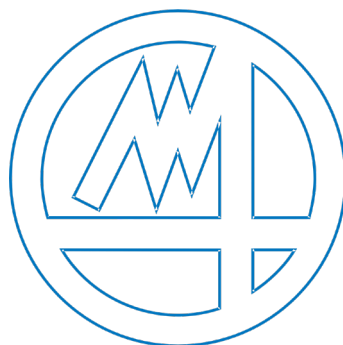


# BUILT

**GRINDING WHEEL BALANCING  
WB**



**MARPOSS**

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## 1 MAIN NAVIGATION CHART

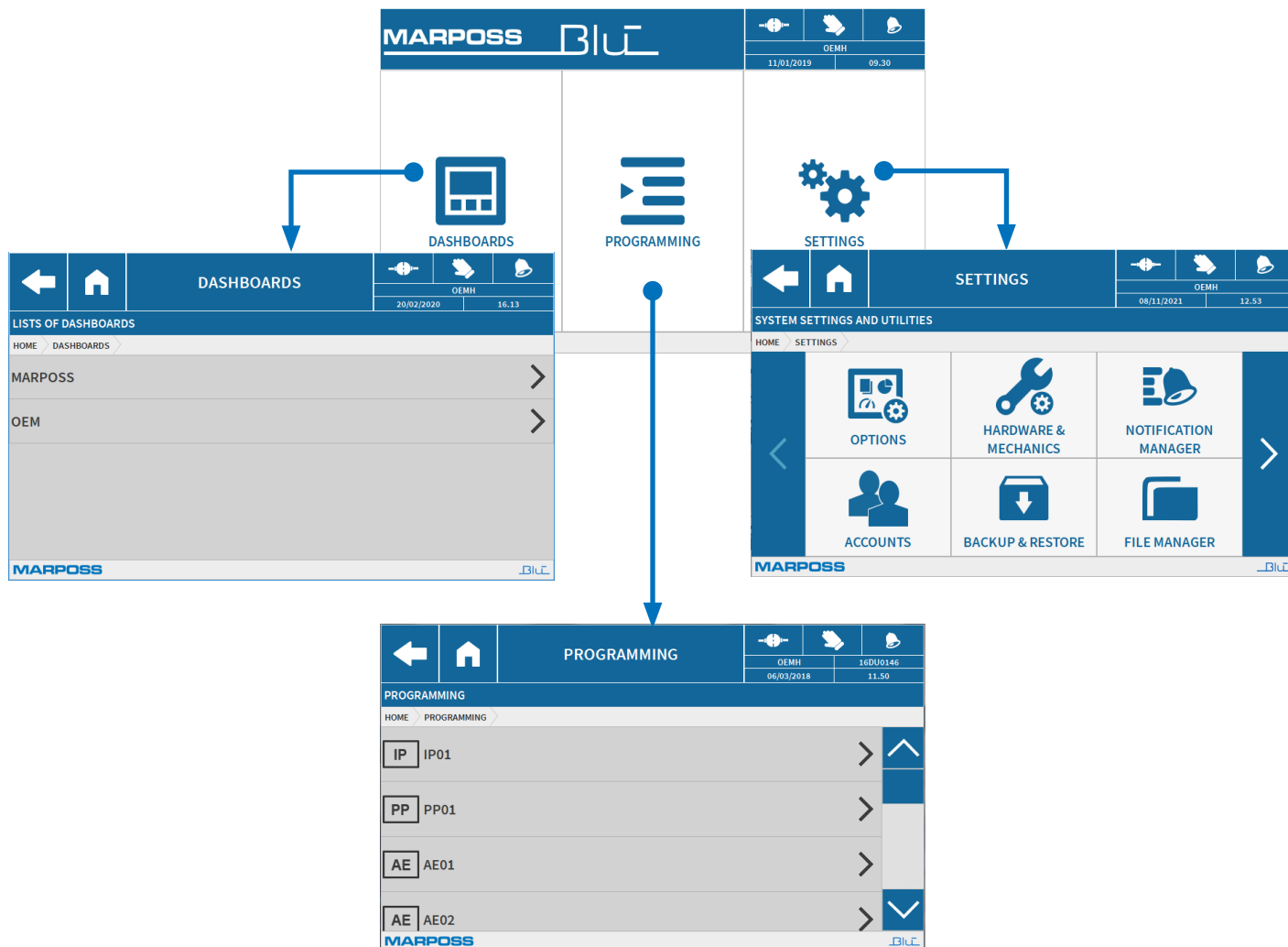





Fig.1. Main menus map

 <ul style="list-style-type: none"> <li>→ Screens <ul style="list-style-type: none"> <li>→ Selection</li> <li>→ Creation</li> <li>→ Modification</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>→ Program instructions <ul style="list-style-type: none"> <li>→ (List of available channels)</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>→ Settings <ul style="list-style-type: none"> <li>→ Options (see B2 and C2xx)</li> <li>→ Hardware and Mechanics programming (see B2 and C2xx)</li> <li>→ Notification Management (see B2 and C2xx)</li> <li>→ Users (see B2)</li> <li>→ Backup &amp; Restore (see B2)</li> <li>→ File management (see B2)</li> <li>→ Information (see B2)</li> <li>→ Exporting and importing application sets (see B2)</li> </ul> </li> </ul>
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## 2 SETTINGS



### 2.1 Options



See part. B2.

### 2.2 Hardware & Mechanical programming



The **Hardware and Mechanics Programming** screen may be used to select which hardware or mechanical components to intervene on. For a complete description, see Part B2. The **HW Programming** screen corresponding to the **ACC** node is described below.

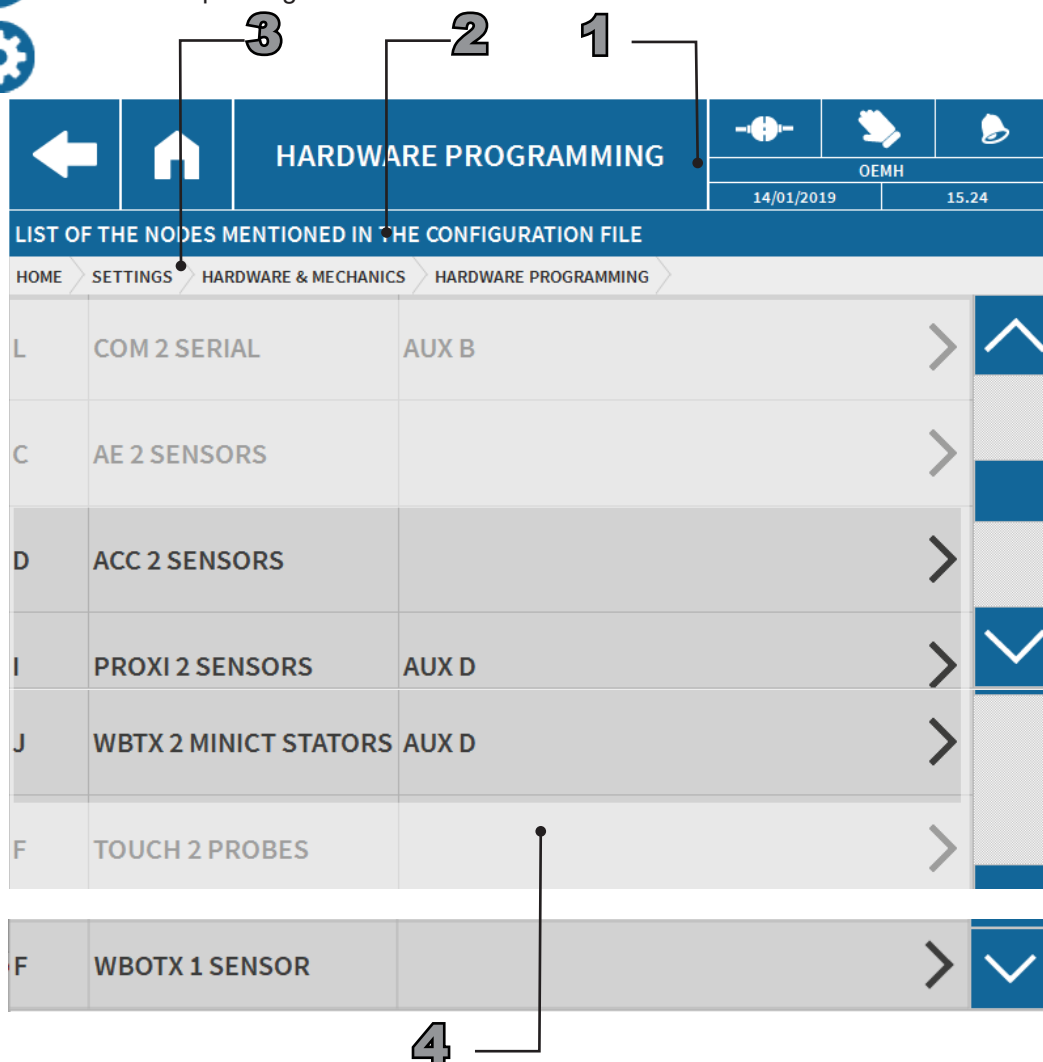


Fig.2. Main ACC 2 sensors grinding wheel balancing node hardware programming screen

Screen title: **Hardware Programming**.

- 1 Messages and descriptions area: **List of nodes mentioned in the configuration file.**
- 2 Navigation path: *Home > Settings > Hardware and Mechanical parts > Hardware programming*
- 3 Working area: List of installed nodes. In the example:
  - **ACC 2 SENSORS.** Application Grinding wheel balancing with two sensors.
  - **PROXI 2 SENSORS.** PROXI auxiliary NODE.
  - **WBTX 2 MINICT STATORS.** WBTX auxiliary NODE.
  - **WBOTX 1 SENSOR.** OTX application with one sensor.

2.2.1 Setting up an ACC type 2 Sensors accelerometer node

Use the **ACC 2 Sensors** screen to set-up the parameters of the sensors and obtain information about the connected node.

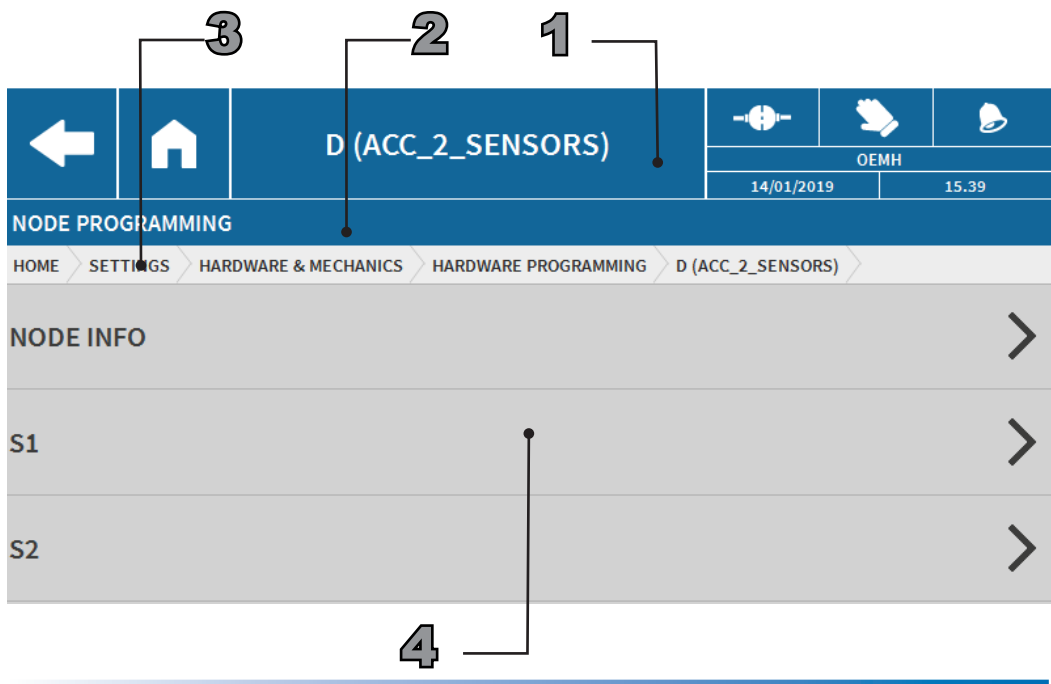


Fig.3. ACC 2 Sensor accelerometer node set-up screen

1. Screen title: **ACC 2 Sensors**
2. Messages and descriptions area: Node programming
3. Navigation path: *Home > Settings > Hardware & Mechanical > Hardware Programming > ACC 2 Sensors.*
4. Working area:
  - **Node information.** Use this command to enable the function node and access the corresponding identification information.

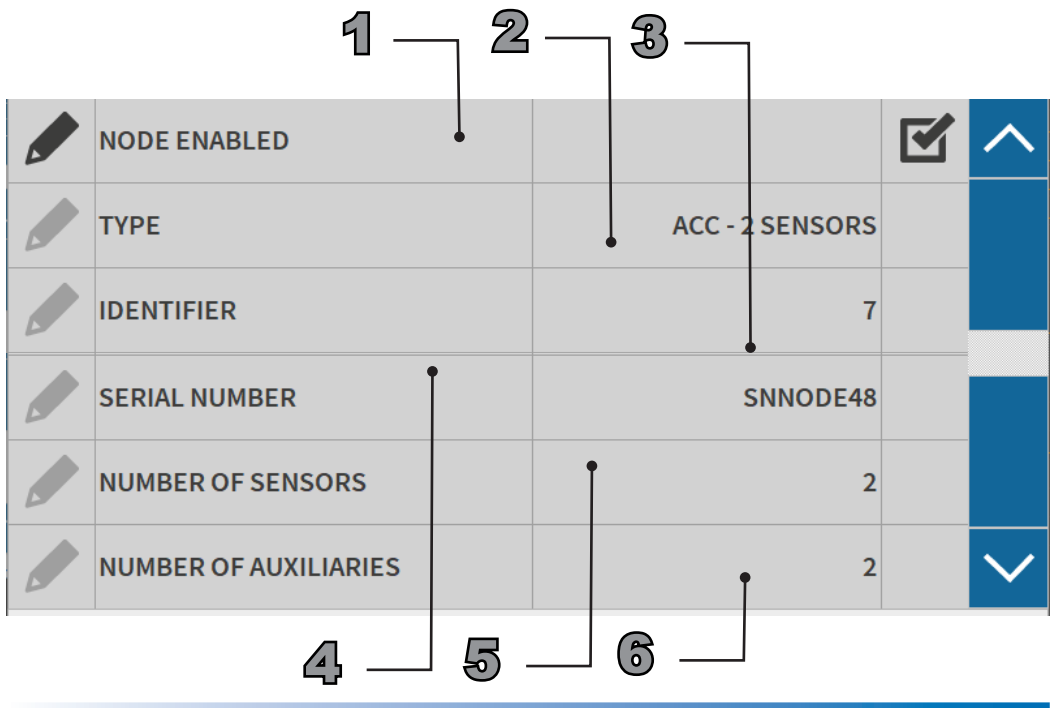


Fig.4. Information about auxiliary node

1. **Enable node.** Enables/Disables the node functions.

N.B.

Disable the auxiliary node only if the node itself is damaged.

2. **Type of node.** Displays the node name, as assigned by the configuration file.
  3. **Node identification number.** Displays the node number, as assigned by the configuration file.
  4. **Serial Number.** Displays the node serial number.
  5. **Number of sensors.** Displays the number of sensors the node can manage.
  6. **Connected auxiliary elements.** Displays the number of auxiliaries that can potentially be used. Defined in the configuration file.
- **S1-S2.** Socket hardware settings.

	ACCELEROMETER ENABLED			
	ACCELEROMETER IDENTIFIER		ACC1	
	ACCELEROMETER TYPE		STANDARD	
	RPM IDENTIFIER		RPM1	
	RPM SOURCE		FROM BALANCING HEAD	
	BALANCING HEAD IDENTIFIER		WBH1	

Fig.5. ACC 2 Sensors accelerometer node sensors properties

1. **Accelerometer enabled.** Enables the accelerometer functions.
2. **Accelerometer identifier.** Indicates which accelerometer is associated with the socket.
3. **Type of accelerometer.** Shows the type of accelerometer set up. Parameter cannot be changed.
4. **RPM identifier.** Selects which RPM sensor is associated with the accelerometer.
5. **RPM source.** Selects which source is associated with the RPM sensor.

	RPM SOURCE	FROM BALANCING HEAD		
--	------------	---------------------	--	--

Fig.6. Select source to be associated

FROM PROXIMITY SENSOR	<input type="radio"/>
FROM BALANCING HEAD	<input checked="" type="radio"/>

Fig.7. RPM source: Possible alternatives

6. **Balancing Head identifier.** Selects which balancing head is used for the RPM.

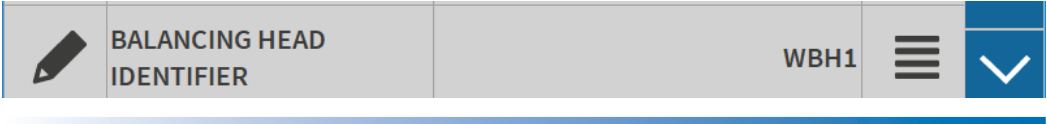


Fig.8. Select balancing head to be associated

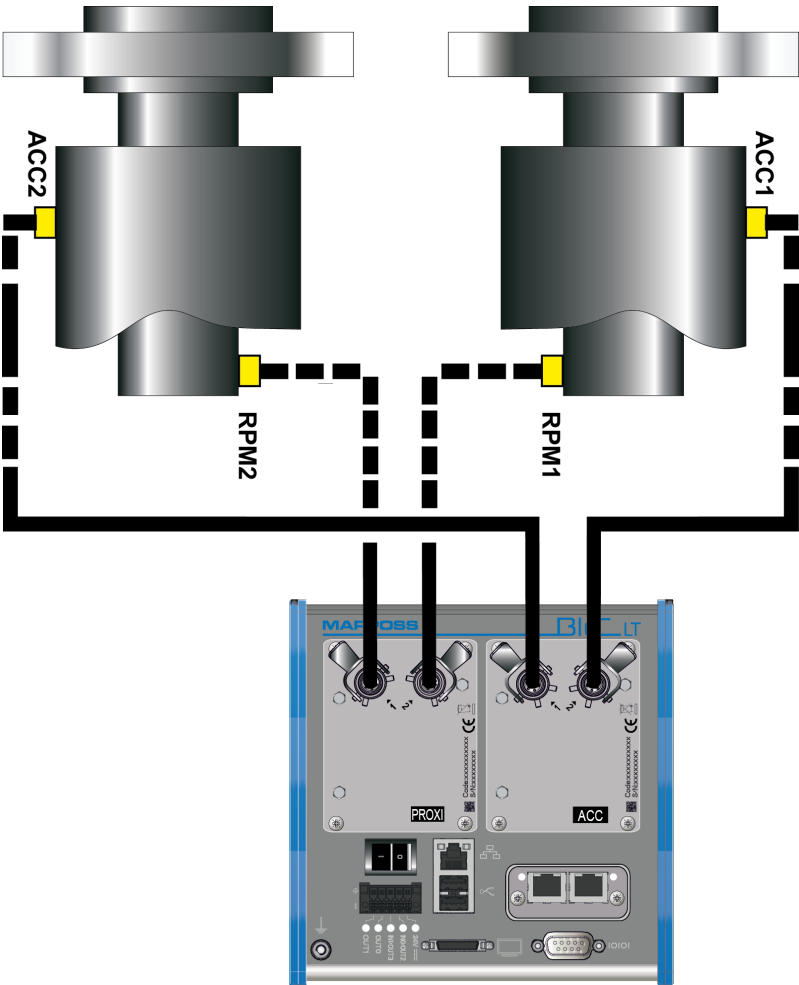


Fig.9. Example of connection between PROXI node and RPM sensor



### 2.2.2 PROXI auxiliary node setting

If present, the **PROXI** screen is used to set up the custom parameters for the PROXI auxiliary node.

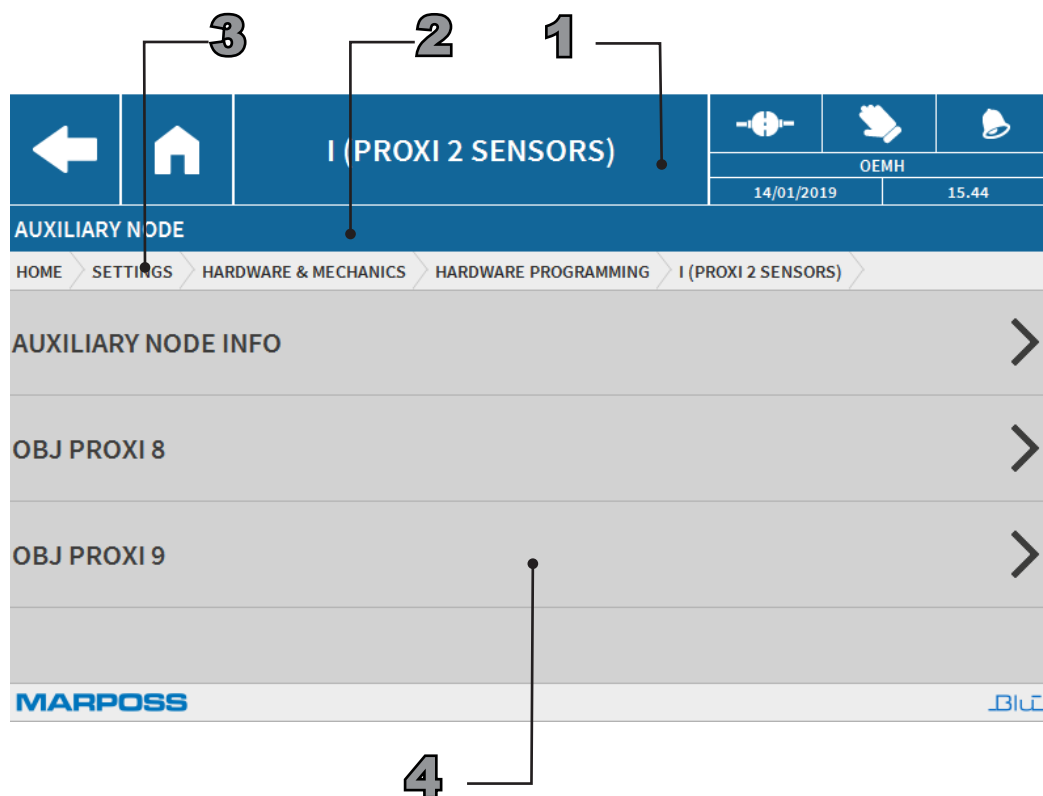


Fig.10. ACC 2 Sensor accelerometer node set-up screen

1. Screen title: **PROXI 2 sensors**.
2. Messages and descriptions area: **Auxiliary node**.
3. Navigation path: *Home > Settings > Hardware & Mechanical > Hardware Programming > PROXI 2 Sensors*.
4. Working area:
  - **Auxiliary Node Information.** Use this command to enable the auxiliary node and access the corresponding identification information.

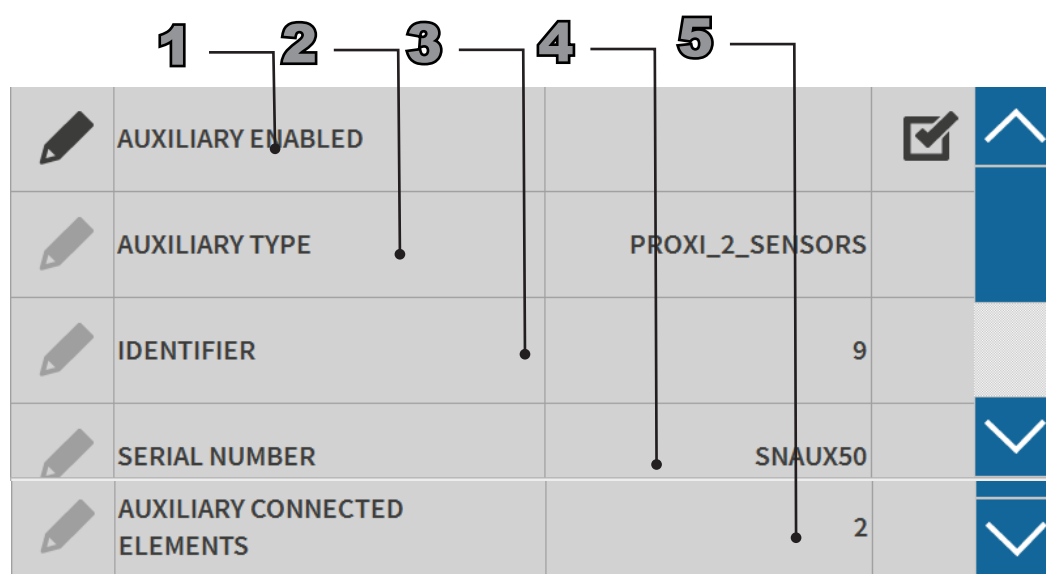


Fig.11. Auxiliary node information screen

1. **Enable node.** Enables/Disables the node functions.

[

N.B.  
Disable the function node only if the node itself is damaged.

- 2. **Type of node.** Displays the node name, as assigned by the configuration file.
  - 3. **Node identification number.** Displays the node number, as assigned by the configuration file.
  - 4. **Serial Number.** Displays the serial number marked on the node itself.
  - 5. **Connected auxiliary elements.** Displays the number of sockets that can potentially be used. Defined in the configuration file.
- **Auxiliary PROXI node.** Use this command to enable the auxiliary node and access the corresponding identification information.

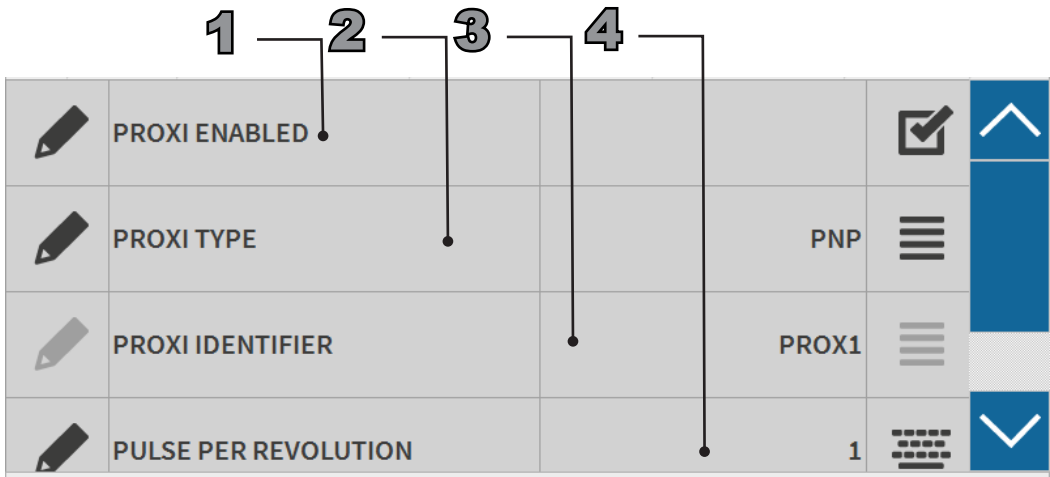


Fig.12. PROXI 2 Sensors proximity node sensors properties screen

1. **Enable node.** Enables/Disables the auxiliary node functions.

[

N.B.  
Disable the function node only if the node itself is damaged.

2. **Type of prox.** Selects the type of sensor connected.

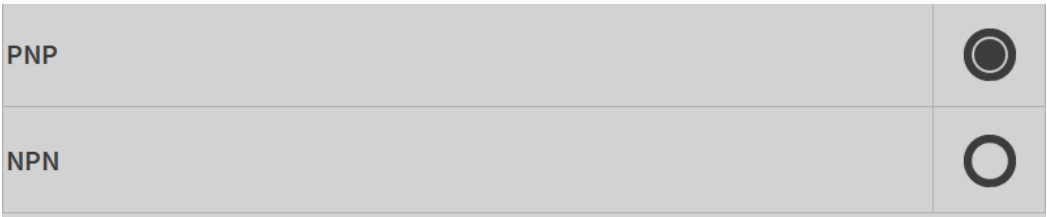


Fig.13. Screen indicating the type of sensor connected

- 3. **PROXI identifier.** Displays the name of the transducer connected to the node.
- 4. **Pulses per revolution.** Selects the number of pulses for each grinding wheel revolution. Typical value: 1.

### 2.2.3 WBTX auxiliary node settings

If present, the **WBTX** screen is used to set up the custom parameters for the WBTX auxiliary node.

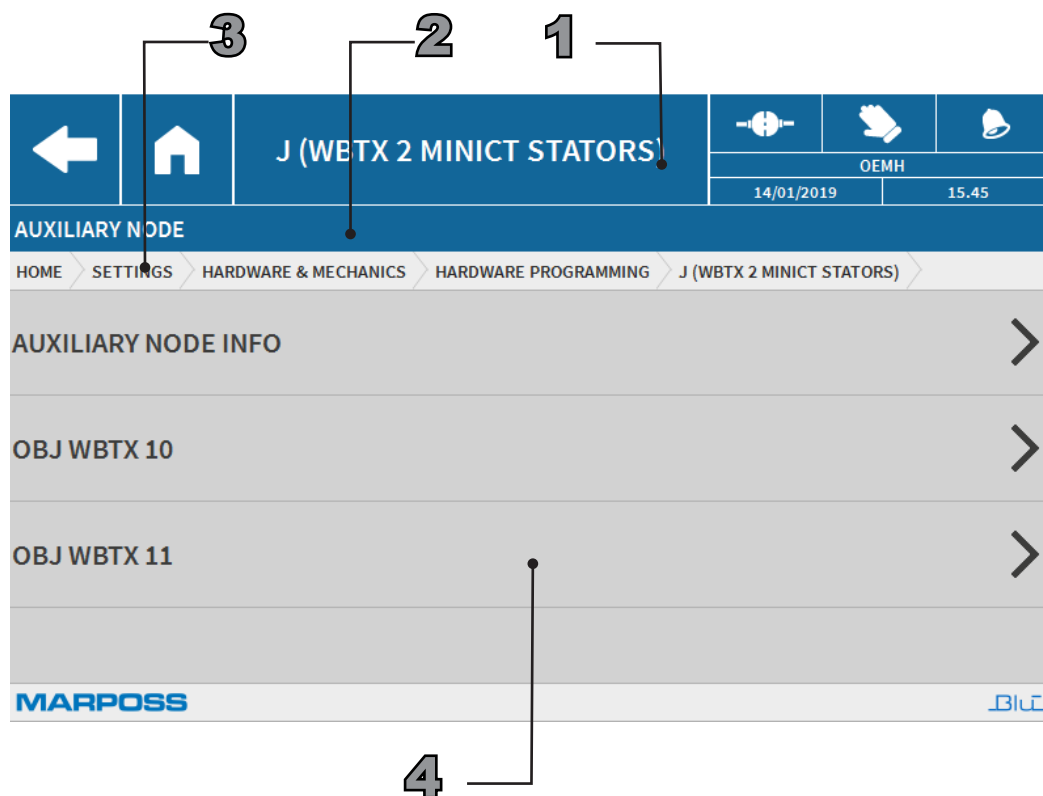


Fig.14. WBTX 2 Sensor accelerometer node set-up screen

1. Screen title: **WBTX 2 Sensors**.
2. Messages and descriptions area: **Auxiliary node**.
3. Navigation path: Home > Settings > Hardware & Mechanical > Hardware Programming > WBTX MINICT 2 Stators.
4. Working area:
  - **Node information.** Use this command to enable the auxiliary node and access the corresponding identification information.

	AUXILIARY ENABLED			
	AUXILIARY TYPE	WBTX_2_MINICT_STAT...		
	IDENTIFIER	10		
	SERIAL NUMBER	SNAUX51		
	AUXILIARY CONNECTED ELEMENTS	2		

Fig.15. WBTX balancing node sensors properties screen

- **OBJ WBTX (X).** Customisable auxiliary node settings.

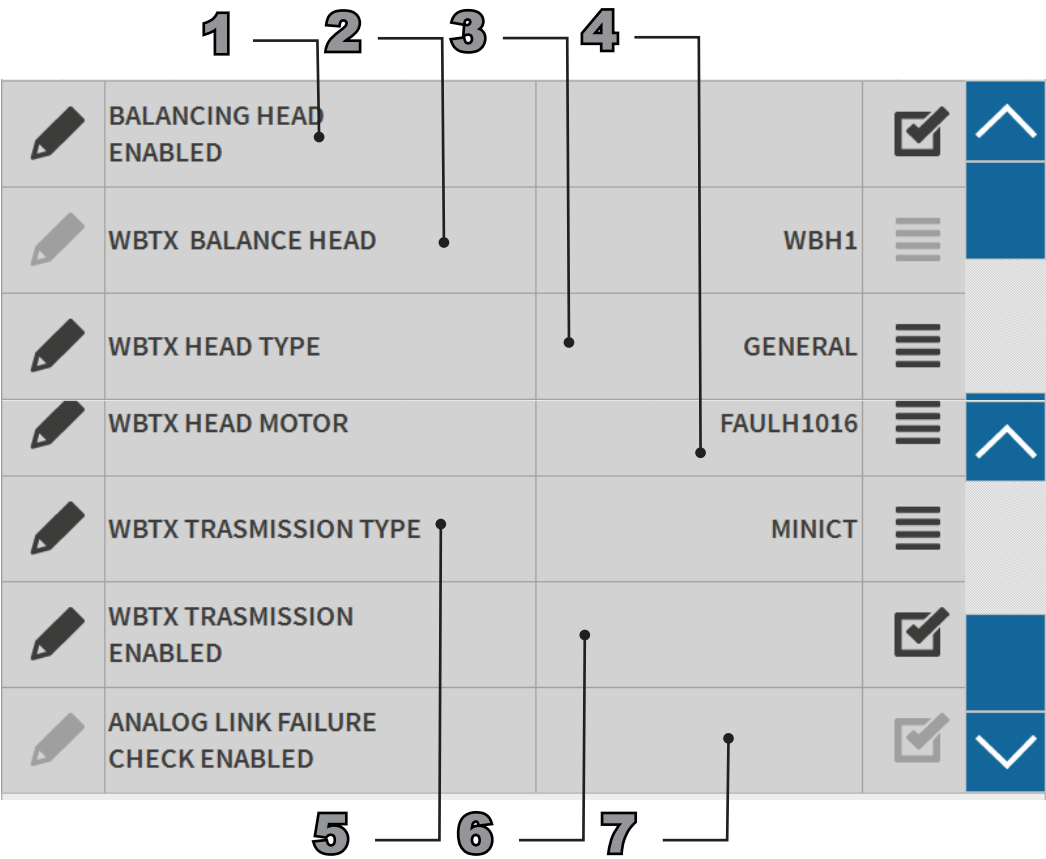


Fig.16. Auxiliary node properties group screen

1. **Enable node.** Enables/Disables the node functions.

[

N.B.  
Disable the auxiliary node only if the node itself is damaged.

2. **Balance Head.** Assigns the name of the balance head connected to the node.
3. **Driven head type.** Permits the user to select a single plane (2 motors) or a two plane (4 motors) balancing head. Select "General" if it is necessary to select a balancing head that it not equipped with an absolute encoder.

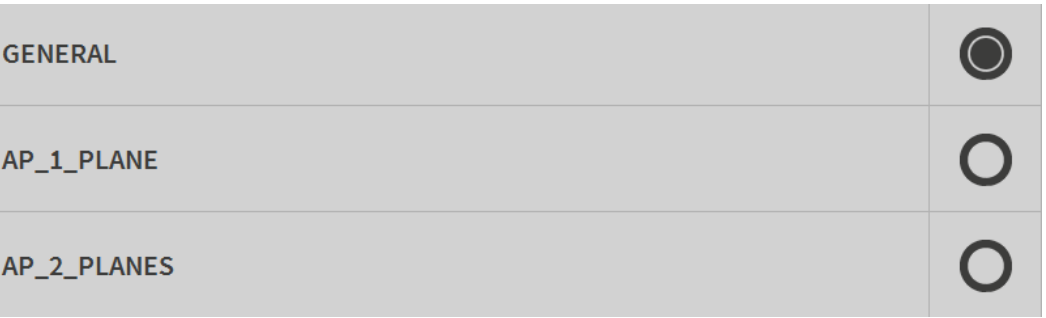



Fig.17. Type of the balance head connected to the node selection

In this case, it is possible to select the type of motor using the following parameter.

4. **Driven motor type.** Permits the user to select the type of motor used in the balancing head. The option “None” corresponds to the MiniCT default motor.

NONE	<input type="radio"/>	
ESCAP_FAU1724	<input type="radio"/>	
FAULH1016	<input checked="" type="radio"/>	

*Fig.18. Balance head motor selection*

5. **Transmission type.** Selects the type of rotor used to drive the balance head.

MINICT	<input checked="" type="radio"/>
MINICT_PLUS	<input type="radio"/>

*Fig.19. Transmission system type selection*

6. **Transmission system enabled.** Enables/Disables the transmission functions.
7. **Enables the level check on the analogue acoustic signal between rotor and stator.** Enables/disables the minimum level present check on the analogue acoustic signal received from the stator. This selection may only be made by Marposs personnel.

2.2.4 OTX 1 Sensor node settings

Use the **OTX 1 Sensor** dashboard to set-up the parameter sensors and obtain information about the connected node.

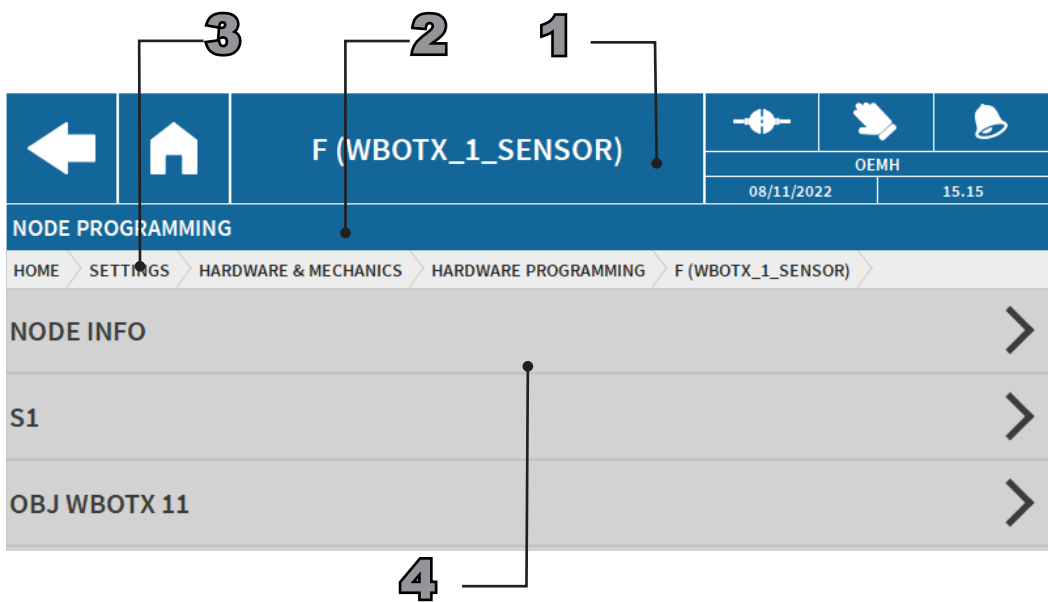


Fig.20. OTX 1 Sensor node settings dashboard

- 1. Screen title: **OTX 1 Sensor**.
- 2. Messages and descriptions area: Node programming
- 3. Navigation path: *Home > Settings > Hardware & Mechanical > Hardware Programming > OTX 1 Sensor*.
- 4. Working area:
  - **Node information.** Use this command to enable the function node and access the corresponding identification information.

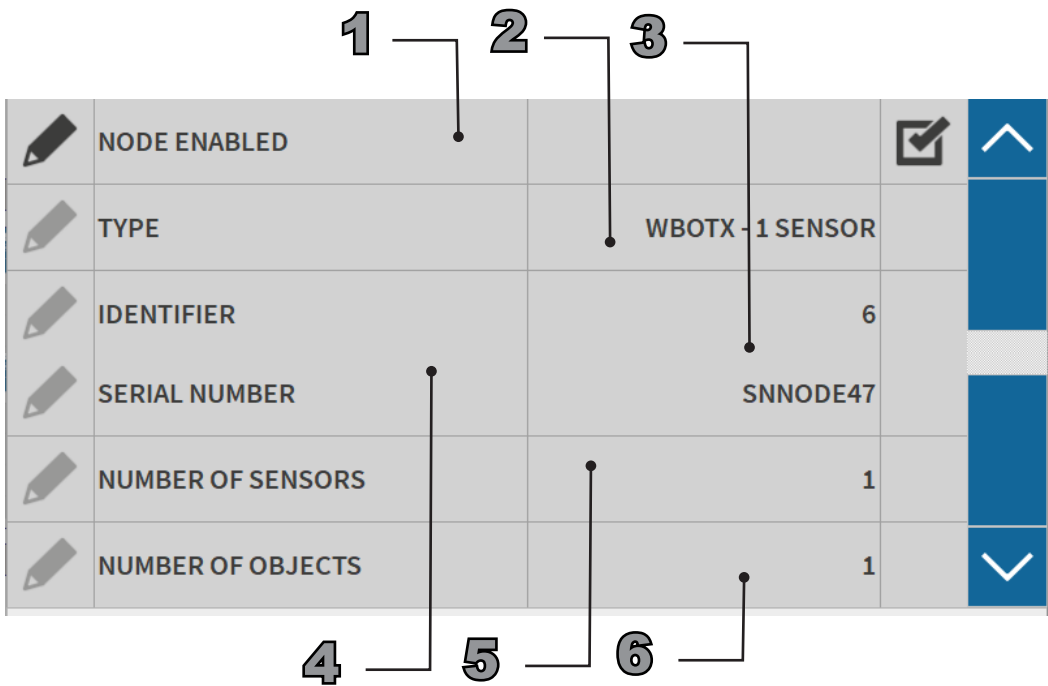


Fig.21. Information about auxiliary node

- 1. **Enable node.** Enables/Disables the node functions.

[

N.B.  
Disable the auxiliary node only if the node itself is damaged.

2. **Type of node.** Displays the node name, as assigned by the configuration file.
  3. **Node identification number.** Displays the node number, as assigned by the configuration file.
  4. **Serial Number.** Displays the node serial number.
  5. **Number of sensors.** Displays the number of sensors the node can manage.
  6. **Number of objects.** Displays the number of potentially usable objects. Defined in the configuration file.
- **S1.** Socket hardware settings.

	ACCELEROMETER ENABLED			<input checked="" type="checkbox"/>	
	ACCELEROMETER IDENTIFIER			ACC1	
	ACCELEROMETER TYPE			STANDARD	
	RPM IDENTIFIER			RPM1	
	RPM SOURCE			FROM BALANCING HEAD	
	BALANCING HEAD IDENTIFIER			WBH1	
	SOCKET			S1	

Fig.22. OTX 1 Sensor node sensor properties

1. **Accelerometer enabled.** Enables the accelerometer functions.
2. **Accelerometer identifier.** Indicates which accelerometer is associated with the socket.
3. **Type of accelerometer.** Shows the type of accelerometer set up. Parameter cannot be changed.
4. **RPM identifier.** Selects which RPM sensor is associated with the accelerometer.
5. **RPM source.** Selects which source is associated with the RPM sensor.

	RPM SOURCE	FROM BALANCING HEAD	
--	------------	---------------------	--

Fig.23. Select source to be associated

FROM PROXIMITY SENSOR	<input type="radio"/>
FROM BALANCING HEAD	<input checked="" type="radio"/>

Fig.24. RPM source: Possible alternatives

6. **Balancing Head identifier.** Selects which balancing head is used for the RPM.

	BALANCING HEAD IDENTIFIER	WBH1	
--	---------------------------	------	--

Fig.25. Select balancing head to be associated

7 **Socket.** Displays the type of socket connected.

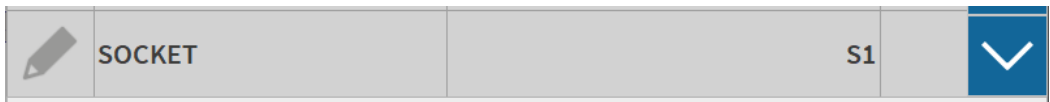


Fig.26. Type of socket connected

2.3 *Notification management*

---



See part B2.

2.4 *Users*

---



See part B2.

2.5 *Backup & Restore*

---



See part B2.

2.6 *File management*

---



See part B2.

2.7 *Information*

---

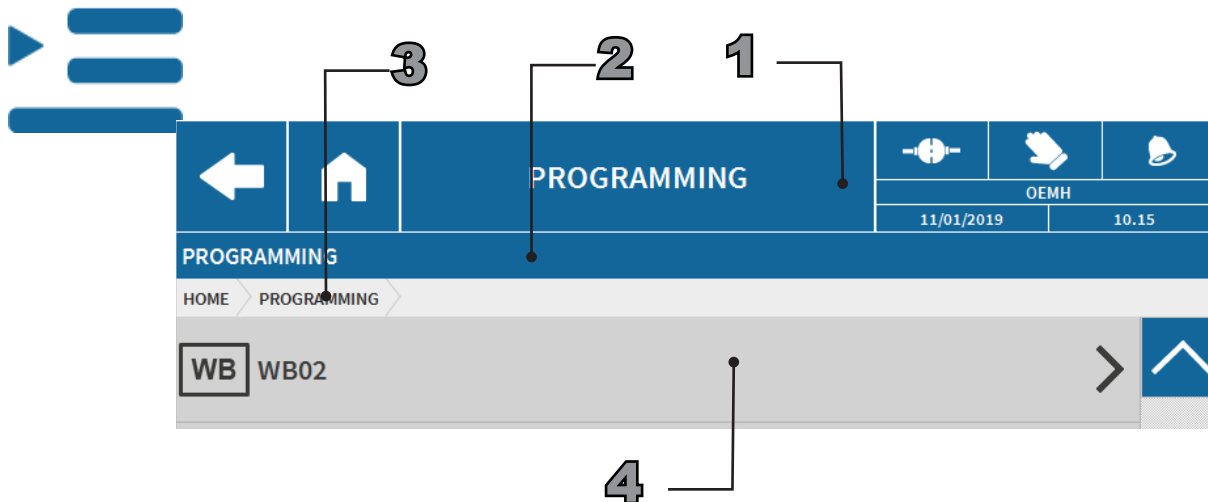


See part B2.



### 3 PROGRAMMING

Use the **Programming** screen to customise the parameters of the sets included in the configuration file.



*Fig.27. Available nodes for installed system screen*

1. Screen title: **Programming**.
2. Messages and descriptions area: **Programming**.
3. Navigation path: *Home* > **Programming**.
4. Working area: List of installed nodes. In the example:
  - **WB0X**. Grinding wheel X balancing application.

### 3.1 List of cycles



Use the **List of Cycles** present in the **Channel** screen (e.g. **WB01**) to add the sets available in the **List of Sets**.

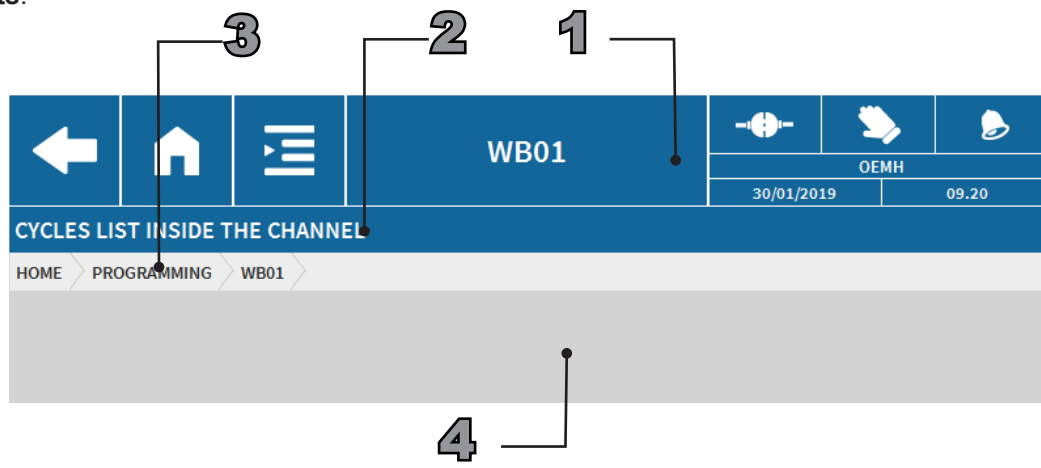


Fig.28. Available nodes for installed system screen

1. Screen title: **WB01** (name of the channel).
2. Messages and descriptions area: **List of cycles present in the channel**.
3. Navigation path: *Home > Programming > WB01* (name of the channel).
4. Working area: List of selected sets. In the example: no set added.

			0	ONE PLANE PRE-BALANCING	>	
			1	TWO PLANES PRE-BALANCING	>	
			2	ONE PLANE AUTO-BALANCING	>	
			3	TWO PLANES AUTO-BALANCING	>	

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Fig.29. Screen displaying a list of the cycles present in a channel *after adding a set*

### 3.2 Available sets



Use the **List of Sets** screen to select those to be included in the cycles list.

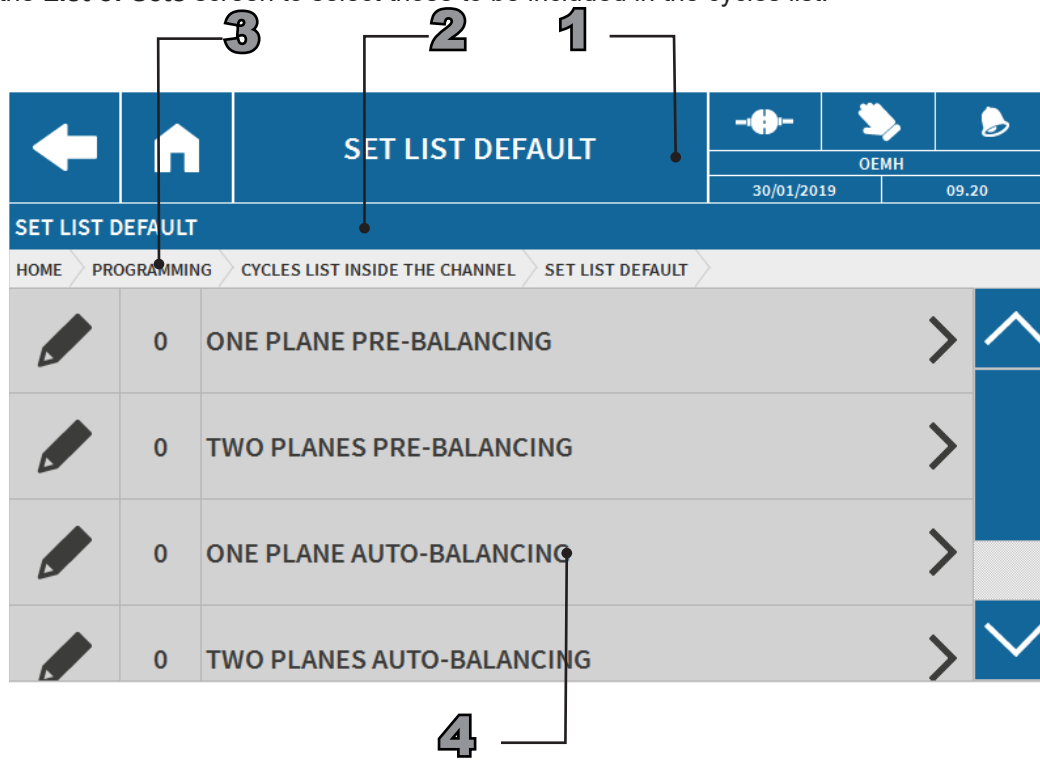


Fig.30. List of available sets

1. Screen title: **Default List of Sets**.
2. Messages and descriptions area: **Default List of Sets**.
3. Navigation path: *Home* > *Programming* > *WB01 (name of the channel)* > **Default List of Sets**.
4. Working area: List of available sets:
  - **One plane pre-balancing (manual).**
  - **Two plane pre-balancing (manual).**
  - **One plane auto-balancing.**
  - **Two plane auto-balancing.**

### 3.3 Programmable data

The data for the selected set may be customised on the screen corresponding to each individual set.

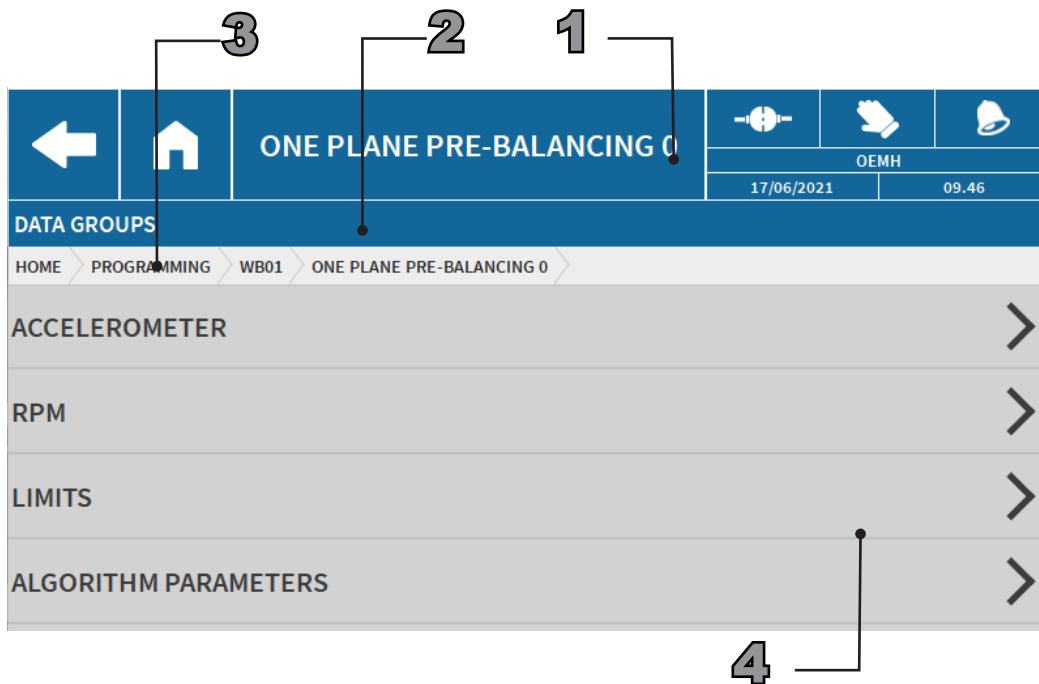


Fig.31. Programmable values screen. Ex.: One plane pre-balancing

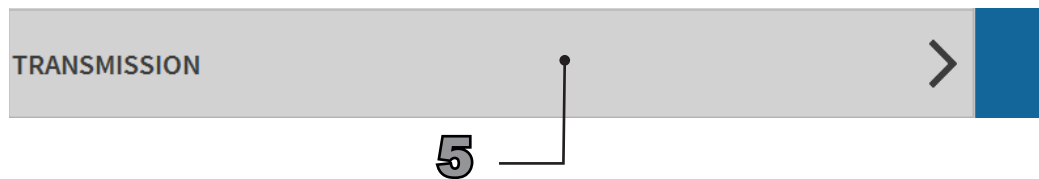


Fig.32. Programmable values screen. Ex.: Two plane auto-balancing

1. Screen title: **One plane pre-balancing** (ref. 4) and **Two plane auto-balancing** (ref. 5)
2. Messages and descriptions area: **Data groups**.
3. Navigation path: *Home > Programming > WB01 (e.g.) > One plane pre-balancing (e.g.)*.
4. Working area:
  - **Accelerometer.**
  - **RPM.**
  - **Limits.**
  - **Algorithm parameters.**
5. Working area:
  - **Transmission.**

### 3.3.1 Accelerometer

Available for the following sets:

- One plane pre-balancing (manual).
- Two plane pre-balancing (manual).
- One plane auto-balancing.
- Two plane auto-balancing.

The **Accelerometer** screen is used to set the operating fields of the accelerometer selected. The values that can be set in the screen vary based on the selected set.

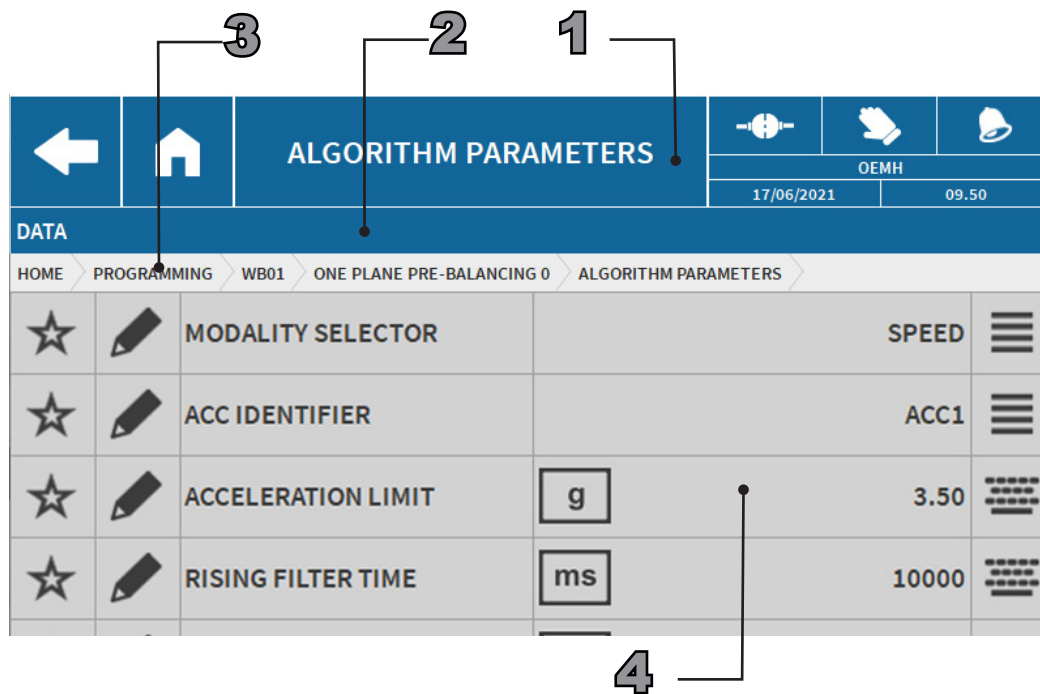


Fig.33. "One plane auto-balancing" set data screen

1. Screen title: **Accelerometer**
2. Messages and descriptions area: **Data**.
3. Navigation path: *Home > Programming > WB01 (name of the channel) > One plane pre-balancing (e.g.) > Accelerometer*.
4. Working area (see example in Fig.33).
  - **Mode selector**. Valid for **One plane pre-balancing (manual)**, **Two plane pre-balancing (manual)**, **One plane auto-balancing** and **Two plane auto-balancing** sets. Selecting the vibration measurement units.

SPEED	<input checked="" type="radio"/>
ELONGATION	<input type="radio"/>

Fig.34. Accelerometer selection screen.

- **Accelerometer identifier**. Valid for **One plane pre-balancing (manual)**, **Two plane pre-balancing (manual)**, **One plane auto-balancing** and **Two plane auto-balancing** sets. Selects which accelerometers in the configuration to use.

ACC1	<input checked="" type="radio"/>
ACC2	<input type="radio"/>

Fig.35. Accelerometer selection screen.

- **Acceleration limit.** Valid for **One plane pre-balancing (manual), Two plane pre-balancing (manual), One plane auto-balancing and Two plane auto-balancing** sets. Sets the acceleration value. When this limit is exceeded, the Vibration Alarm signal is activated. Programmable values between **0.01g** and **3.50g** with resolution 0.01g. **Default value 3.50g.**
- **Rising filter.** Valid for **One plane pre-balancing (manual), Two plane pre-balancing (manual), One plane auto-balancing and Two plane auto-balancing** sets. Defines the filter response time to a rapid increase in vibration. Programmable values between **0.01s** and **10.00s** with resolution 0.01s. **Default value 10.00s.**
- **Falling filter.** Valid for **One plane pre-balancing (manual), Two plane pre-balancing (manual), One plane auto-balancing and Two plane auto-balancing** sets. Defines the filter response time to a rapid decrease in vibration. Programmable values between **0.01s** and **10.00s** with resolution 0.01s. **Default value 0.010s.**
- **PB filter type.** Valid for **One plane auto-balancing and Two plane auto-balancing** sets. Selects the signal range on the vibration measurement acquisition. Recommended for applications at low RPM (<800 RPM):
  - **Medium Q factor**, less selective filter.
  - **High Q factor**, more selective filter.

MEDIUM Q FACTOR	<input type="radio"/>
HIGH Q FACTOR	<input checked="" type="radio"/>

Fig.36. Q factor selection screen

### 3.3.2 RPM

Available for the following sets:

- One plane pre-balancing (manual).
- Two plane pre-balancing (manual).

The **RPM** screen is used to set the control parameters of the source used to monitor the grinding wheel speed.

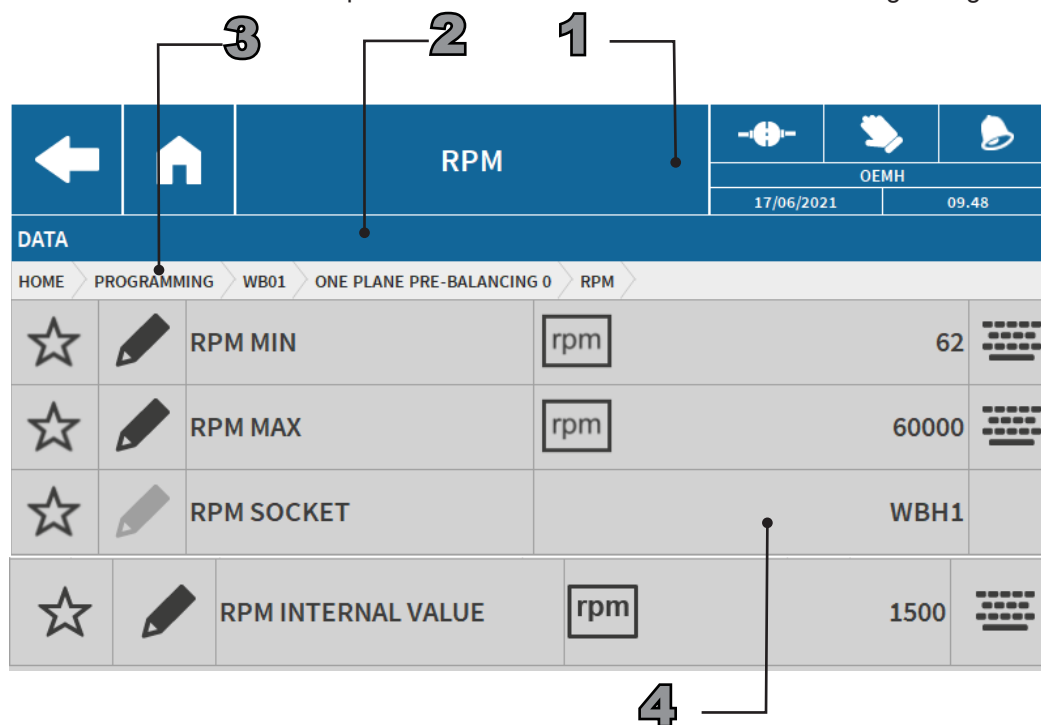


Fig.37. RPM data screen. In the example: from internal source

1. Screen title: **RPM**
2. Messages and descriptions area: **Data**.
3. Navigation path: *Home > Programming > WB01 (name of the channel) > One plane pre-balancing (e.g.) > RPM*.
4. Working area:
  - **RPM Min.** Grinding wheel minimum speed of rotation. Used for monitoring the grinding wheel rotation speed. Below the minimum threshold, the RPM out of range message is displayed.
  - **RPM Max.** Grinding wheel maximum speed of rotation. Used for monitoring the grinding wheel rotation speed. When the maximum threshold is exceeded the RPM out of range message is displayed.

#### N.B.

The min. RPM value must be less than the max. RPM, otherwise when the user presses the OK button to confirm the settings the value will not be saved.

- **RPM socket.** Indicates which proximity the value must be acquired from (WBH 1 or WBH 2).
- **RPM internal value.** Use this parameter to enter an estimated number of grinding wheel rotations. We recommend entering a value similar to the real value of the grinding wheel. In many instances, the operator will be able to read this value on the CNC display. The "internal RPM value" should be used with caution in cases where the CNC implements the "constant cutting rate" function, since as the diameter of the grinding wheel decreases the RPM value rises proportionally. This would result in an error reading corresponding to the imbalance of the grinding wheel.

#### N.B.:

To enable "Internal RPM value" select the value "None" at the following address:

*Home > Setting > Hardware & Mechanics > Nodes > Acc2 Sensors > S1 > Accelerometer parameters > RPM Identifier.*

### 3.3.3 Limits

Available for the following sets:

- One plane pre-balancing (manual).
- Two plane pre-balancing (manual).
- One plane auto-balancing.
- Two plane auto-balancing.

The **Limits** screen is used to set the grinding wheel vibration tolerance limits.

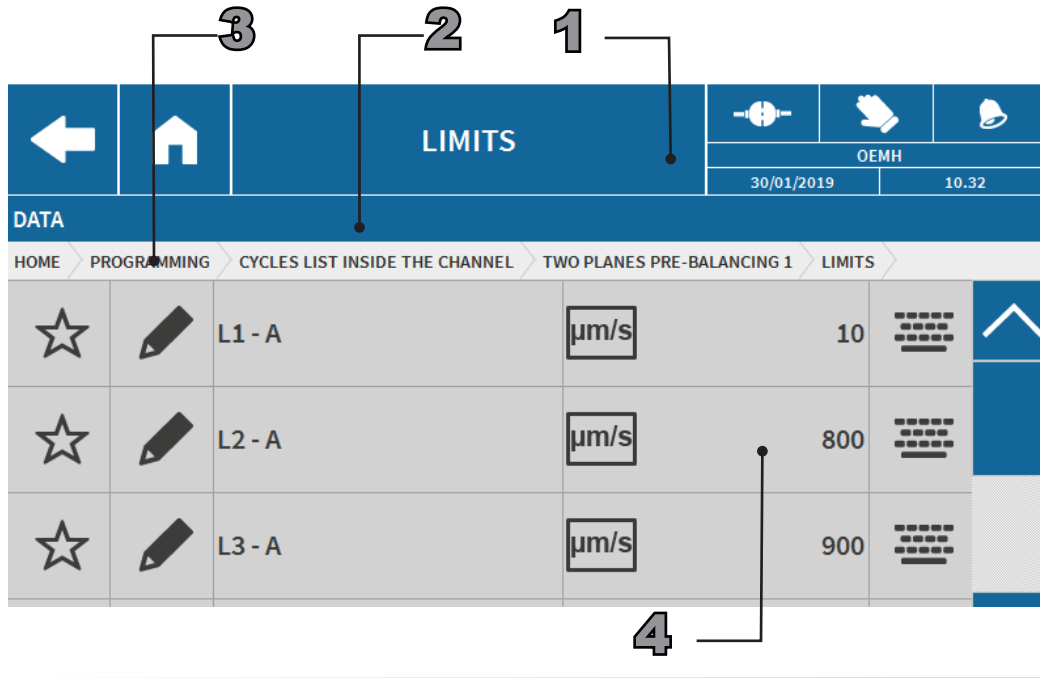


Fig.38. Limits screen

1. Screen title: **Limits**
2. Messages and descriptions area: **Data**.
3. Navigation path: *Home > Programming > WB01 (name of the channel) > One plane pre-balancing (e.g.) > Limits*.
4. Working area:
  - **L1**. Maximum limit according to which the grinding wheel vibration is optimal.
  - **L2**. Maximum limit according to which the grinding wheel vibration is acceptable.
  - **L3**. Maximum limit according to which the grinding wheel vibration is excessive.

**N.B.**

The set values must comply with the following condition:  $L1 < L2 < L3$



### 3.3.4 Algorithm parameters

Available for the following sets:

- One plane pre-balancing (manual).
- Two plane pre-balancing (manual).
- One plane auto-balancing.
- Two plane auto-balancing.

The **Algorithm parameters** screen is used to set the operative fields of the balancing algorithm. It is well to remember that the automatic one or two plane auto-balancing algorithms may be either “**Heuristic** (i.e. by successive approximations)” or “**Deterministic**”. In the case of “**heuristic**” balancing, the balancing masses are positioned according to a series of successive approximations until the requested residual imbalance condition is achieved. In the case of “**deterministic**” balancing, the position of the masses is determined by calculation. In the event that the residual imbalance achieved by positioning the masses exceeds the programmed limits, the deterministic phase is supplemented by a heuristic phase. The programmable parameters for heuristic balancing represent a sub-set of those that are programmable in the case of deterministic balancing. The choice between the heuristic and deterministic method depends on the value assigned to the parameter “**Balancing algorithm**” (**traditional = heuristic**). If a “**deterministic**” type algorithm is selected, the **conclusive** “heuristic” phase depends on the value assigned to the parameter “**Fine tuning**”. Basically, the list of programmable values for balancing in two planes replicates the programmable values for balancing in one plane. The following lists illustrate the resulting values, depending on whether the operator selects “**Heuristic or Deterministic**” and “**One Plane or Two Plane**”.

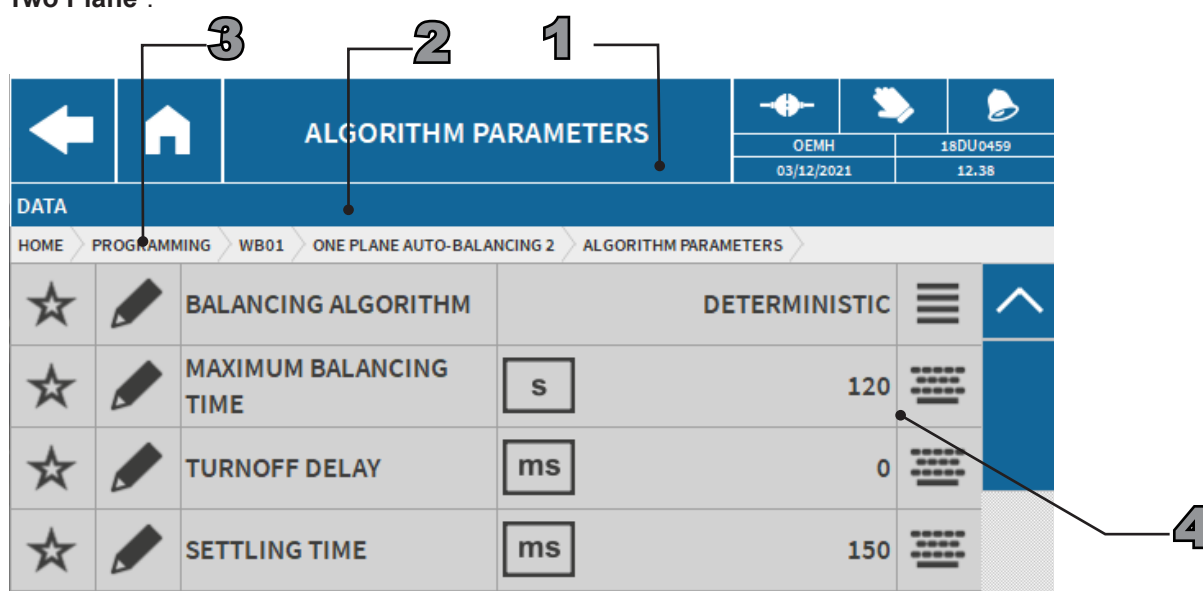


Fig.39. "Auto-balancing" set balancing algorithm parameters screen

1. Screen title: **Algorithm parameters**
2. Messages and descriptions area: **Data**.
3. Navigation path: *Home > Programming > WB01 (name of the channel) > One plane pre-balancing (e.g.) > Algorithm parameters*.
4. Working area (see Fig.39, for example).
  - **Maximum balancing time.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. Indicates the maximum time expected for the balancing cycle, after which a timeout warning is generated, although the balancing cycle is not interrupted. **Default value: 120 s, selectable range from 10 s to 300 s.**



Fig.40. Maximum balancing time selection screen

- **Output delay.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. This function may be used to set-up the minimum time interval the vibration signal remains within the threshold L1 before terminating the balancing cycle. **Default value: 0 ms, suggested value 2000 ms.**

☆	✎	TURNOFF DELAY	ms	0	
---	---	---------------	----	---	--

Fig.41. Maximum balancing time selection screen

- **Settling time.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets in “deterministic” operating mode. This parameter may be used to delay the start of the measurement interval defined by the “measurement period” parameter so as to allow the vibration signal time to stabilise before initiating the measurement. The typical programming value for this parameter is between 100 ms and 200 ms. **Default value = 150ms.** Permitted values: 10 ms – 1000 ms with increments of 10 ms.

☆	✎	SETTLING TIME	ms	150	
---	---	---------------	----	-----	--

Fig.42. Settling time selection screen

- **Measurement period (deterministic)** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets in “deterministic” operating mode. The interval defined by the “measurement period” parameter starts once the “settling time” has expired. The average value of the imbalance readings is calculated over the duration of the measurement period. In this way it is possible to complete the balancing cycle automatically even in the event of beating. In the present of beating at frequencies similar to the grinding wheel operating speed, the “measurement period” must be programmed so that it is greater than or equal to the period of oscillation of the vibration signal. The beat frequency (and hence its period) may be determined by simply observing the leading and lagging edges of the vibration signal, under conditions where the grinding wheel is fairly well balanced (the measurement interval setting must be greater than the space between two consecutive leading edges of the vibration signal). **Default value = 1000ms.** Permitted values: 100 ms – 10000 ms with increments of 1 ms.

☆	✎	MEASUREMENT TIME (DETERMINISTIC)	ms	1000	
---	---	-------------------------------------	----	------	--

Fig.43. Measurement time screen

- **Widening of acceptable imbalance.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. When balancing in two planes, the planes are balanced individually and alternately. When one of the planes is balanced, the imbalance in both planes may increase initially before decreasing due to the effect of balancing. The limit value of this increase is calculated based on the imbalance in both planes, and the balancing process is interrupted if this value is exceeded. For this reason, the balancing process switches the movements to the other plane long before this value is reached. **This parameter is only available only when using the “deterministic” balancing strategy.** **Default value = 100um/s.** Permitted values: 20 um/s – 1600 um/s at increments of 1 um/s.

☆	✎	ACCEPTED UNBALANCE ENLARGEMENT	µm	1.00	
---	---	-----------------------------------	----	------	--

Fig.44. Permitted imbalance limits modification screen

- **Wheel rotation direction (A/B for “TWO plane” set).** Valid for One plane pre-balancing (manual) and Two plane pre-balancing (manual) sets. Indicates the wheel rotation direction. In the case of deterministic balancing, this parameter must be programmed correctly, otherwise the cycle will not be completed successfully. The direction of travel of the spindle depends on the plane to be balanced: the direction of rotation is determined by observing the grinding wheel from the part where the balancer is mounted. **This parameter is only available only when using the “deterministic” balancing strategy.** Default value = clockwise. Permitted values: = clockwise/counter-clockwise.

☆	✎	WHEEL ROTATION DIRECTION	CLOCKWISE	☰	✓
---	---	-----------------------------	-----------	---	---

Fig.45. Grinding wheel rotation direction selection screen

- **Imbalance test.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. Default value = Medium (recommended). Permitted values: small/medium/large. **This parameter is only available only when using the “deterministic” balancing strategy.**



Fig.46. Degree of imbalance level selection screen.

- **Fine tuning.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets in “deterministic” operating mode. Enable traditional balancing in order to achieve the threshold **L1** if it cannot be reached using deterministic balancing. If the “fine tuning” parameter is active, additional parameters relating to traditional balancing are available. Default value = active. Permitted values: active/inactive.



Fig.47. Degree of imbalance level selection screen.

- **Measurement Time.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. Varies the measuring interval of the accelerometer signal to filter periodic disturbances such as chattering. The acquisition time must equal to or slightly higher than the disturbance recurrence. **Default value: 2 s, may be set from 1 s to 10 s.**



Fig.48. Measurement period selection screen

- **Balancing strategy.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. There are two possible balancing strategies:
  - *Standard:* the balancing mass movements are set-up by evaluating the rotation speed of the grinding wheel and the imbalance detected by the vibration sensor.
  - *Adaptive2:* the balancing mass movements are set-up by evaluating not only the rotation speed of the grinding wheel and its imbalance, but also by observing the more or less elastic response of the machine to a shift in the position of the balancing masses.



Fig.49. Balancing strategy selection screen.

- **Motor speed multiplier.** Valid for **one plane auto-balancing** and **two plane auto-balancing** sets in “traditional” operating mode. Used to change the speed of the balancing masses during the balancing cycle. **Default value: 3, may be set from 1 to 5.**



Fig.50. Motor speed multiplier settings page

- **Sample and hold setting.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. Adjusts the reactivity of the balancing algorithm to the changes of the accelerometer signal. The maximum reactivity (Fine) is recommended when the vibration signal is sable. A reduced reactivity may be required if there are external disturbances on the vibration signal. **Default value: Fine, may be set to medium and rough.**



Fig.51. Sampler settings page

- **Machine reactivity.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. This function may be used to define the degree of rigidity of the machine tool. **Default value: Normal**, the available options are as follows:
  - **Very low:** Particularly elastic machine tool where a small movement of the masses causes a variation in the imbalance that requires a lengthy interval to stabilise.
  - **Low**
  - **Normal**
  - **High**
  - **Very high:** Particularly rigid machine tool, where even a significant movement of the masses causes a variation in the vibration that does not take a long time to stabilise.



Fig.52. Sampler settings page

- **Permitted variation in imbalance increase.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. When balancing in two planes, the planes are balanced individually and alternately. When one of the planes is balanced, the imbalance in both planes may increase initially before decreasing due to the effect of balancing. The limit value of this increase is calculated based on the imbalance in both planes, and the balancing process is interrupted if this value is exceeded. For this reason, the balancing process switches the movements to the other plane long before this value is reached. **This parameter is only available only when using the “traditional” balancing strategy. Default value = Standard.**



Fig.53. Permitted imbalance limits modification screen

- **Saving balancing log.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. This parameter may be used to define when the balancing procedure LOG must be saved.



Fig.54. LOG save type selection screen

- **Balancing method.** Valid for **One plane pre-balancing (manual)** and **Two plane pre-balancing (manual)** sets. Notifies the user that the selected balancing method uses fixed weights. The algorithm calls for a protractor keyed to the flange.



Fig.55. Balancing method scree

- **Delta angle.** Valid for **One plane pre-balancing (manual)** and **Two plane pre-balancing (manual)** sets. Defines the shift executed by “weight 1” from “step 1” to “step 2” (expressed in degrees).



Fig.56. Angle set-up screen

- **Weights dimension (A/B for “TWO plane” set).** Valid for **One plane pre-balancing (manual)** and **Two plane pre-balancing (manual)** sets. Defines the space occupied by the dimensions of the weights (expressed in degrees).

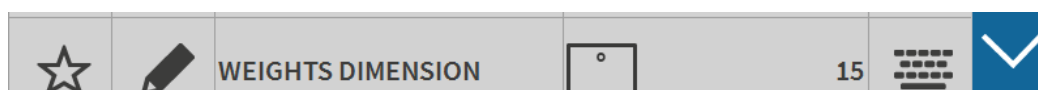


Fig.57. Permitted tolerance on RPM screen

- **Angular scale direction (A/B for “TWO plane” set).** Valid for **One plane pre-balancing (manual)** and **Two plane pre-balancing (manual)** sets. Indicates the rotation direction of the protractor.



Fig.58. Protractor rotation direction screen

- **RPM tolerance.** Valid for **One plane pre-balancing (manual)** and **Two plane pre-balancing (manual)** sets. Permits the user to define the tolerance on the RPM value between the various steps of the procedure.

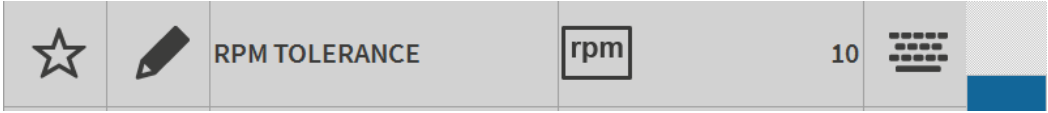


Fig.59. Permitted tolerance on RPM screen

- **Switching difference.** Valid for **Two plane auto-balancing** sets. Defines the switching condition for the balancing algorithm from one plane to the other. The algorithm, even though it controls both planes, implements the movement of the balancing masses on one plane at the time. When the vibration value drops in relation to the value set, the algorithm switches the plane. **Default value: 50%, can be set from 10% to 100% with increments of 10%.**

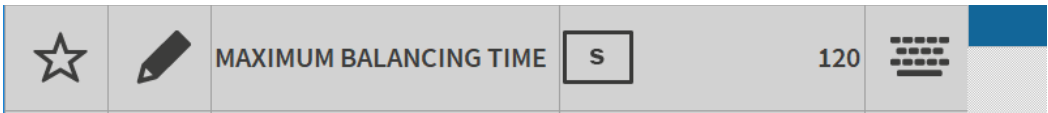


Fig.60. Automatic balancing algorithm type selection screen

- **Balancing algorithm.** Valid for **One plane auto-balancing** and **Two plane auto-balancing** sets. This parameter may be used to select automatically whether to use the “Traditional” or “Deterministic” balancing algorithm.

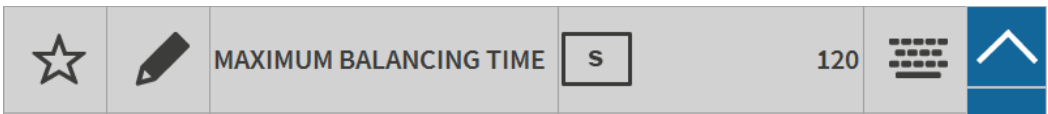


Fig.61. Automatic balancing algorithm type selection screen



Fig.62. Automatic balancing algorithm type selection screen

- **Wait for PC acknowledge.** When this function is enabled it indicates that the “Request Performed” signal is waiting for the machine CN to acknowledge that it has received the NCF file, which is required for the roundness correction.

[

**N.B.**  
Even if the function is not enabled, the NCF file is still saved on the Master Node.



Fig.63. Enable Request Performed signal screen

- **Timeout for PC acknowledge.** This function may be used to set-up the maximum waiting time for the acknowledge signal on the part of the CN.



Fig.64. Maximum PC acknowledge time settings screen

- **Number of files saved.** This function may be used to set-up the number of saved files that may be loaded.



Fig.65. Number of saved recordings settings screen

### 3.3.5 Transmission

Available for the following sets:

- One plane auto-balancing.
- Two plane auto-balancing.

The **Transmission** screen is used to set the control parameters of the source used to monitor the grinding wheel speed.

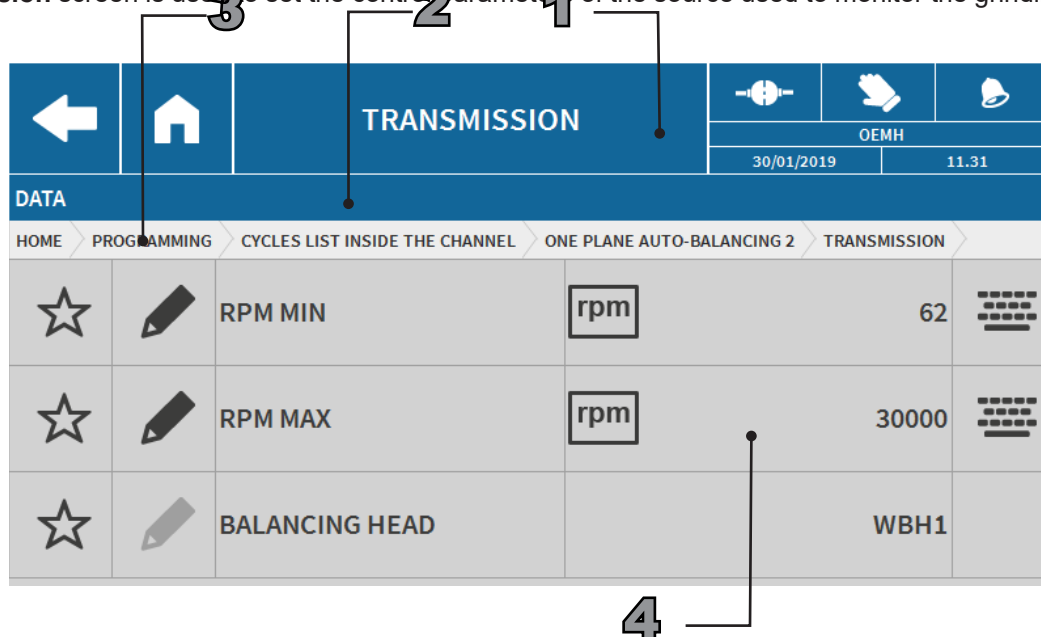


Fig.66. Transmission data screen. In the example: from internal source

1. Screen title: **Transmission**
2. Messages and descriptions area: **Data**.
3. Navigation path: *Home > Programming > WB01 (name of the channel) > One plane pre-balancing (e.g.) > Transmission*.
4. Working area:
  - **RPM Min**. Grinding wheel minimum speed of rotation. Used for monitoring the grinding wheel rotation speed. Below the minimum threshold, the RPM out of range message is displayed.
  - **RPM Max**. Grinding wheel maximum speed of rotation. Used for monitoring the grinding wheel rotation speed. When the maximum threshold is exceeded the RPM out of range message is displayed.

#### N.B.

The min. RPM value must be less than the max. RPM, otherwise when the user presses the OK button to confirm the settings the value will not be saved.

- **Balancing head** = Balancing head on which to perform the transmission.
- **RPM internal value**. Enters a simulated number of grinding wheel rotations. We recommend entering a value similar to the real value of the grinding wheel.

☆	✎	RPM INTERNAL VALUE	rpm	62	⌨
---	---	--------------------	-----	----	---

Fig.67. Internal source values

#### N.B.

To enable "Internal RPM value" select the value "None" at the following address:

*Home > Setting > Hardware & Mechanics > Nodes > Acc2 Sensors > S1 > Accelerometer parameters > RPM Identifier*



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## 4 DASHBOARDS



For instructions on creating, modifying and deleting dashboards, see Part B2. For the navigation map between the menus, see **Navigation map, Sect. E**.

### 4.1 Selecting a Marposs/OEM page

When it is switched on, the **Blú LT** system permits the operator to select either the page corresponding to the installed application (**Marposs**), or between the ready to use options created by the customer (**OEM**) (see Sect. B2).

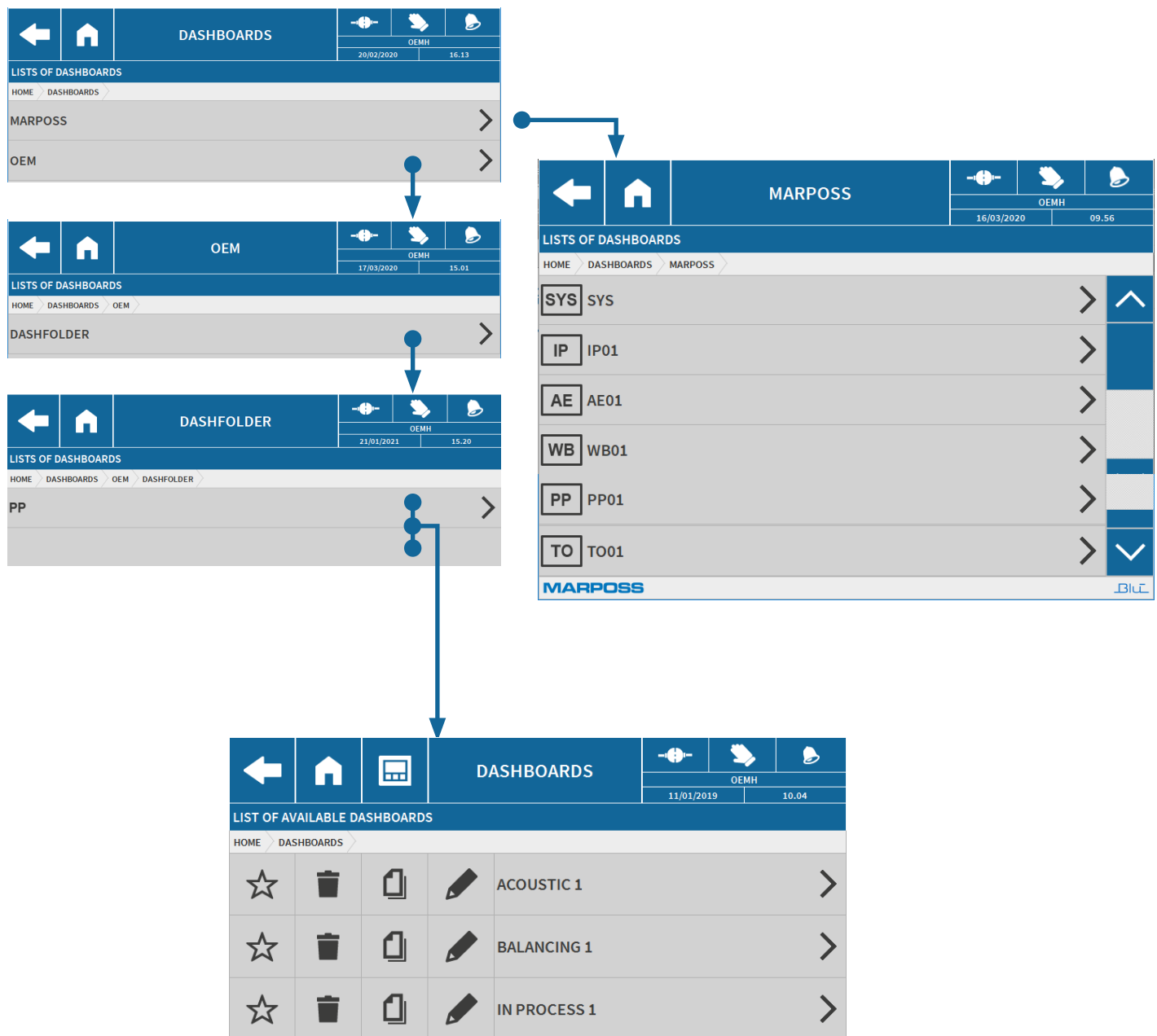


Fig.68. Pre-compiled Marposs page and pages created by the OEM customer

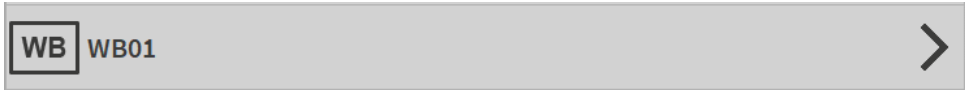
4.2 Widgets and dashboards

The wheel balancing application (**WB**) widgets are those that can be used for sensors assigned to different functions (Mic1, RPM, etc.) There are two types of widget available:

- **Marposs**. Group of pages, pre-compiled by Marposs, containing widgets that are ready for use with the current applications.
- **OEM**. Group of pages, created by OEM, containing widgets that are ready for use with the current applications.

For instructions on creating and managing the dashboards, see Sect. Sect. B2.

4.2.1 Marposs dashboards for grinding wheel balancing applications



For a description of the individual widgets present and their characteristics, see subsequent paragraphs.

Table 1. List of Marposs dashboards > Process view	
Page name	Page
WB01 AUTO BALANCING PROCEDURE	A screenshot of the 'WB01 AUTO BALANCING PROCEDURE' page. It features a large speed scale at the top ranging from 0 to 100 rpm, with a green indicator light. Below the scale are two columns of balance data: 'WB01 POSITION UNBALANCE A' and 'WB01 SPEED UNBALANCE A', both showing '+1.64 μm' and '+164 μm/s' respectively. Further down, there are buttons for '+1', '-1', '+2', and '-2', a 'START' button, and a 'CLEAR ALARM' button. At the bottom, there are indicators for 'WB01 MOTORS DIRECTIONS VIEWER', 'B01 AUTO BALANCING PROCEDURE', 'SYS CLEAR ALARM', and 'WB01 SET SELECTOR'.

Table 2. List of Marposs pages > Setup	
Page name	Page
WB01 MANUAL MOV HOME POS	A screenshot of the 'WB01 MANUAL MOV HOME POS' page. It includes a speed scale from 0 to 100 rpm with a green indicator light. The balance data section shows 'WB01 POSITION UNBALANCE A' and 'WB01 SPEED UNBALANCE A' with values '+11.65 μm' and '+1165 μm/s'. Below this, there are buttons for '<<->>' and '<<->>'. The bottom section contains buttons for '+1', '-1', '+2', and '-2', a 'START' button, and a 'WB01 SET SELECTOR'.

Table 2. List of Marposs pages &gt; Setup

Table 2. List of Marposs pages > Setup	
Page name	Page
WB01 ONE PLANE PRE BALANCING	
WB01 TWO PLANES PRE BALANCING	

## 4.2.2 Widgets for Wheel Balancing Application

## WB MARPOSS WIDGETS FOR WHEEL BALANCING APPLICATION

Table 3. List of Widgets for Wheel Balancing Application







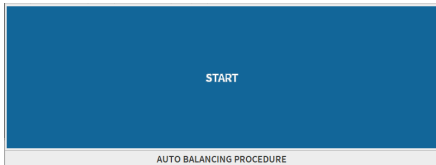









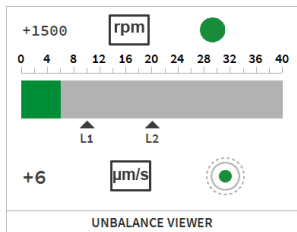



Icon	Widget	System Description/Status
	<b>Home Position Procedure</b> 	   <p>This widget may be used to move the balancer heads to the Home (or neutral) position, where the heads are in counter-position.</p> <p><b>START</b> = Automatic cycle. Not active.</p> <p><b>START</b> = Command enabled.</p> <p><b>STOP</b> = Operation in progress.</p>
	<b>Motorised balancing procedure</b> 	   <p>Starts the automatic balancing procedure.</p>
	<b>Manual balancing head movements</b> 	   <p>This widget may be used to move the balancing heads manually in either direction at four different speeds. The heads may also be activated individually or in pairs.</p>
	<b>Imbalance display</b> 	   <p>This widget may be used to display the current wheel imbalance, where the colour of the bar indicator has the following meanings:</p> <ul style="list-style-type: none"> <li>• <b>Green</b> = Wheel vibration <b>optimum</b> (less than L1).</li> <li>• <b>Yellow</b> = Wheel vibration <b>acceptable</b> (value <b>between</b> L1 and L2).</li> <li>• <b>Red</b> = Wheel vibration excessive (value <b>exceeds</b> L2).</li> </ul>

Table 3. List of Widgets for Wheel Balancing Application


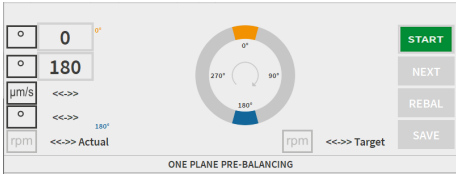




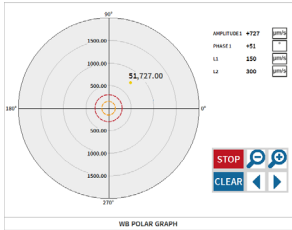




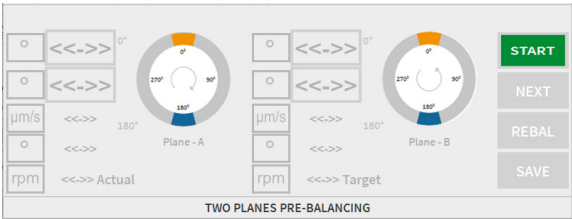













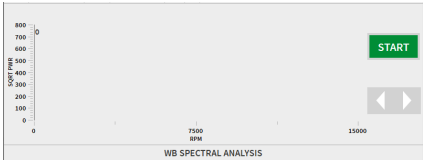



Icon	Widget	System Description/Status
	<p><b>One plane pre-balancing</b></p> 	   <p>Activated when the pre-balancing set is selected. May be used to pre-balance the wheel by positioning two weights having a pre-defined mass. The widget includes a guide procedure that describes how to position the weights to obtain optimum balance conditions.</p>
	<p><b>WB Polar Graph</b></p> 	   <p>This widget displays the phase and amplitude of the current vibration detected by the accelerometer.</p>
	<p><b>Two plane pre-balancing</b></p> 	   <p>Activated when the pre-balancing set is selected. May be used to pre-balance the wheel by positioning two weights having a pre-defined mass. The widget includes a guide procedure that describes how to position the weights to obtain optimum balance conditions.</p>
	<p><b>WB Limits</b></p> 	   <p>This widget displays the wheel vibration, the colour of the LED indicates the vibration range:</p> <ul style="list-style-type: none"> <li> = The imbalance value is <b>less</b> than L1.</li> <li> = The imbalance value is <b>between</b> L1 and L2.</li> <li> = The imbalance value is <b>greater</b> than L2.</li> <li> = The imbalance value is <b>greater</b> than L3.</li> </ul>
	<p><b>WB Spectrum analysis</b></p> 	   <p>This widget may be used to analyse the balancing measurement carried out on the wheel.</p>

Table 3. List of Widgets for Wheel Balancing Application


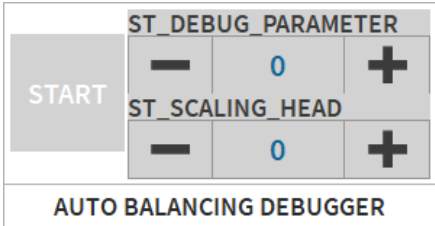




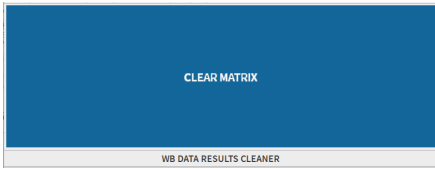




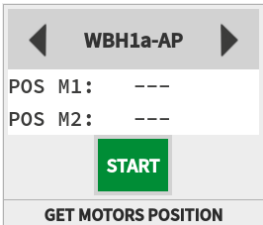









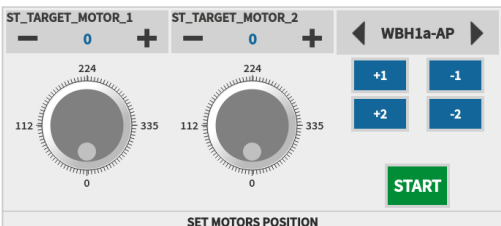




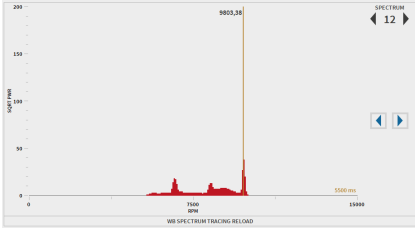








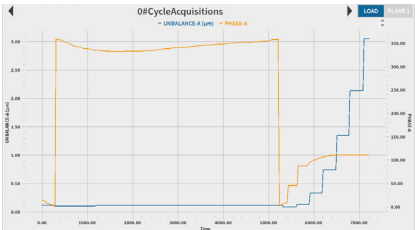



Icon	Widget	System Description/Status		
	<b>Auto Balancing procedure</b> 			
		Only for Marposs Assistance		
	<b>WB data results cleaner</b> 			
		Allows you to reset the "Result" data matrix.		
	<b>Obtain motor position</b> 			
		Shows the current position of the balancing head masses, in degrees.		
	<b>Shows motors direction</b> 			
		Shows the current direction of the balancing head masses.		
	<b>Motors movement in known position</b> 			
		Only for Marposs Assistance		

Table 3. List of Widgets for Wheel Balancing Application		
Icon	Widget	System Description/Status
	<div>Vibration spectrogram display</div> 	<div></div> <div>Use this function to view the last spectrogram saved via spectrum analysis. The cursors   may be used to display the amplitude of the various spectral lines, whereas the  12  function may be used to view the various spectrograms at 500 ms intervals.</div>
	<div>Balancing cycle display</div> 	<div></div> <div>Use this function to view balancing cycles saved previously, including the imbalance and phase trends for each plane.</div>

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## 5 OPERATING PROCEDURES

### 5.1 One plane pre-balancing procedure



This procedure may be carried out in **Manual and Set-up** mod

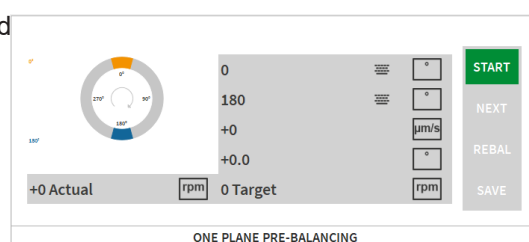
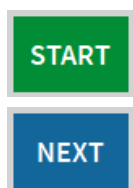


Fig.69. One plane pre-balancing widget

Activated when the pre-balancing set is selected. May be used to pre-balance the wheel by positioning two weights having a pre-defined mass. Make sure the wheel is stationary, then proceed as follows:



Press the **START** button and follow the instructions provided by the widget.

Press the **NEXT** button and follow the instructions provided by the widget until the procedure is complete.

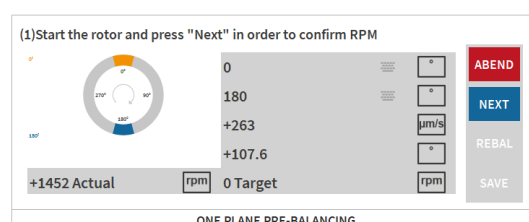
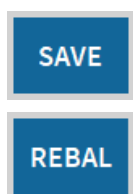


Fig.70. One plane pre-balancing widget



Once the procedure is complete, save the configuration by pressing the **SAVE** button, or repeat the pre-balancing procedure by pressing the **REBAL** button.

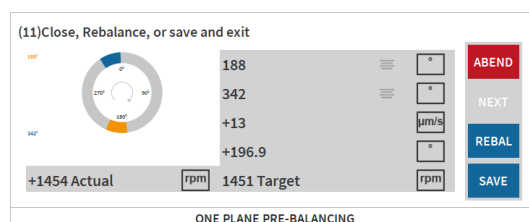


Fig.71. One plane pre-balancing widget

### 5.2 Two plane pre-balancing procedure



This procedure may be carried out in **Manual and Set-up** mod

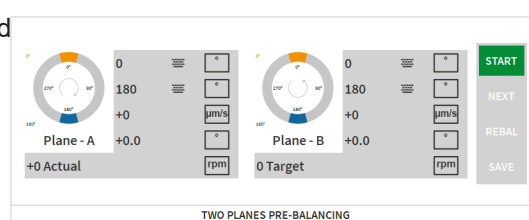
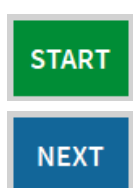


Fig.72. Two plane pre-balancing widget

Activated when the pre-balancing set is selected. May be used to pre-balance the wheel by positioning weights having a pre-defined mass. Make sure the wheel is stationary, then proceed as follows:



Press the **START** button and follow the instructions provided by the widget.

Press the **NEXT** button and follow the instructions provided by the widget until the procedure is complete.

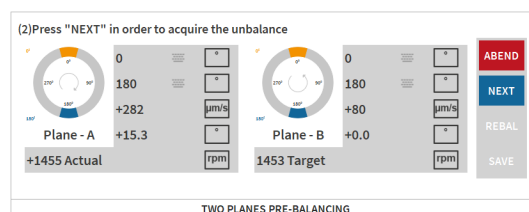


Fig.73. Two plane pre-balancing widget

SAVE

REBAL

Once the procedure is complete, save the configuration by pressing the **SAVE** button, or repeat the pre-balancing procedure by pressing the **REBAL** button.

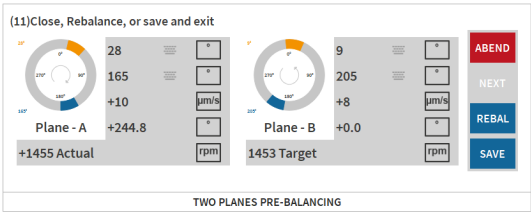


Fig.74. Two plane pre-balancing widget

## 6 ERRORS - WARNINGS - ALARMS

### 6.1 Errors

Table 4. Errors			
Code	Message	Cause	Remedy
1	The selected accelerometer cannot be used.	The accelerometer selected in the current set has been declared as being absent or not belonging to the hardware configuration.	Restore the missing accelerometer or modify the hardware settings.
2	Memory heap full	Memory heap full	Switch off and on again
4	Incorrect balancing limits	L3 must be greater then or equal to L2, L2 must be greater then or equal to L1	Correct the programmed balancing limits
5	Rpm values not valid	Max. rpm must be greater than or equal to min. rpm	Enter appropriate rpm values
6	L2 - L1 must be greater than or equal to 10	Turn-off threshold value not valid	Modify the turn-off threshold value or the L1 value
7	The selected balancing head cannot be used.	The balancing head selected in the current set has been declared as being absent or not belonging to the hardware configuration.	Restore the missing balancing head or modify the hardware settings.
8	Two accelerometers with the same identifier.	Two accelerometers with the same identifier.	Modify the identifiers assigned to the accelerometers.
9	Two balancing heads with the same identifier.	Two balancing heads with the same identifier.	Modify the identifiers assigned to the balancing heads.
10	The selected proximity sensor cannot be used.	The proximity sensor selected in the current set has been declared as being absent or not belonging to the hardware configuration.	Restore the missing proximity sensor or modify the hardware settings.
11	Rpm source not valid for the current accelerometer identifier	The rpm source associated with the current accelerometer identifier is not valid	Change the selected accelerometer or modify the relationship in the hardware configuration, if possible
12	Two balancing heads programmed with the same identifier	Two balancing heads with the same identifier.	Modify the identifiers assigned to the balancing heads.
13	The accelerometers must be connected to the same node as the balancing head	The accelerometers must be connected to the same node as the balancing head	Connect the accelerometers to the same node as the balancing head
14	A double balancing cycle must be performed with the same types of transmission and heads on each plane	A double balancing cycle must be performed with the same types of transmission and heads on each plane	Change the layout of the application

## 6.2 Warnings

Table 5. Warnings			
Code	Message	Cause	Remedy
10001	The automatic balancing cycle has exceeded the maximum balancing time.		
10002	Error during acquisition cycle		
10003	Error when saving the acquisition cycle data		

## 6.3 Alarms

Table 6. Alarms			
Code	Message	Cause	Remedy
10001	Balancing request not authorised	It is not possible to perform a balancing cycle while another cycle is in progress on the same head	Perform the cycle when the head is not involved in any other cycles
10002	Masses homing request not authorised	It is not possible to perform a masses homing cycle while another cycle is in progress on the same head	Perform the cycle when the head is not involved in any other cycles
10003	MINICT not available	The MINICT requested for this cycle is currently occupied in another cycle	Attempt to perform the cycle when the balancing head is available
10004	Manual mass movements request not authorised	It is not possible to perform a masses manual movements cycle while another cycle is in progress on the same head	Perform the cycle when the head is not involved in any other cycles
10005	Accelerometer not available	The accelerometer requested for this cycle is occupied in another cycle	Perform the cycle when the accelerometer is available
10006	Pre-balancing procedure alarm	It is not possible to perform the pre-balancing procedure due to an invalid set or because another procedure is currently in progress	Repeat the procedure when there are no other cycles in progress on the current channel
10007	Balancing procedure alarm	Alarm during the balancing procedure	Repeat the cycle
10008	Critical error during automatic balancing		
10009	Critical error at start-up		
10010	Critical communication error on the WBTX node		
10011	Critical error in processing		
10012	Critical error on the processed data		
10013	Critical error on the FIELDBUS		
10014	Critical error in flow control		
10015	Balancing cycle not permitted at current RPM	It is not possible to execute a balancing cycle at the current RPM value.	Set the grinding wheel rotation speed to a valid RPM value
10016	Home position not permitted at current RPM	It is not permitted to execute a home position at the current RPM value	Set the grinding wheel rotation speed to RPM value at which it is permitted to execute a home position

### Notes:

[illegible]

