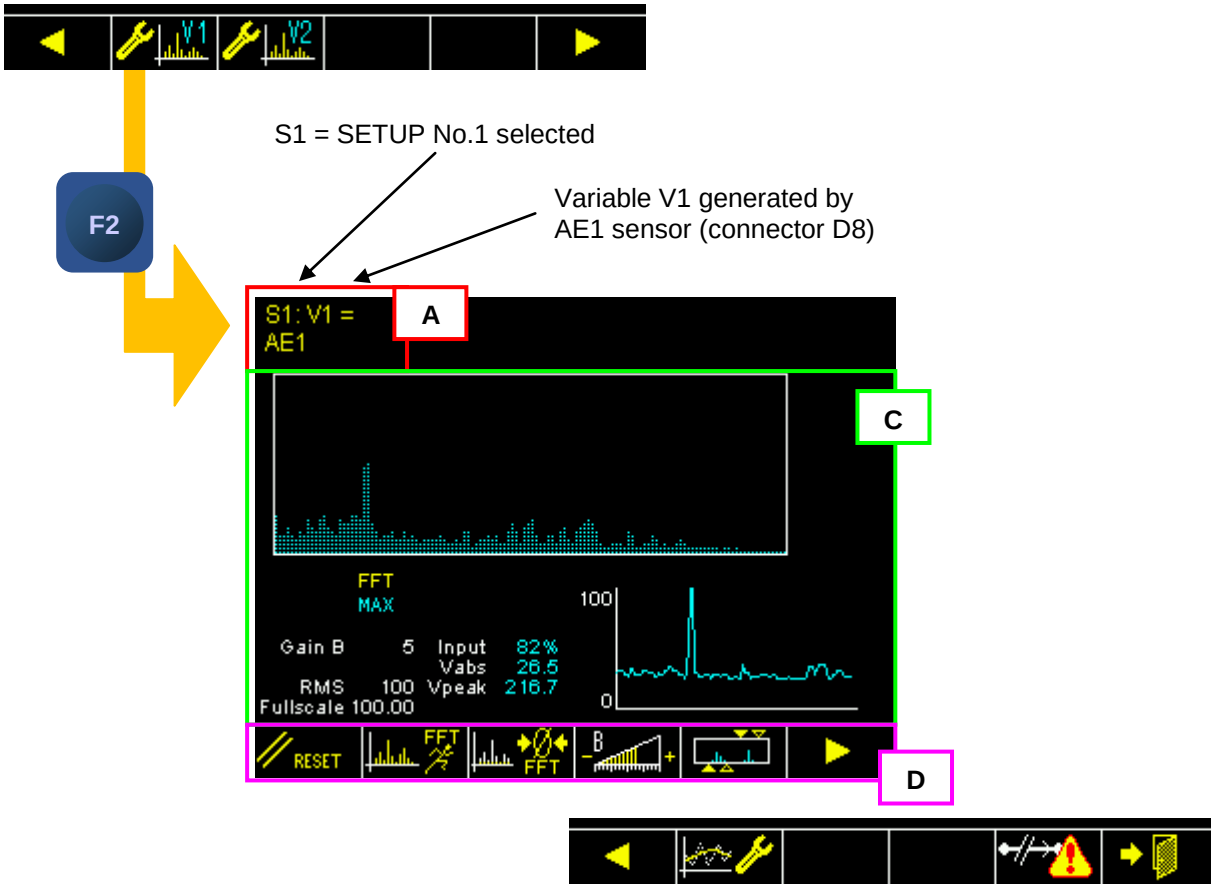
The system displays the entire available frequency band.

It is possible to progam:

Parameters			
Icon	**Parameter**	**Button**	**Description**
	Source	F2	Choice of the AE sensor channel which generates the input signal
	Gain B	F4	Amplification of the input signal.
	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.
	RMS Filter	F2	Low pass filter which gives a reduction of disturbance, eliminating the high frequency components.
	Fullscale	F2	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.

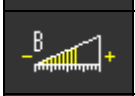
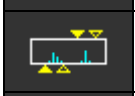
1. Access to the setup of the variables used in the part program written above:



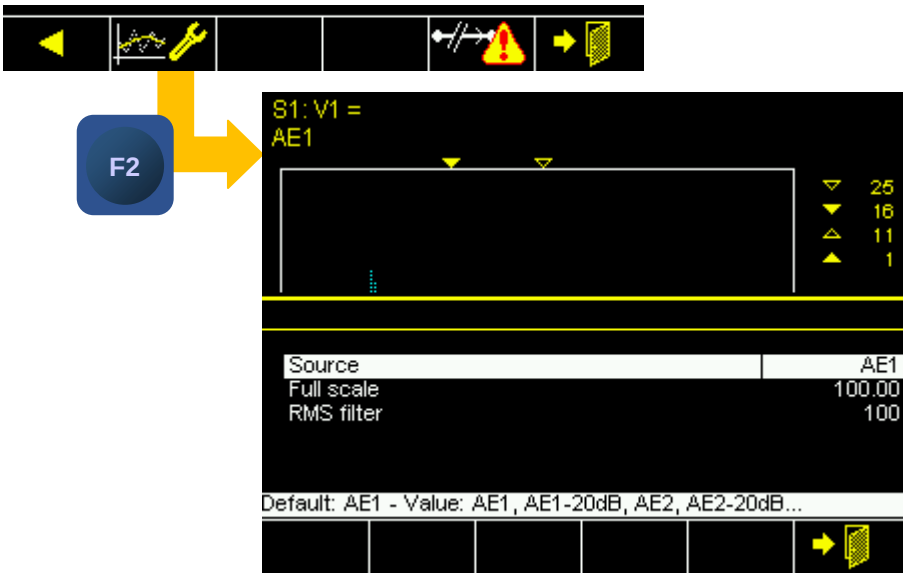
On screen are identified the following areas:

A. Selected channel
B. 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
C. Command buttons [Fx]

The available commands are described in the table below.

Commands			
Icon	**Command name**	**Button**	**Description**
	Reset	F1	Status reset
	FFT run-time	F2	FFT in run-time mode
	FFT peak detector	F2	FFT in peak detector mode (default)
	Zero FFT	F3	Background noise spectrum acquisition
	Reset Zero FFT	F3	Background noise spectrum reset
	Gain B	F4	Gain B setup. Gain of the input signal
	Filters	F5	Digital filters setup
	Parameter	F2	Other parameter setup
	Sensor ready	F5	Sensor ready check setup
	Exit	F6	Exit

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



- Set the value then press  to save it

- Press the button **Exit**  **[F6]**

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

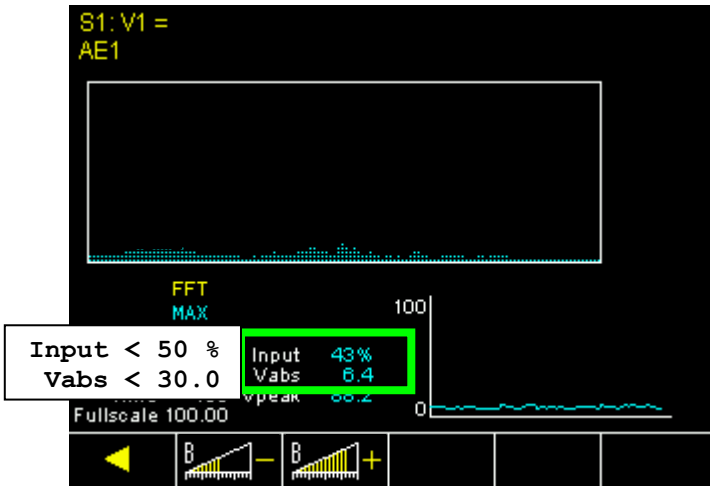
No.	Sensor	Typical Setup				
		Gain B	Digital Filters	RMS Filter	Full scale	FFT mode
1		4	OFF	100	100	FFT MAX
2		4	OFF	100	100	FFT MAX
7		4	OFF	50	100	FFT MAX

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 **Reset**  **[F1]**

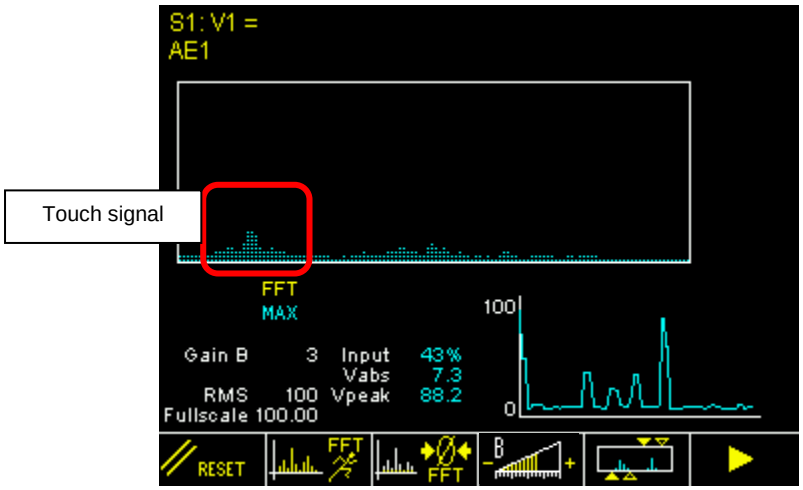
c. Verify that in such condition the background noise detected is:



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 **Reset**  **[F1]**

f. Execute a touch grinding

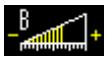


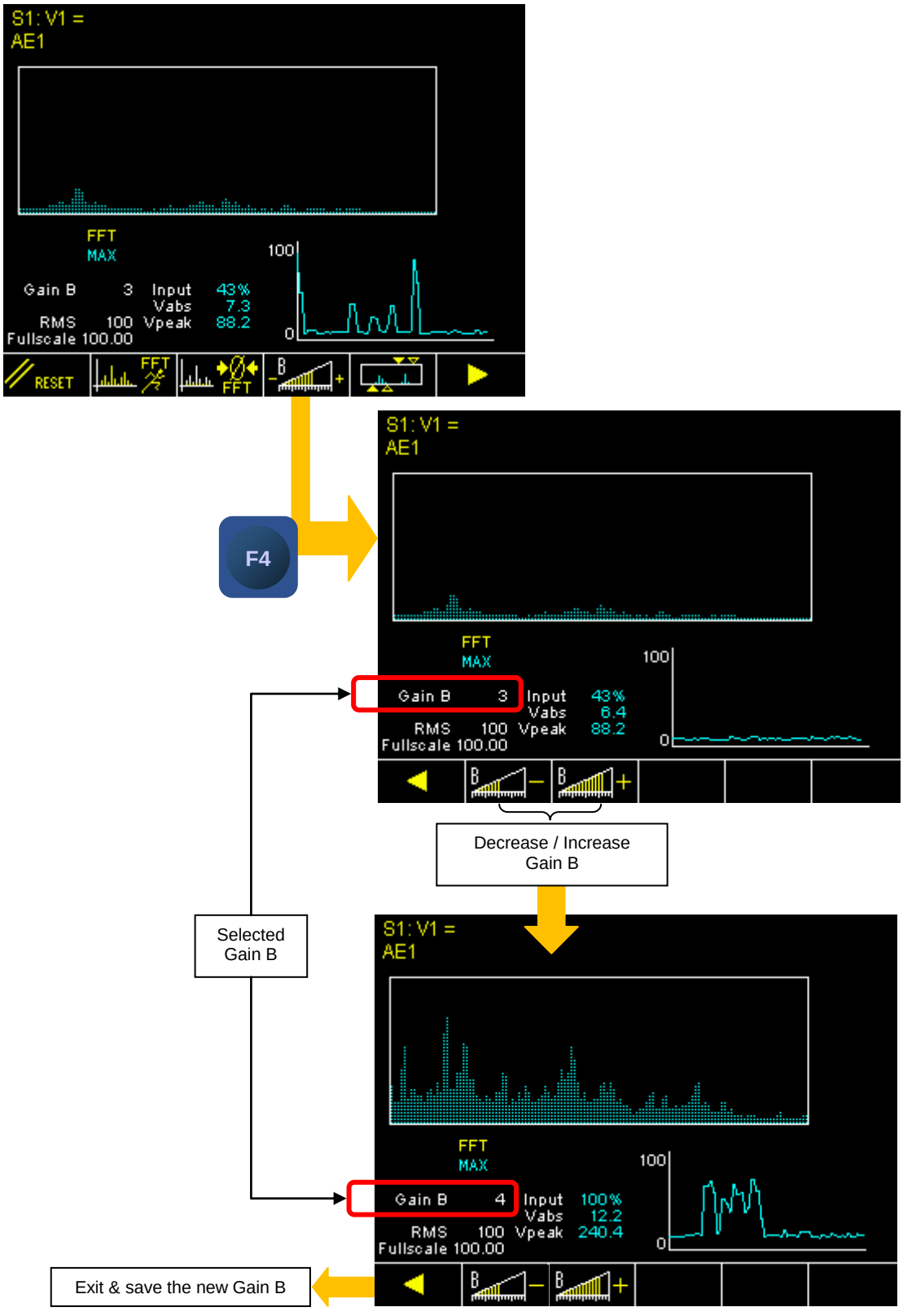
g. Watch on the frequency diagram where are the signals generated by the contact. At this purpose can be useful to execute a **Zero FFT**  **[F3]** command. In this way, only the differences between the signal and the background noise will be displayed.

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

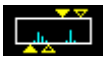
i. If necessary, to obtain the optimization it is possible to modify:

GAIN B

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



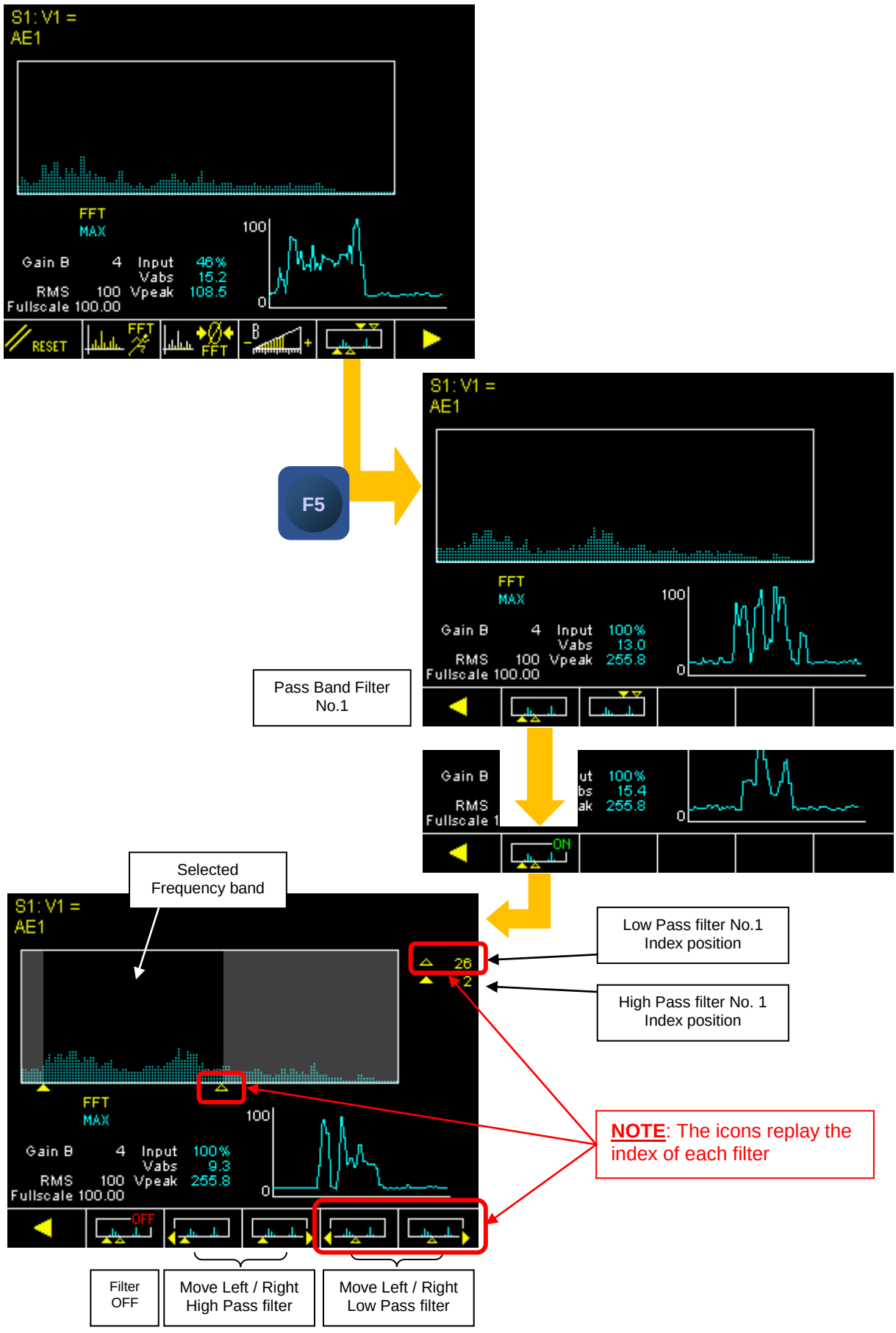
DIGITAL FILTERS

- 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.

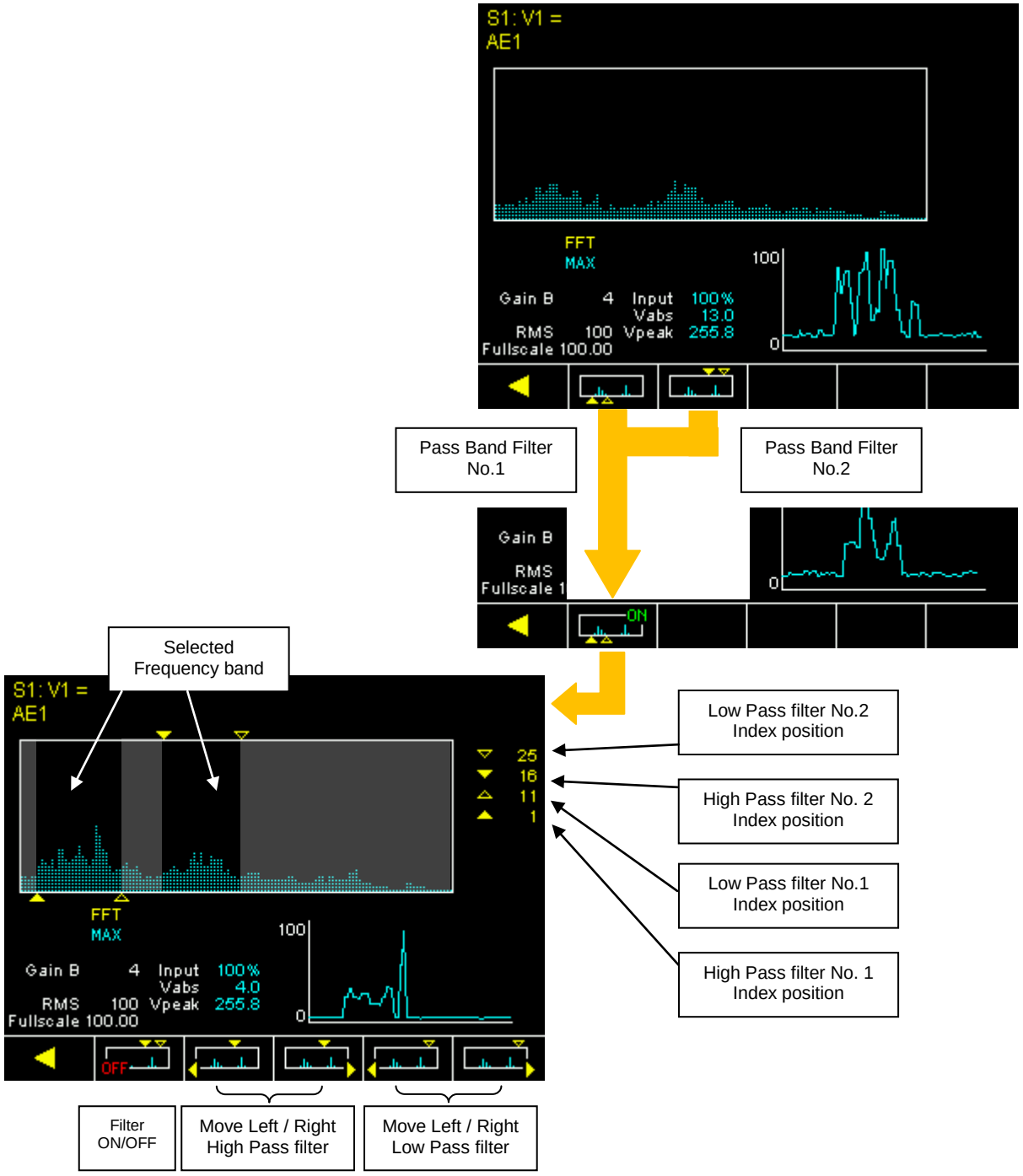
  There are up to 2 programmable band-pass digital filters. Each band pass filter is composed of:

  - 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
MAX
Gain B 4 Input 46%
Vabs 15.2
RMS 100 Vpeak 108.5
Fullscale 100.00
100
0
RESET
FFT
FFT
B
F5
S1: V1 =
AE1
FFT
MAX
Gain B 4 Input 100%
Vabs 13.0
RMS 100 Vpeak 255.8
Fullscale 100.00
100
0
Pass Band Filter
No.1
Gain B
RMS
Fullscale 1
ut 100%
bs 15.4
ak 255.8
0
ON
Selected
Frequency band
S1: V1 =
AE1
26
2
FFT
MAX
Gain B 4 Input 100%
Vabs 9.3
RMS 100 Vpeak 255.8
Fullscale 100.00
100
0
OFF
Low Pass filter No.1
Index position
High 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

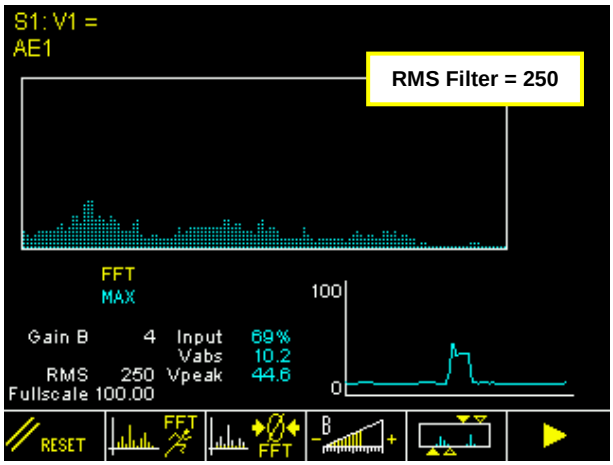
Use of 2 Band-Pass filters:

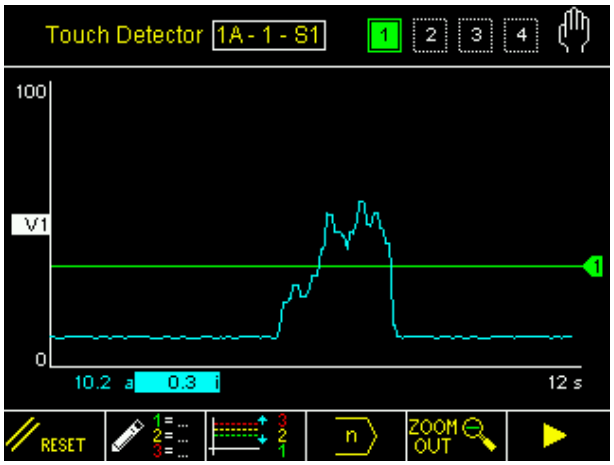


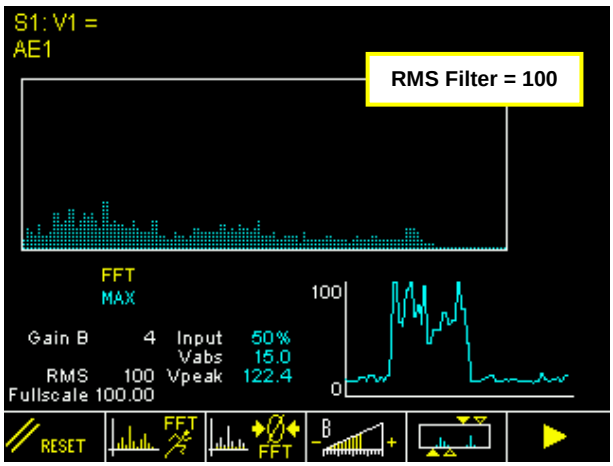
RMS FILTER and FULLSCALE

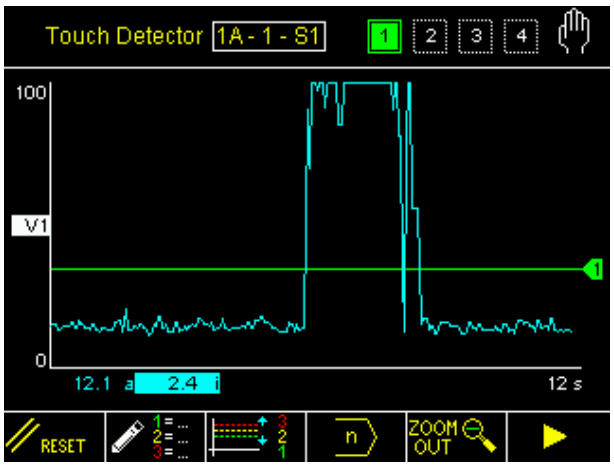
- Further optimizations can be obtained by changing the value of the **RMS Filter**. This will smooth the high frequency noise components. Be careful not to use too much high value for the filter to not affect the response time of the system.

ID	Parameter	Description
	RMS filter [100]	Low pass filter value which gives a reduction of the noise, 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



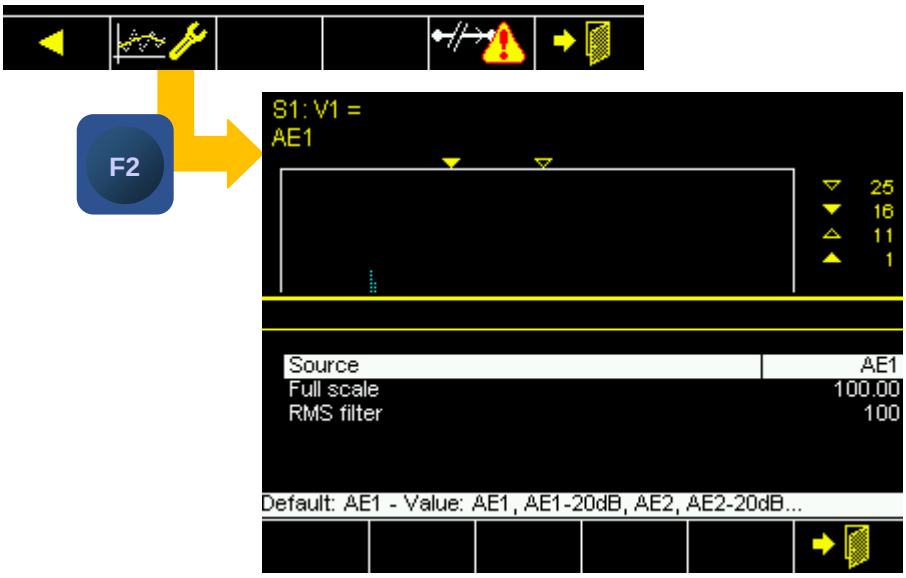






- Change the fullscale to vary the normalization of the Vx variable (this is normally not necessary).

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

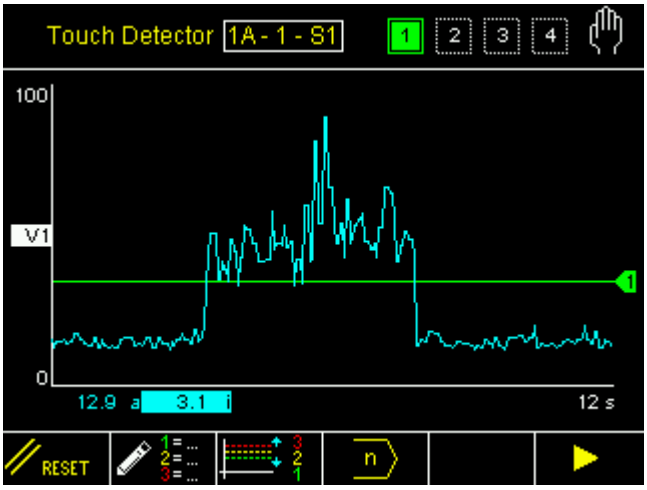


- Set the value then press 

to save it

- Press the button **Exit**  **[F6]**

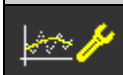
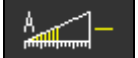
4. Once it is found a satisfactory setup in terms of signal / noise ratio, switch to the normal display mode (standard) and perform sufficient testing to verify the stability and repeatability of the calibration performed.



4.1.1.5 MULTI-BAND mode optimization

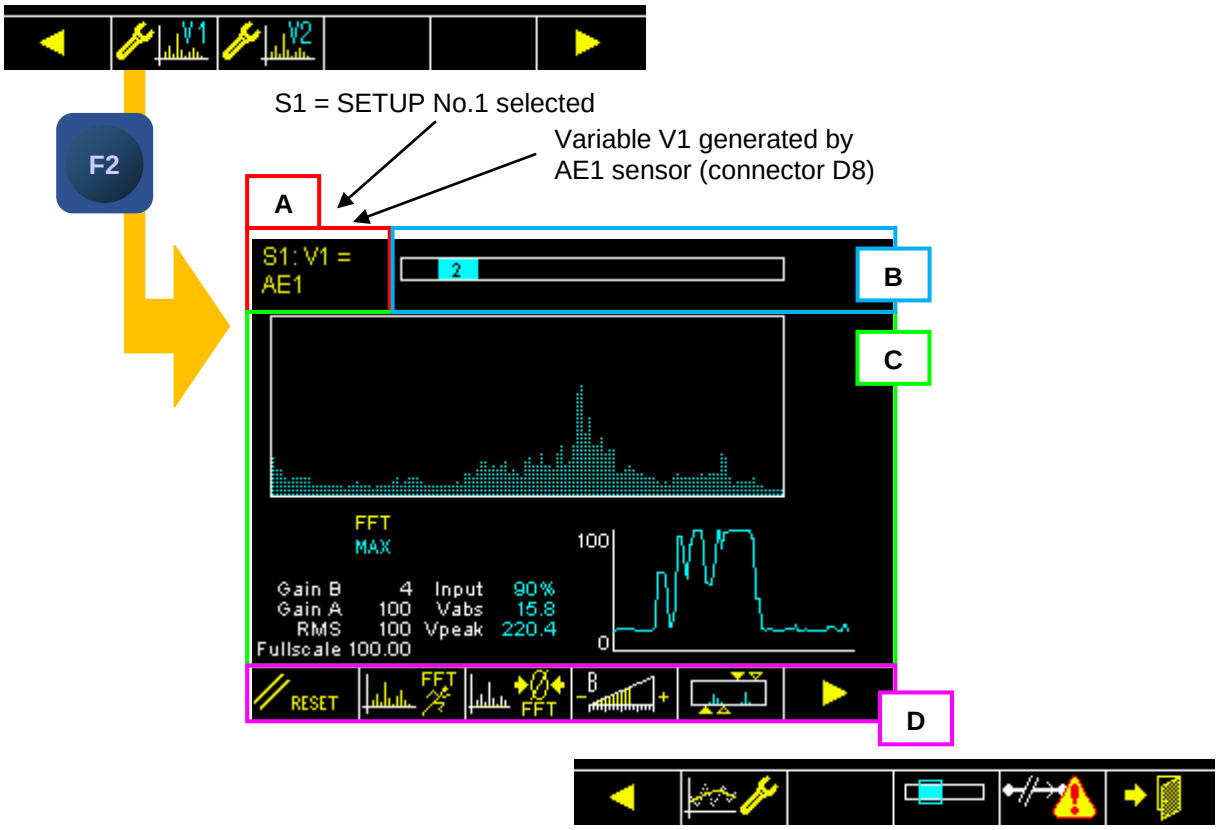
The system displays the entire available frequency band divided into 20 windows of observation. The pre-selected window is zoomed and analyzed in the working area.

It is possible to progam:

Parameters			
Icon	**Parameter name**	**Button**	**Description**
	Source	F2	Choice of the AE sensor channel which generates the input signal
	Window	F4	Window which define the frequency band observed. The selected window is then zoomed in the working area.
 	Gain A	F4 F5	Amplification of the signal inside the selected window.
	Gain B	F4	Amplification of the input signal.
	Band Pass Filter	F5	Up to 2 Band Pass filter inside the selected window. The filters can switched on/off and placed independently inside the selected window.
	RMS Filter	F2	Low pass filter 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.
	RMS downsample	F2	RMS filter downsample
	Fullscale	F2	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.

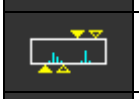
1. Access to the setup of the variables used in the part program written above:



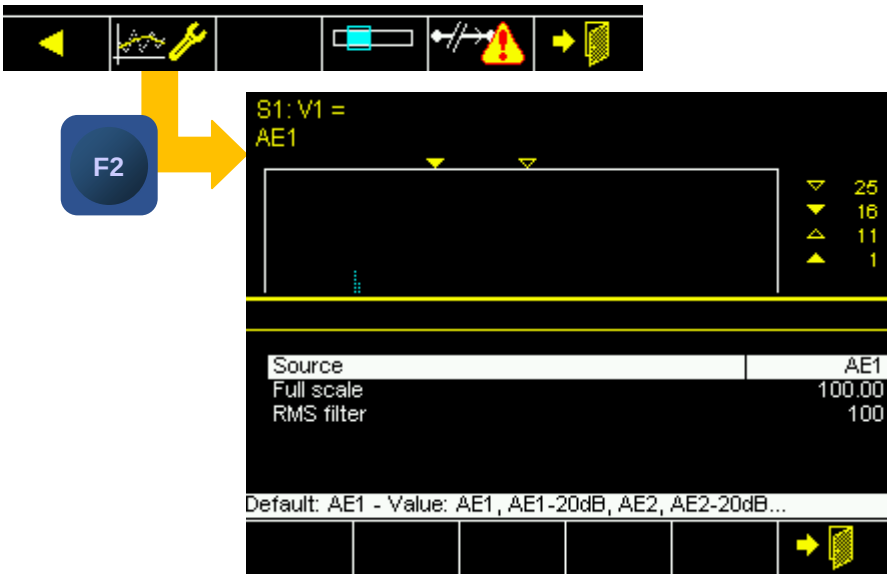
On screen are identified the following areas:

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.

Icon	Command name	Button	Description
	Reset	F1	Status reset
	FFT run-time	F2	FFT in run-time mode
	FFT peak detector	F2	FFT in peak detector mode (default)
	Zero FFT	F3	Background noise spectrum acquisition
	Reset Zero FFT	F3	Background noise spectrum reset
	Gain B	F4	Gain B setup. Gain of the input signal
	Filters	F5	Digital filters setup
	Parameter	F2	Other parameter setup
	Window	F4	Working window selection
	Sensor ready	F5	Sensor ready check setup
	Exit	F6	Exit

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



- Set the value then press  to save it

- Press the button **Exit**  **[F6]**

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 MAX
3		1..4	100	4	OFF	100	100	FFT MAX
4		1..4	100	4	OFF	100	100	FFT MAX
5		1..4	100	4	OFF	100	100	FFT MAX
6		1..4	100	4	OFF	100	100	FFT MAX

and operating as follow:

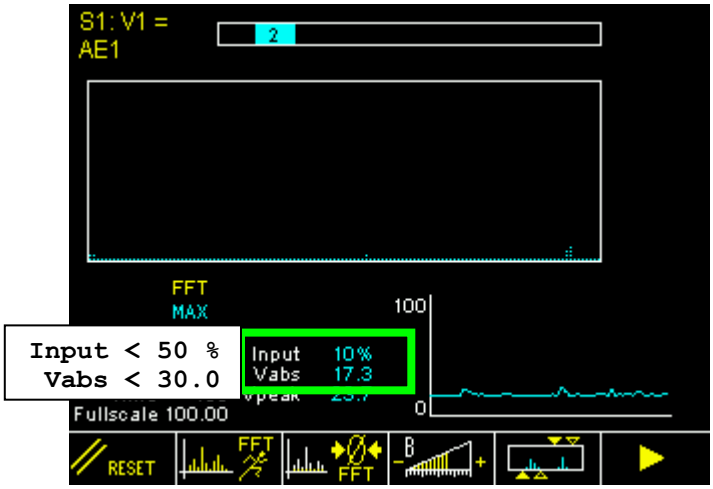
a. Select a suitable working WINDOW and GAIN A following the suggestions in the table above

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 **Reset** 

[F1]

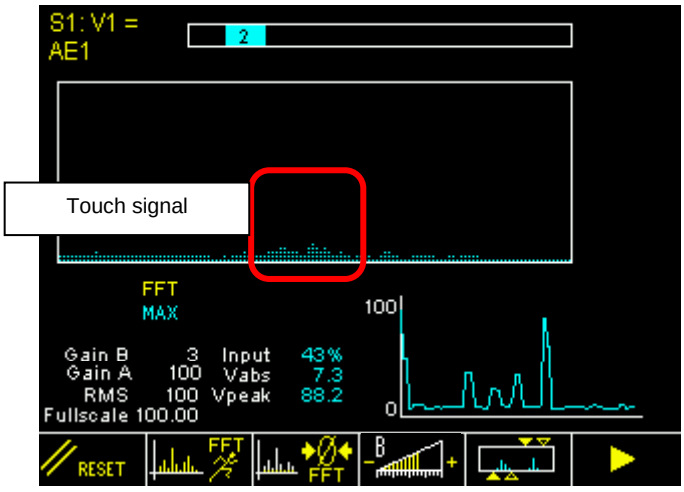
d. Verify that in such condition the background noise detected is:



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 **Reset**  **[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.

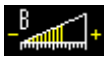
i. Repeat the touch grinding and press the button **Reset**  **[F1]** each time.

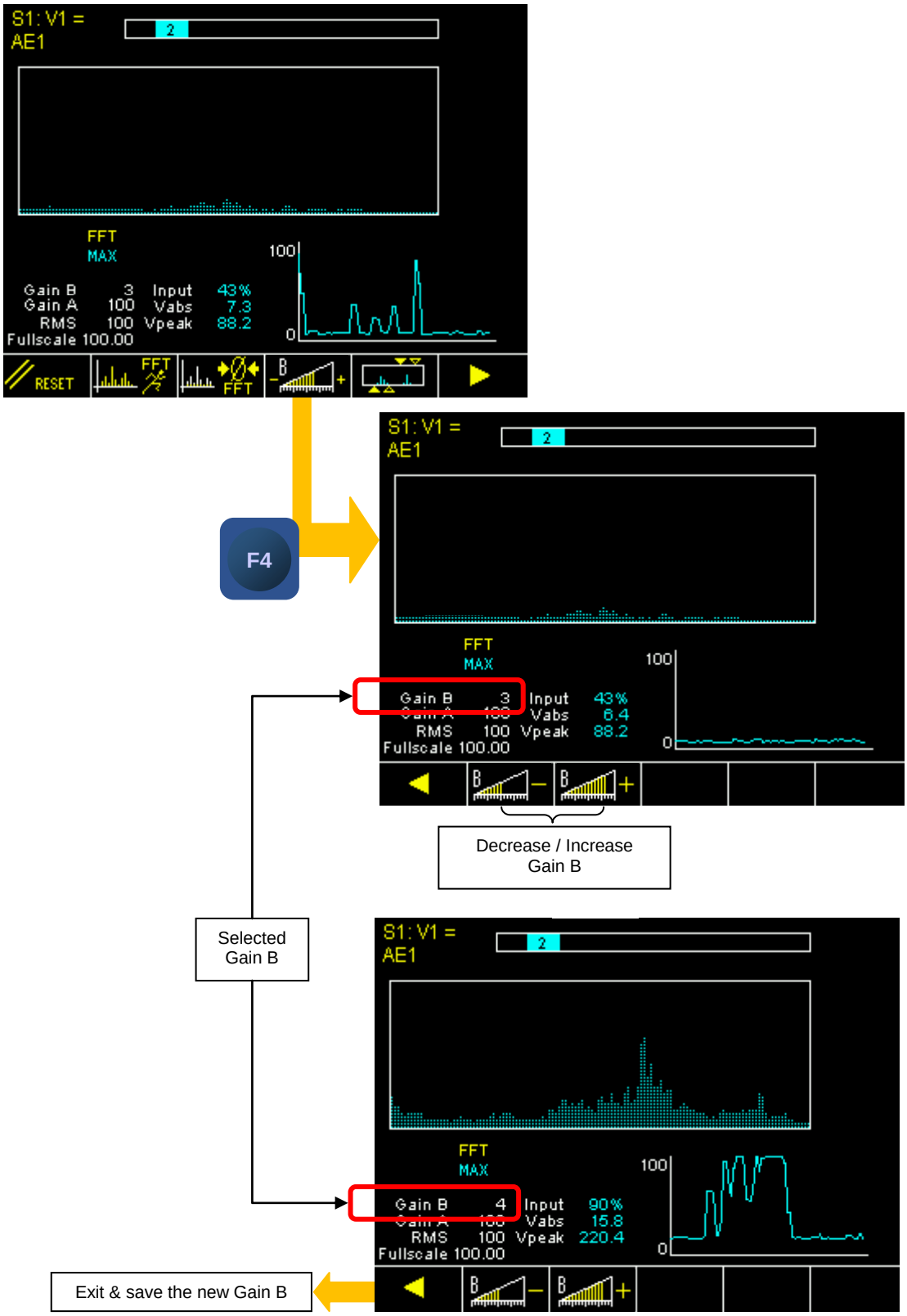
j. If necessary, to obtain the optimization it is possible to modify:

GAIN A & WORKING WINDOW

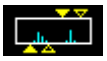
Restart with the step (a)

GAIN B

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



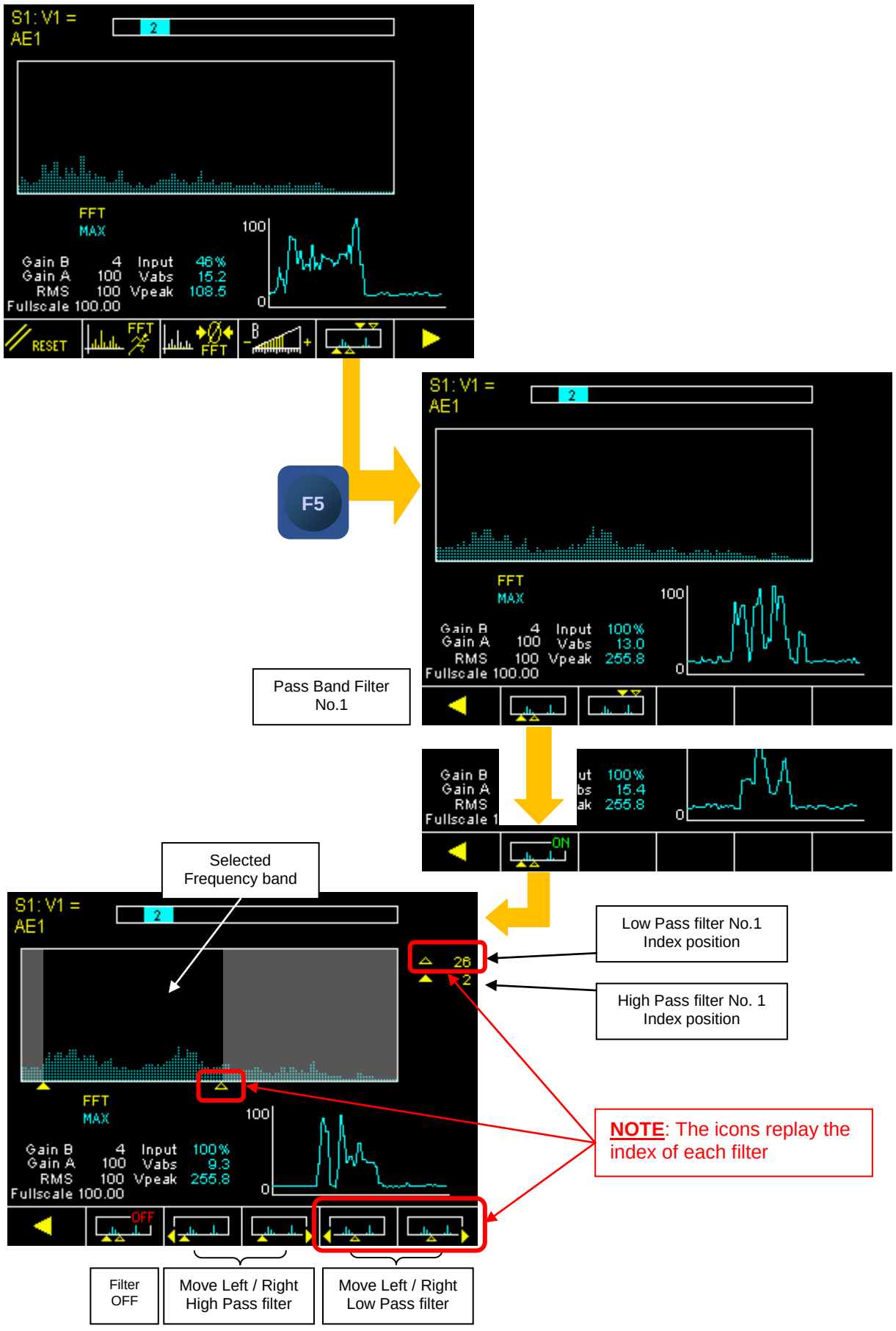
DIGITAL FILTERS

- 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.

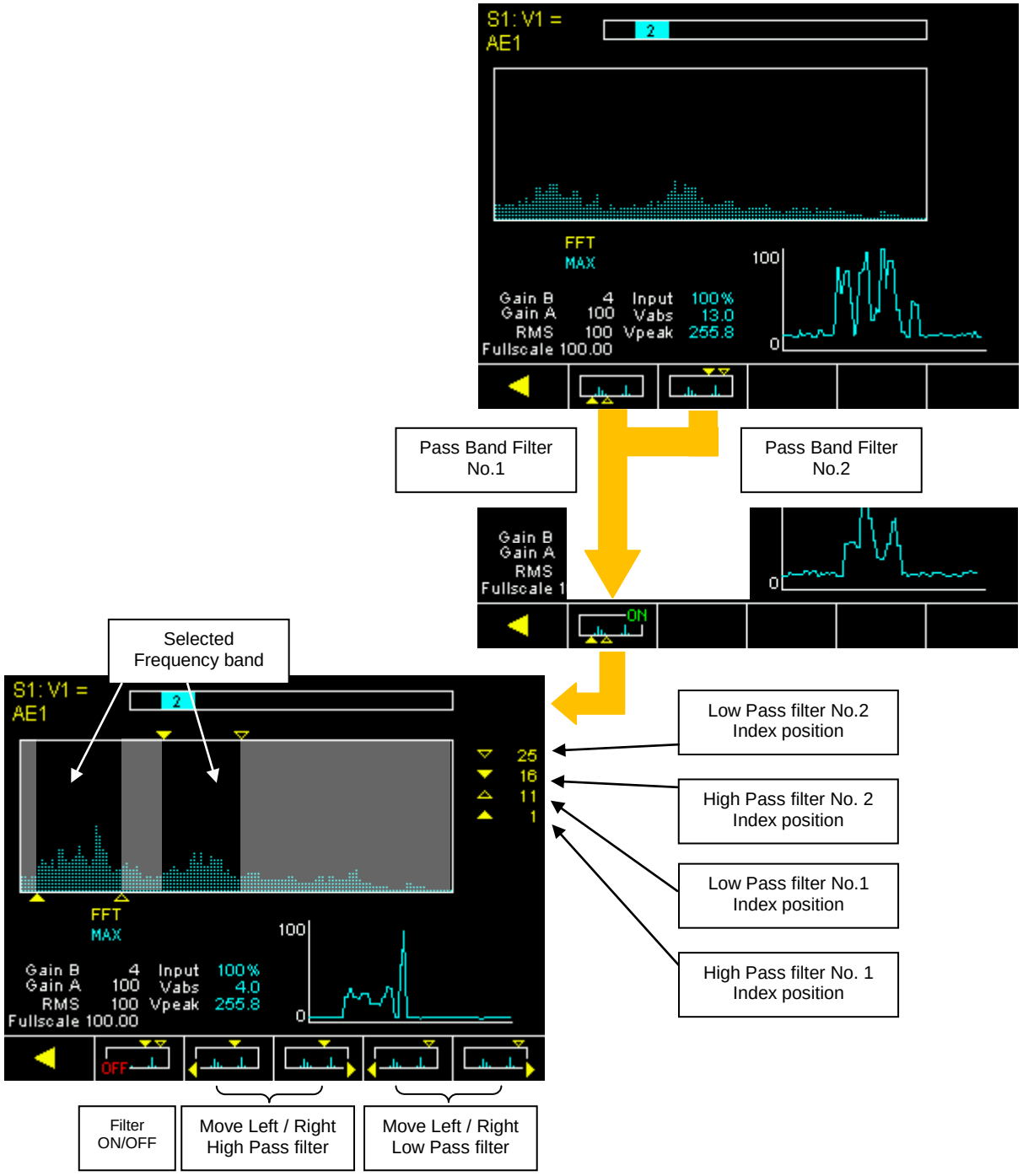
  There are up to 2 programmable band-pass digital filters. Each band pass filter is composed of:

  - 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
MAX
Gain B 4 Input 46%
Gain A 100 Vabs 15.2
RMS 100 Vpeak 108.5
Fullscale 100.00
RESET
F5
Pass Band Filter
No.1
Gain B 4 Input 100%
Gain A 100 Vabs 13.0
RMS 100 Vpeak 255.8
Fullscale 100.00
Gain B
Gain A
RMS
Fullscale 1
ON
Selected
Frequency band
Gain B 4 Input 100%
Gain A 100 Vabs 9.3
RMS 100 Vpeak 255.8
Fullscale 100.00
OFF
Low Pass filter No.1
Index position
High 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

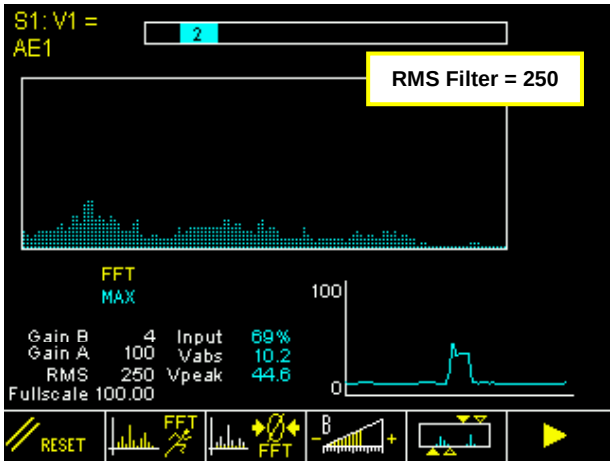
Use of 2 Band-Pass filters:

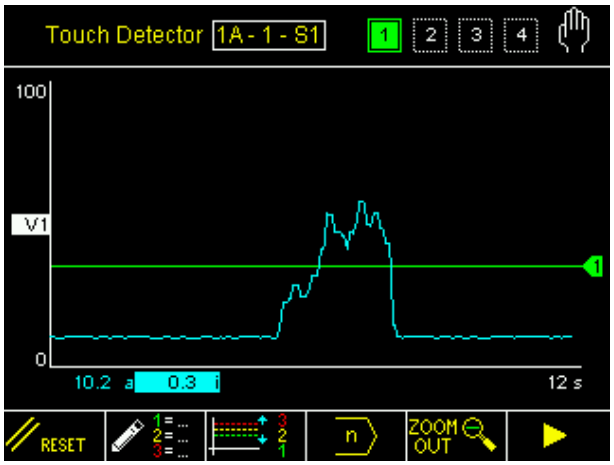


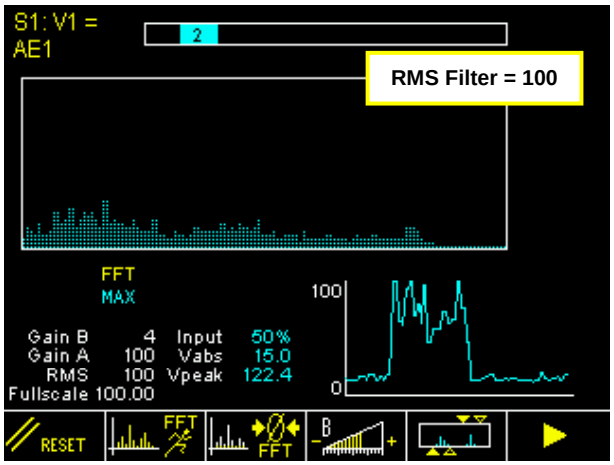
RMS FILTER and FULLSCALE

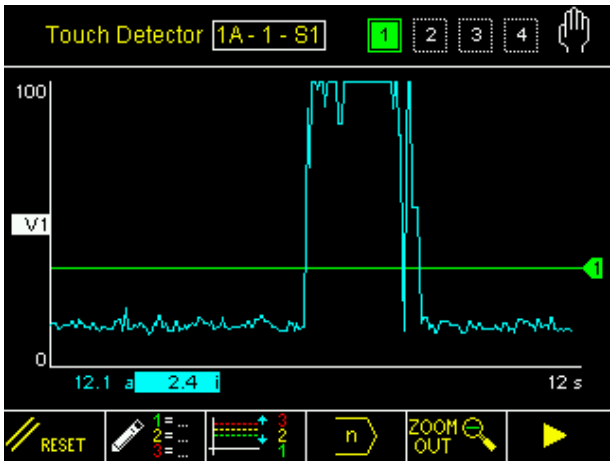
- Further optimizations can be obtained by changing the value of the **RMS Filter**. This will smooth the high frequency noise components. Be careful not to use too much high value for the filter to not affect the response time of the system.

ID	Parameter	Description
	RMS filter [100]	Low pass filter value which gives a reduction of the noise, 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



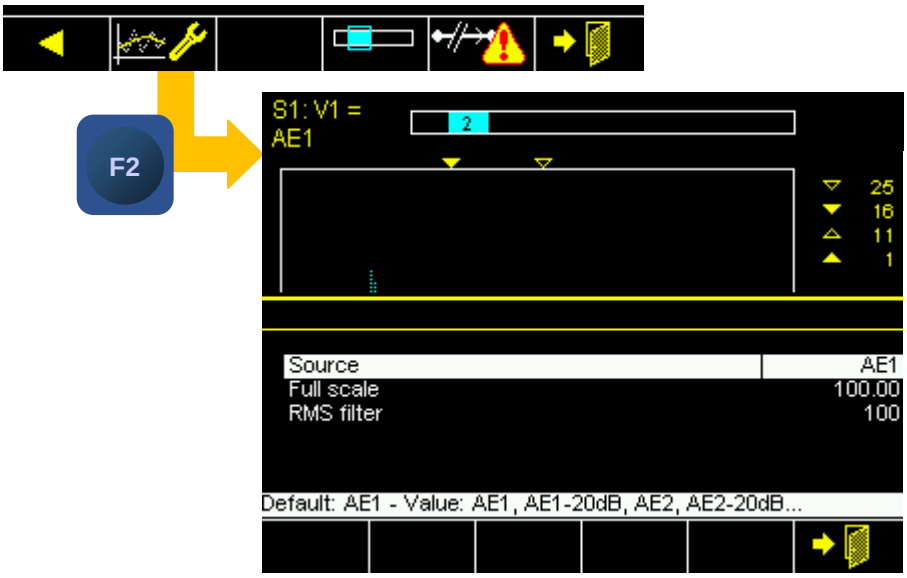






- Change the fullscale to vary the normalization of the Vx variable (this is normally not necessary).

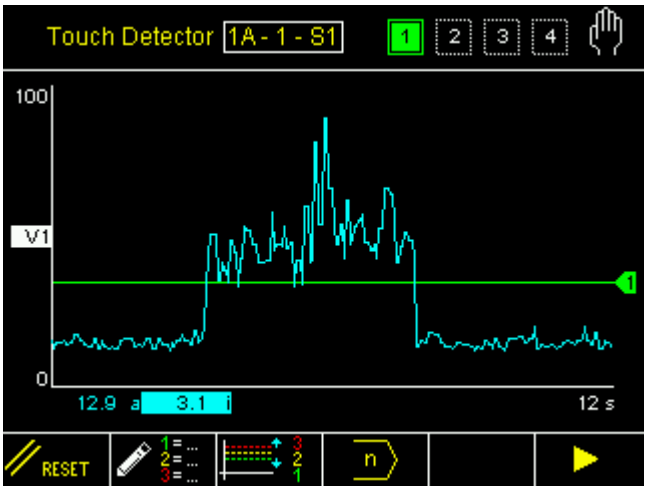
ID	Parameter	Description
	Full-scale **[100]**	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.



- Set the value then press to save it

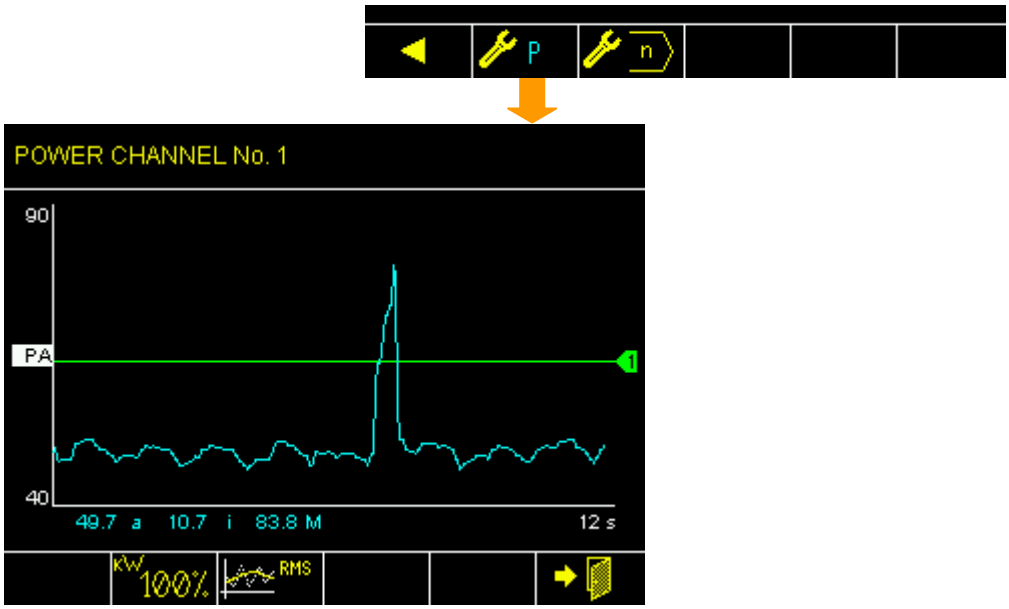
- Press the button **Exit** **[F6]**

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.

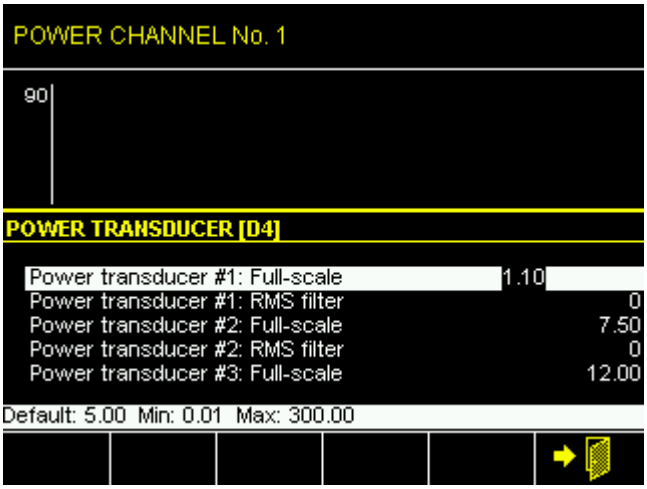


4.1.2 Power channel setup

To access the Power channel setup press the button  **[F2]**



Commands			
Icon	**Command name**	**Button**	**Description**
	Fullscale	F2	Fullscale setup: set the value according to the nominal power of the motor [kW]
	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.
	Exit	F6	Exit
	Fullscale	F2	Value of the signal associated to 100%. The fullscale can be used to normalize the input signals.



5. APPENDIX

Documents referred to in the text		
Name document	**Paragraphs**	**Link**
Components	1.2.1	9UMIT2506-1100 VM25 Components v120 It.pdf
Setup parameters	3.3, 4	9UMEN1505-1200 YYMMDD Parameter Setup v120 En.pdf
Service	2, 3.2, 3.3.2, 3.3.3	9UMEN0012-1200 YYMMDD VM15 Service v120 En.pdf
User pannel	4	9UMEN1514-1200 YYMMDD VM15 Panel User v120 En.pdf