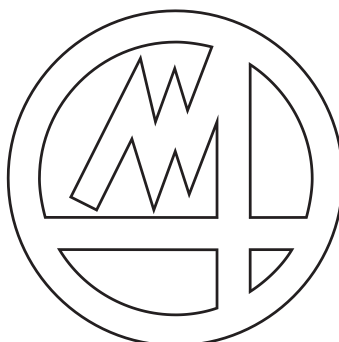


BLU LT

PROGRAMMING MANUAL

Manual Code
D21B0009GA



MARPOSS

**MANUFACTURER****ADDRESS****Manual code No.:****Issue date:****Edition:****Software version:****Issued by:**

MARPOSS S.p.A.

Via Saliceto, 13 - Bentivoglio (BO) Italy

www.marposs.com

D21B0000GA

05/2022

12/2021

1.3

Marposs S.p.A. Via Saliceto 13, Bentivoglio (BO) Italy

The information and descriptions contained in this manual are provided in good faith and **MARPOSS** declares that they are accurate at the date of publication. **MARPOSS** is not obliged to update the contents or to inform its customers of changes to the product.

The instructions contained in this document are intended for professional users who have a thorough working knowledge of the product in question.

Using the **MARPOSS** product for any purpose other than those described in this document, or carrying out any operation on it not described herein, shall invalidate any and all warranty agreements it may be covered by.

MARPOSS declines any responsibility for losses, damage or claims deriving from incorrect use of this manual. This manual, and all the information it contains, are protected under intellectual property rights legislation.

Original language Italian

© MARPOSS S.p.A. 2016 - 2021 - All rights reserved

Marposs acknowledges the rights of third parties whose trademarks or registered trademarks are referenced in this publication.



This product conforms to the following requirements:

- **EMC** as defined by the Directive **2014/30/EU**.
- **Low voltage** as defined by the Directive **2014/35/EU**.

This product has been designed and manufactured for use in industrial environments.

The applicable standards are:

- **EMC: EN 61326-1.**
- **Safety: EN 61010-1**

FOR INFORMATION ON THE "RoHS" DIRECTIVE THAT REGULATES THE PRESENCE OF CERTAIN HAZARDOUS SUBSTANCES IN MARPOSS ELECTRONIC AND ELECTRICALLY EQUIPMENT, CONSULT:

http://www.marposs.com/compliance_detail.php/eng/rohs

FOR INFORMATION ABOUT THE USE OF RAW MATERIALS ORIGINATING FROM CONFLICT ZONES IN MARPOSS PRODUCTS, SEE:

http://www.marposs.com/compliance_detail.php/eng/conflict_minerals



INFORMATION FOR USERS
European Directive 2006/66/EC

DISPOSAL OF EXHAUSTED REMOVABLE CELLS/BATTERIES

The crossed out wheellie-bin symbol printed on the battery, or its packaging, indicates that the cell or battery fall within the scope of the European Directive 2006/66/CE and therefore must be collected separately from the other waste products at the end of their working life. Correct waste separation and environmental disposal helps to prevent possible negative effects on the environment and human health and safety. For countries outside the European Union, such components must be collected and disposed of in accordance with the applicable national regulations and legislation covering the treatment of used cells/batteries. For information about the type of used batteries and how to replace them without endangering the user, refer to the equipment instruction manual.



INFORMATION FOR USERS

in accordance with article 26 of the Italian Legislative Decree N. 49, "Enactment of the Waste Electrical and Electronic Equipment Directive 2012/19/EU", dated 14 March 2014.

The crossed out wheellie bin symbol that appears on the product or its packaging indicates that the product must be disposed of separately from other waste materials at the end of its working life. The manufacture shall be responsible for organizing and handling separate collection of the equipment described in this manual at the end of its working life. Users who wish to dispose of the equipment must contact the manufacture and follow the procedures implemented by the latter for the separate collection of the equipment at the end of its working life. Sorting the equipment to be disposed of into its component materials before recycling, treatment and environmentally compatible disposal helps to prevent potentially harmful effects on health and the environment and favours re-use and/or recycling of these materials. Illegal disposal of the product by the user is punishable by the application of fines or other penalties as defined by the applicable regulation.

CONTENTS

1 GENERAL STANDARDS AND RECOMMENDATIONS	5
1.1 INTRODUCTION	5
1.2 MANUAL DESCRIPTION	5
1.3 ORIGINAL VERSION	5
1.4 TESTING AND GUARANTEE	5
1.5 GENERAL SAFETY INDICATIONS	5
1.6 HOW TO READ THE MANUAL	6
1.6.1 CONVENTIONS AND SYMBOLS USED	8
1.7 DEFINITION OF OPERATOR	8
1.8 INSTALLING THE ELECTRONIC UNIT	9
1.9 DISPOSING OF PACKAGING MATERIALS	9
1.10 TECHNICAL ASSISTANCE	10
1.11 INTENDED USE OF THE BLÚ LT SYSTEM	10
1.12 POWER SUPPLY PROTECTION DEVICE	10
2 INFORMATION FOR USERS	11
2.1 CHARACTERISTICS	11
2.2 REFERENCE TO THE COUNCIL DIRECTIVE 89/391	11
2.3 GENERAL USER ACTIVITIES	11
2.4 GUIDELINES FOR USING THE BLÚ LT SYSTEM	12
3 DESCRIPTION OF THE BLÚ LT SYSTEM	13
3.1 BASIC CONCEPTS	13
3.2 SYSTEM COMPONENTS	13
3.2.1 DEFINITION OF THE COMPONENTS	14
4 GLOSSARY	19

1 GENERAL STANDARDS AND RECOMMENDATIONS

1.1 Introduction

This document, or any part thereof, may not be reproduced or disclosed to third parties, by any means or in any form, without the prior authorisation of the author. Legal action will be taken in the event of any violations of this condition.

Warning

The extraordinary service and maintenance operations may only be carried out by authorised personnel.

1.2 Manual Description

This manual provides all the information necessary to understand the MARPOSS product in your possession and to use it correctly.

THE PURCHASER SHALL BE RESPONSIBLE FOR ENSURING THAT THE PERSONNEL RESPONSIBLE FOR INSTALLING AND OPERATING THIS MARPOSS PRODUCT HAVE READ AND UNDERSTOOD THIS MANUAL AND ALL ITS CONTENTS.

The contents of this manual are intended for use by the following categories of personnel involved in using and operating the product:

- Safety manager responsible for the area in which the product is used.
- MARPOSS or customer personnel directly responsible for installing the product.
- Customer technical personnel operating directly with the MARPOSS product for production activities.
- All other personnel who are legitimately authorised to use or work on the product.

The manual is an integral part of the product and therefore must be kept intact and available to the user for the entire duration of the working life of the product.

The manufacturer's responsibility is limited to the correct use of the product, as defined in this manual and its attachments. The product must be used as described in this manual; therefore it is important to read it thoroughly before installing the product and using it, without omitting anything, and paying special attention to any messages which may appear in the text boxes. Observing all the regulations and suggestions it contains will ensure that the product remains safe to use. In the event of discrepancies between the content of the manual and the product, the Purchaser should inform the manufacturer before using it.

For any data that is not included in the following pages, or that cannot be derived from the information provided on them, contact the manufacturer.

1.3 Original version

The original version of this document was created in Italian.

Should there be any disputes due to the translations, even if done by MARPOSS, the reference text will be the Italian version only.

1.4 Testing and guarantee

Materials are guaranteed against defects, with the following limitations:

- DURATION OF WARRANTY: the warranty covers all the repairs to the product made within the terms foreseen.
- OBJECT OF THE WARRANTY: the guarantee applies to the product or its parts marked with the serial number or other identification systems used by MARPOSS.

The above warranty applies unless other agreements are reached between MARPOSS and the Customer.

1.5 General safety indications

Follow the machine tool manufacturer's safety procedures. Follow all safety procedures when installing the system. In the event of uncertainty, contact the service department.

1.6 How to read the manual

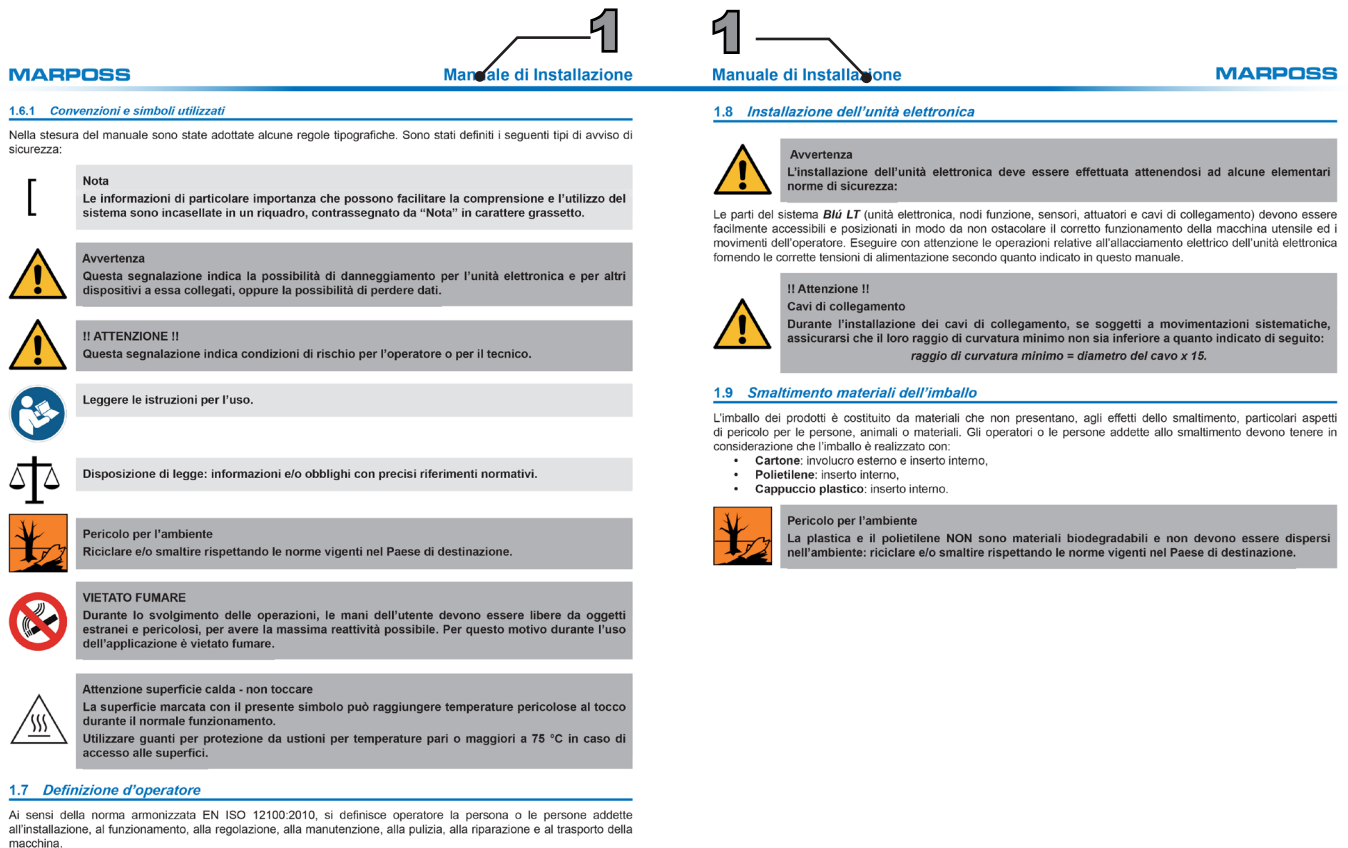
The manual is identified by a ten figure code and subdivided into sections that are, in turn, divided into progressively numbered chapters and paragraphs. The manual is divided into five parts:

- **PART A2 General safety information;**
- **PART B2 General information about the programming environment.** Introduction to the **Blú LT** system; **General programming.** This section covers the parts that are common to all the processes;
- **PART C Specific programming for regarding the function/auxiliary nodes.** PART C consists of the chapters in the programming and user manual that refer to the use of the function and auxiliary nodes which may be present in the installed configuration:
 - **C2AE ACOUSTIC EMISSION** Application - Includes the **AE - 2 Sensor function node**.
 - **C2WB BALANCING** application. Includes the **ACC - 2 sensor** (accelerometer) *function node*, as well as the **PROXI** (proximity) and **WBTX auxiliary nodes**.
 - **C2ME MEASUREMENT** Application. Includes the **ME - LVDT 4** and **ME - LVDT/HBT 2 sensors function nodes**.
The following applications may be executed:
 - IP - In Process Measurement;
 - PP - Post Process Measurement;
 - **C2TOUCH** Application for **MIDA** probes. Includes the **TOUCH - 2 probe function node**.
- **PART E. Quick reference guide, diagnostics and attached documentation.** This part is common to the installation, programming and user manuals.

All figures relate to the English. Where necessary, each figure is followed by a translation of the text in the language used in the manual.

The following convention was used when preparing the page layout of this manual:

1. Manual Title;
2. Page number within the respective Part;
3. Code number of the Part;
4. Indicative name of the Part.



Figg.1. Manual lay-out.

A **part index** appears at the beginning of each section, which you can use to consult the chapter and paragraph titles and page numbers.

When consulting the CD version of the manual, you can open the corresponding chapter by clicking on the file code number since it is hyper-linked to the corresponding software code.

N.B.
The screen pages present are all in English. To make the meaning easier to understand, a diagram describing their content is indicated for each of them. See Part B2b Chap.2.1 on page 5.

1.6.1 Conventions and symbols used

Some typographical modalities were adopted for drafting this manual. The following types of safety warning have been defined:

[N.B.
Important information that may help the operator to use and understand the system is contained in boxes indicated by the letters "N.B." in bold type.

WARNING

This warning indicates the possibility of damage to the electronic unit and other devices connected to it, or of losing data.

!! ATTENTION!!

This symbol indicates the presence of risk conditions for the operator or technician.



CAUTION

This message appears when triangular "Caution" symbol is present on the product, obliging the operator/technician to read it so as to avoid potentially hazardous situations.



Read the operating instructions.



Legal requirements: information and/or requirements with specific reference to the applicable regulations.



ENVIRONMENTAL HAZARD

Recycle and/or dispose of in accordance with the applicable regulations in the destination Country.



NO SMOKING

To ensure the best possible reaction time, the user must keep his/her hands free from dangerous or distracting objects while performing operations. Therefore, smoking is not permitted when using the application.



WARNING HOT SURFACE - DO NOT TOUCH

Surfaces marked with this symbol may reach temperatures that are hazardous to the touch under normal operating conditions. Use safety gloves designed to protect against temperature of 75°C or greater if it is necessary to access such surfaces.



USE OF GLOVES OBLIGATORY

Avoid touching the sharp surfaces of the window and use cut resistant safety gloves

1.7 Definition of operator

In compliance with the harmonized standard EN ISO 12100/2010, operator is the person(s) entrusted with installation, operation, adjustment, maintenance, cleaning, repair and transportation of the machine.

1.8 Installing the electronic unit

WARNING

When installing the electronic unit it is important to observe some basic safety rules:

The parts of the **Blú LT** system (function nodes, sensors, actuators and connection cables) must be accessible and positioned so as not to hinder the correct operation of the machine tool and the operator's movements. When making the electrical connections to the electronic unit, make sure that the power supply voltages correspond to the indications provided in this manual.

!! ATTENTION !!

Connection cables

While installing the connecting cables that are to subject regular movements, make sure that the minimum bending radius of the cables is not less than as follows:

$$\text{minimum bending radius} = \text{diameter of cable} \times 10.$$

1.9 Disposing of packaging materials

The packaging used for the P1dWB consists of materials that may be disposed of without exposing people, animals or property to any significant hazards. Operators or personnel responsible for disposing of the packaging should be aware that it consists of:

- **Cardboard:** external container and internal insert.
- **Polyethylene:** internal insert,
- **Plastic cover:** internal insert.



ENVIRONMENTAL HAZARD

The plastic and polyethylene components are NOT biodegradable and must be disposed of in the surrounding environment; recycle and/or dispose of materials in accordance with the locally applicable regulations.

1.10 Technical Assistance

When requesting technical assistance, ensure that you have the following information to hand: part number, page number referred to the total number pages, revision summary. The correct reference ensures quick and accurate answers. In the event of a fault condition that requires the assistance of Marposs personnel, contact the nearest service centre (visit the website www.marposs.com for a list of distributors). If updates are not carried out in conformity with the instructions provided, or without the manufacturer's written permission, or in such a way as to compromise correct operation or modify its characteristics, the manufacturer will not accept any responsibility if the application fails to function correctly. The warranty, as agreed in the contract, will be declared null and void in the event of any unauthorised modifications being carried out. Therefore, any modification or operation not expressly mentioned in this technical document is to be considered unauthorised. If the necessary procedures are not described in this manual, contact the equipment dealer or manufacturer. The warranty, as agreed in the contract, will be declared null and void in the event of any unauthorised modifications being carried out. Therefore, any modification or operation not expressly mentioned in this technical document is to be considered unauthorised. If it is necessary to carry out updates not covered by this user and maintenance manual, contact the distributor or software manufacturer. When calling for Marposs service, please make sure you have the following information to hand:

- Label containing the unit code no. (MODEL: 76xxxxxxx) and serial number (SERIAL No.)

See the example in the following figure:



Figg.2. Location of identification codes

1.11 Intended use of the Blú LT system

The **Blú LT** system is designed to perform measurements and checks on machine tools. Any other use not set out in this manual is **NOT** allowed by the manufacturer.

1.12 Power supply protection device

There is a resettable fuse installed inside the Master Node, which, if tripped, disables the operator panel (if present):

- Switch the Master Node off immediately using the ON/OFF switch (see Figg.2 on page 10).
- Wait for about 10 min. (the time necessary to re-arm the fuse), and then switch the Master Node on again.

N.B.:

In the event of any further problems, contact Marposs Customer Service.

2 INFORMATION FOR USERS

2.1 Characteristics

The application has been designed and built in such a way that its operation does not exceed the user's mental resources. The work performed by the user on the application is such that it does not cause tension or create situations which are out of the user's control. In order to avoid creating situations that place him/herself, other personnel working in the danger zones, animals, or property at risk, the application user must be aware of the following points:

- The user must be an able bodied person, in full possession of his/her mental faculties, and be fully aware of the dangers inherent in the application.
- The application should only be used by operators who are in optimum psycho-physical condition.
- The assigned user's state of health is very important in avoiding accidents in the workplace. It is very important to stress that an operator who is not in fit condition to operate the application can cause serious damage to him/herself, as well as to other persons, animals or materials present in the working area
- Personnel assigned to use the application must not do so under the influence of substances that could alter their mental and physical capacities, (such as medicines, alcohol, drugs etc.). If, for any reason, the user needs to take medicines that affect human reaction times for any length of time, he/she must immediately inform the factory safety manager, who will suspend him/her from performing these operations temporarily. Before resuming the activities in question, the user must provide the relevant medical documentation indicating that he/she is fit to do so.
- The user must not permitted other personnel, who are unaware of the inherent hazards, to modify/use the application while it is operating.
- We recommend that the application not be operated by persons under the age of eighteen: the application must not be operated by unqualified personnel, such as apprentices.

2.2 Reference to the Council Directive 89/391

The European Council Directive N°. 391, dated 12 June 1989 (enacted in Italy by the Legislative Decree N°.626, dated 19 September 1994), on the measures to be applied in order to improve health and safety conditions of employees in the workplace, stipulates the basic criteria to be observed by employer and employee in order to prevent accidents. In conformity with Section II, Article 10, the employer undertakes to ensure that the requirements cited in this directive, and the associated Safety Standards are observed. Therefore, the employer must take steps to provide the employees and/or their representatives in the company/factory with all the necessary information to ensure that the user's health and safety are protected, in conformity with national laws and/or conventions, and taking into account the dimensions of the company/factory. Therefore:

BEWARE

The person responsible for this manual must ensure that it is kept in perfect condition and stored in the vicinity of the machine tool, and that it is at the complete disposal of anyone who requests its.

2.3 General user activities

Operators must complete a training course covering the use of the application, organised by the OEM, in order to ensure that they are aware of, and understand, the responsibilities and operating procedures listed below. The user responsible for operating the application must:

- Understand the procedure for connecting the application to the hardware;
- **Understand the start production cycle procedure, as specified by the Manufacturer of the application;**
- Understand the procedures for resetting error conditions that do not require routine or special maintenance, and the procedures for switching the application off and quitting the work station.

2.4 Guidelines for using the Blú LT system

Before starting the operations that involve the **Blú LT** application, make sure that all the safety conditions are satisfied, in order to avoid accidents. In order to simplify the control operations, the following is a non-exhaustive list of the actions that are deemed to be necessary:

1. Make sure that there are no counter-indications regarding the procedure to be carried out using the **Blú LT** application.
2. Check that all devices are labelled in order to avoid confusing one device with another.
3. Before using the **Blú LT** system, carefully check that it has been installed correctly in accordance with the procedures described in the installation manual.
4. Read the documentation supplied with system (installation and programming and user manuals) and make sure they have understood it.
5. Only use the application in the configuration recommended by the manufacturer.

BEWARE

NEVER use the equipment if it has been damaged, or modified (with respect to the original configuration). If you notice any variations with respect to the original configuration, report them to the safety manager immediately.

6. Always respect the instructions and messages displayed on the control unit.



NO SMOKING

To ensure the best possible reaction time, the user must keep his/her hands free from dangerous or distracting objects while performing operations. Therefore, smoking is not permitted when using the application.

3 DESCRIPTION OF THE BLÚ LT SYSTEM

3.1 Basic concepts

The **Blú LT** system consists of a Master Unit and a series of elements known as **NODES**, which are installed inside the **Master Unit**, according to the indications in the Configuration File. The Master Unit and respective **NODES** are installed in a dry area (electrical cabinet).

3.2 System components

The system elements are divided into **Master Units**, *Function Nodes*.

1 The **Master Unit** performs the following principal functions:

- *Unit containing the function nodes.*
- *Activating and parametrizing all the Nodes* depending on the operating modes required by the various calculation and processing activities performed by the system.
- *Gathering the measurement values and status information* generated by the Function Nodes.
- *Real-time information exchange* with the Function Nodes.
- *Mass memory.* The Programmed data, the copies of the Application SW for the various Function Nodes, the Log File containing the Error, Alarm and Warning messages and the Configuration File are stored in the Master Unit. This file contains a complete description of the HW specifications and SW features of each specific application.
- *Communication with operator*, with the CNC/PLC and the company network. The **Blú LT** System Human Interface may be implemented either via the machine tool PC or a Proprietary Control Panel. In either case the pages are similar, since the Master Unit manages both situations. The following explanations are provided in order to obtain a better understanding of the communications between the Master Unit and the CNC/PLC: The **Blú LT** System has been designed to be expanded over time in order to perform the functions necessary to guarantee the quality of the pieces produced by the machine tools (e.g. In Process and Post Process Measurements), machine tool productivity (e.g. Detecting contact between Grinding Wheel and Piece), the availability of the machine tools (e.g. Eliminating excessive vibration by balancing the grinding wheel). The **Blú LT** system includes a SW package for each of these functions; in order to operate independently, these packages must be associated with a Channel, which effectively acts as an executor. Each function communicates with the machine tool CNC/PLC by means of a group of signals that the associated Channel handles according to a specific I/O List for each individual application. The functions may have differing operating modes, each of which may be parametrized differently. For example, the "In Process Measurement" function may operate in "Single Diameter", "Active Positionar" and "Double Diameter" mode. Each of these operating modes may be called up multiple times, with differing command trigger threshold values, while processing the same piece. The various operating modes that can be assigned to a given Channel are known as Cycles (Part Cycle). Each cycle is assigned a number, which the CNC/PLC uses to request the **Blú LT** to activate it. As mentioned above, the Configuration File contains a list of all the functions/features available in the associated application. This include the Independent Channel numbers associated with each Function, the list of Available Functions and the respective Operating Modes. The Master Unit reads the "Configuration File" and manages the Human Interface and communications with the CNC/PLC accordingly, so that the Operator is presented with a series of menus that are consistent with expected behaviour of the **Blú LT** system, and the signals indicated in the I/O List in the Configuration File are exchanged with the CNC/PLC. The Master Unit communicates with the CNC/PLC via 2 Outputs, 2 Inputs/Outputs and the Fieldbus board. In much the same way as for the Operator and the CNC/PLC, the Master Unit can also handle communications with the Company Network. Blú LT has been designed to handle communications in accordance with all the most widely established standards (e.g. OPC UA, MTConnect). The Function Nodes have been designed to make the basic functions necessary for conditioning the sensors they are associated with available, irrespective of the "System Function" they are to be used by.

2 The **Function Nodes** perform the following principal functions:

- Conditioning the signals generated by the connected sensors. Conditioned is performed in accordance with the parameters values that have been transmitted to the Master Unit.
- Transmitting the values obtained by conditioning the signals received from the Sensors to the Master Unit.
- Transmitting information regarding the internal status and the status of the connected Sensors to the Master Unit.
- Communication between the Master Unit and any Auxiliary Nodes that are connected mechanically. Each Function Node can manage up to 2 Auxiliary Nodes, not necessarily of the same type For example, an Auxiliary WBTX Node and PROXI may be connected to the same SCC Node.

The **Function Nodes** are installed in the slots, starting from the left hand slot (when viewing the Master from the front) and working towards the right, in accordance with the indications in the configuration (custom or embedded). The dip-switches on the last node (the furthest to the right) are set to “ON”. The function nodes are connected to the Sensors via the fixed connectors known as Sockets, using the cables terminated with the flying connectors known as Plugs. The Sockets and Plugs are fitted with mechanical keys that prevent incompatible devices from being connected together inadvertently.

3.2.1 Definition of the components

For the purposes of clarity when reading and consulting the Installation and Programming/User Manuals, the following definitions have been adopted.

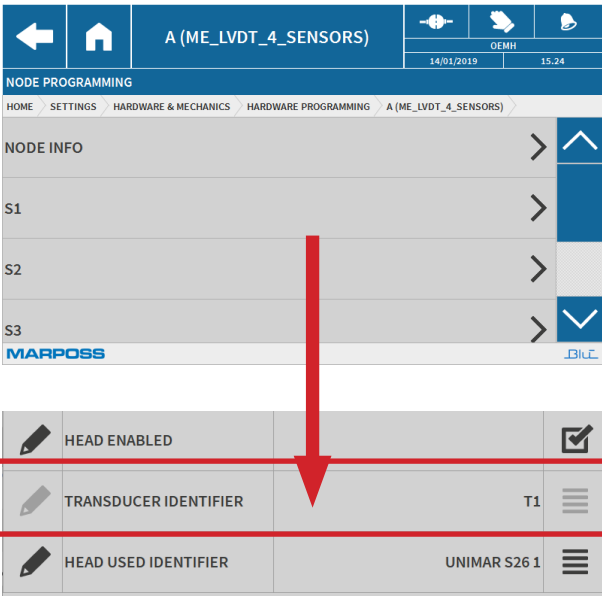
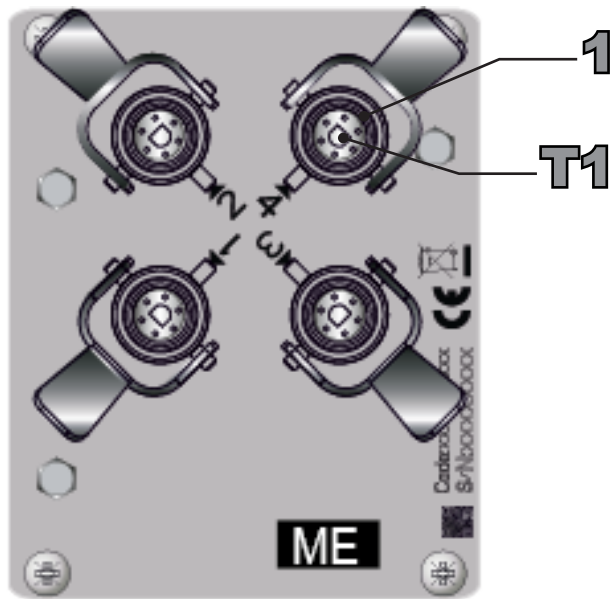
- The **sensor** is a device consisting of an electro-mechanical unit, a cable and a flying connector (Plug). The electro-mechanical unit contains a transducer, which is used to convert the original quantities to be measured into electrical signals. In the **Blú LT** System the Sensors generate signals that usually take their name from the type of transducer contained by the sensors. The numbering of the transducers is absolute and independent of the identifier of the socket to which the related sensor is connected. See for example the “measurement equations” Figg.3 on page 14. *Home > Programming > IP01 (for example) > Single In-Process (for example) > Measurement.*

☆	✎	MEAS EQUATION A	K1*T1A	☰
☆	✎	CONTROLS NUMBER A	3	☰

Figg.3. E.g.: screen page of data relating to the Measurement.

Sensors available:

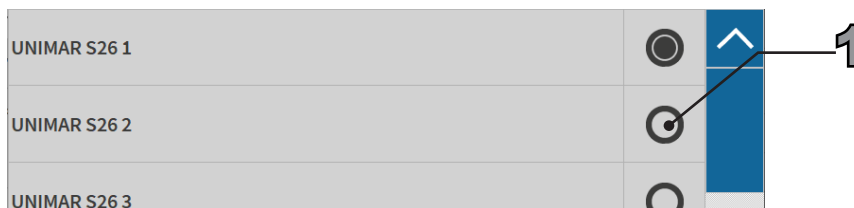
- The Measurement Sensors (Unimar Heads) contain Transducers that are identified in each application by the code numbers T1, T2,... ,T48. **It is possible to connect a maximum of four transducers.**
- The Acoustic Emission Sensors (AE) contain Transducers that are identified in each application by the code numbers MIC1, MIC2,... , MIC48.
- The Accelerator Sensors (Accelerometers) contain Transducers that are identified in each application by the code numbers ACC1, ACC2,... , ACC48.
- Function Nodes.** It is fundamentally important to check that all Function Nodes present in any given application conform to the configuration; the maximum number that may be present is four (4SLT version). In addition it is necessary to check that the correct sensor is connected to the socket on each Node. For the purposes of this check, the sensor is identified by the code number of the transducer that it houses. See the following connection example “Node > Socket > Sensors”.



Figg.4. Example of use of the ideas: Node > Socket > Sensors.

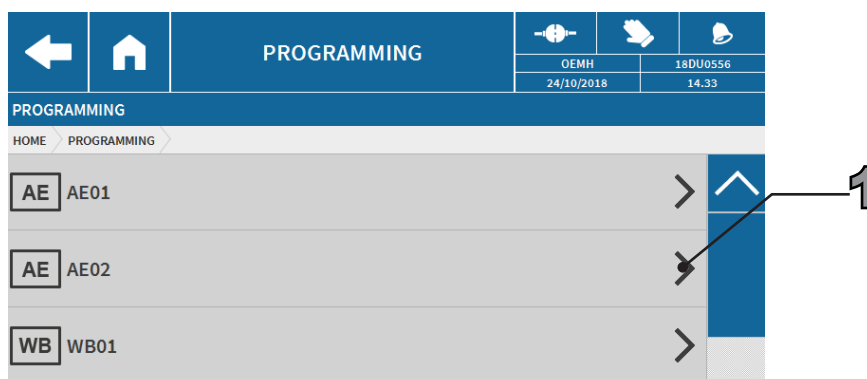
- Configurations.** The **Blú LT** system requires the software configuration to correspond to the hardware that is physically present. The configuration may be:

- *Embedded*. If selected from the native options present in the software version.
- *Custom*. If created for the specific application and loaded via the dedicated "Configuration file".
- The **Sockets** (ref. 1 Figg.4 on page 14) used to connect the Sensors (Unimar Heads) are identified by the numbers 1, 2, 3, 4.
- The **Sensors** (ref. 1 Figg.5 on page 15) used for the measurement are indicated as T1 and T2.



Figg.5. ME Measurement Node. Denomination of sensors.

- The **maximum number** of Functions Nodes is four (4SLT version).
- The currently available **Channel types** are IP, AE, WB, Touch. These are listed below, together with the associated "Cycle Types":
 - **AE** - Grinding Wheel-Piece Contact and Grinding Wheel/Dressing Wheel monitoring, featuring the following function modes:
 - Gap-Crash,
 - Gap - Crash, Monitoring
 - Acoustic integrated into the motor.
 - **IP** - In Process Measurement using Unimar Heads, featuring the following function modes:
 - Single In-Process,
 - Simultaneous In-Process,
 - Active positioning,
 - Passive positioning,
 - Length,
 - Active centring,
 - Passive centring,
 - Single Post-Process,
 - Concurrent Post-Process,
 - **PP** - Post Process Measurement using Unimar Heads, featuring the following executive modes:
 - Expanded program,
 - Reduced program,
 - Medium program,
 - Programs without centres,
 - Continuous parts program,
 - Bars program.
 - **WB** - Wheel Balancing;
 - Single plane pre-balancing (manual).
 - Two plane pre-balancing (manual).
 - Single plane auto-balancing
 - Two plane auto-balancing.
 - **TOUCH** - Measurement using Touch Probes.
 - Probe programming
- The **number of available Channels** for each possible type is confirmed by the Configuration File for each application.
- The **list of available Channels** appears on the initial page of the programming environment (ref. 1 Figg.6 on page 15).



Figg.6. Available channels.



Generally speaking, the list of all the available function modes may be consulted (provided the user possess the requisite access privileges, or Password) by selecting the icon on the following page: *Home>Programming>Set*.

The **HW components** of the **Blú LT** System are as follows (legend Figg.7 on page 16):

In the “dry area”

1. Marposs operator panel;

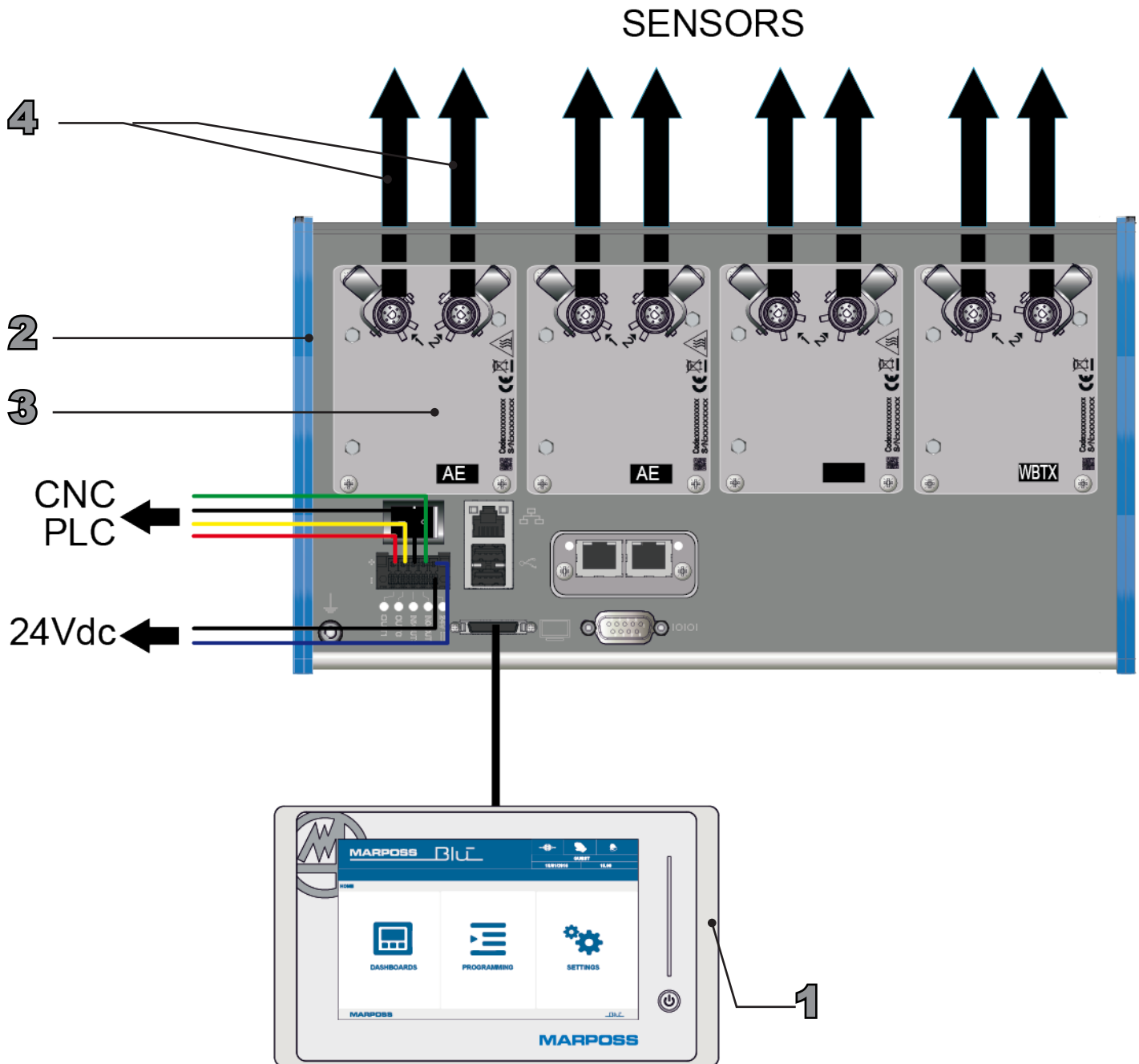
In the “dry area” (electrical cabinet)

2. Master Unit (e.g.: 4SLT);

3. Function node;

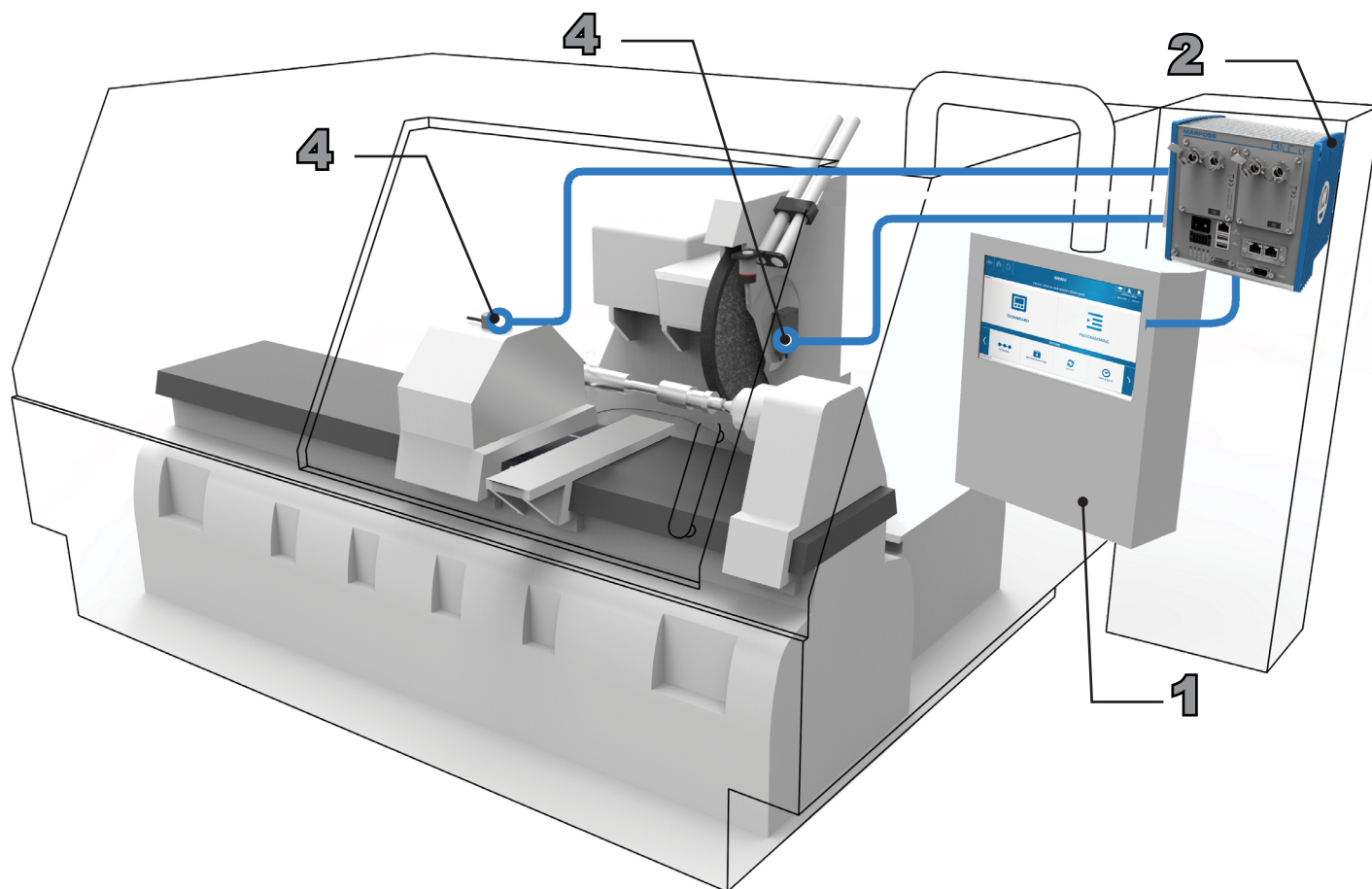
In the “wet area” (working area)

4. Sensors, Balancing heads, Measurement heads, etc.



Figg.7. Conceptual diagram of the **Blú LT** system layout

Example showing a complete installation on a machine tool. The numbers in Figg.8 on page 17 relate to the legend in Figg.7 on page 16.



*Figg.8. Example of **BLU LT** system node connections*

This page has been intentionally left blank

4 GLOSSARY

Table 1. Glossary of terms

Term	Definition
Application	The set of hardware and software elements that make up a specific implementation of the Blú LT system.
Configuration File*	File containing the information (Blú LT master unit structure with respective function nodes) used to describe an Application. A "Configuration File" may be associated with each Application. Using a "Configuration File" activate a configuration is also known as "Custom Configuration".
Embedded Configuration	The Blú LT system software permits the user to select pre-established (embedded) configurations, which can be used as an alternative to the "Custom Configuration" when activating the system.
Channel	Independent executor of one of the Functions of the Blú LT System. The association between the Channel and Function is established by the "Configuration File" and is peculiar to each specific application. IT IS possible to view the list of Channels - Functions on the initial PROGRAMMING dashboard (see Part B2b chap. 2).
Cycle	Type of specific action amongst those available within the scope of each primary Function. Example: <ul style="list-style-type: none"> • In Process Measuring Function. These cycles include: the "IN PROCESS SINGLE CYCLE", the "IN PROCESS SIMULTANEOUS CYCLE", the "ACTIVE POSITIONAR CYCLE" and the "PASSIVE POSITIONAR CYCLE". • Acoustic Emission Monitoring Function. These cycles include the "GAP - CRASH CYCLE" and the "GAP - CRASH - SURVEY CYCLE". • Grinding Wheel Balancing Function. These cycles include the "SINGLE PLANE PRE-BALANCING CYCLE", the "DUAL PLANE PRE-BALANCING CYCLE", "AUTOMATIC SINGLE PLANE BALANCING CYCLE" and the "AUTOMATIC DUAL PLANE BALANCING CYCLE".
Dry area*	A protected zone that cannot be accessed by liquids. The inside of the machine tool electrical cabinet is a typical example of a Dry Area.
Function	A type of primary action that the Blú LT System is capable of performing. Examples <ul style="list-style-type: none"> • Mechanical part measurement during its working (In Process Gauging). • Mechanical part measurement after its working (Post Process Gauging). • Monitoring of Grinding Wheel <-> Part, or Grinding Wheel <-> Abrasive Dressing Wheel contact and grinding wheel balancing. Each application can manage multiple functions simultaneously, associating each of them with a Channel.
I/O list*	The list of digital Input and Output signals necessary for managing the Cycle within the Function it belongs to.
Function node	A device that performs basic activities for the Functions that the Blú LT System is able to perform. Those basic activities include conditioning signals arriving from sensors connected to the node, transmitting the values obtained from conditioning to the Master Unit, transmitting the internal Status to the Master Note and transmitting the status of the connected devices to the Sockets.
Master Unit	Main connection point. Controls all the operating phases of the Blú LT System. Directly manages connections to the CNC/PLC through a fieldbus. Acts as a Server towards devices that, having a Client profile, perform the man-machine (H.I.) connection.
Set Number	Numeric code with which the CNC/PLC can activate execution of a Cycle, applying to it a precise set of parameters from amongst those entered at the Parametrisation stage
Parametrisation	Definition of all the values necessary for setting up the hardware and software for the various Blú LT operating modes.
Plug*	Cable terminations that can be connected to a Node for various purposes (e.g.: coupling a Sensor, a Stator or an Auxiliary power supply unit). The Plugs have a mechanical key that prevents incorrect insertion in an electrically incompatible socket.
Rotor	A rotating element that, facing the Stator, allows connection to the Balancing Head to which it transfers power and from which it receives the signals of a piezoelectric transducer that may be built into it.

Table 1. Glossary of terms

Term	Definition
Sensor	A device consisting of an electro-mechanical unit, a cable and a flying connector (Plug). The electro-mechanical unit contains a transducer connected to a pre-conditioning electronic unit. Typical examples of Sensors are Unimar Heads, AE Fixed and Rotating Microphones, Accelerometers).
Socket*	A fixed connector present in the Nodes. Designed to allow "hard-wired" connection to peripheral devices of the Nodes (e.g.: Sensors, Stators, Auxiliary power supply units). The Socket have a mechanical key that prevents incorrect insertion of a Plug belonging to electrically incompatible devices.
Stator	A fixed element that, facing the Rotor, allows connection to the latter, supplying power to it, sending commands for movement of the motors of the Balancing Head and receiving the signals produced by any transducers contained in it.
Balancing Head	A device fixed to the Rotor and the grinding wheel which, by the movement of specially prepared weights, cancels out the imbalance of the grinding wheel. The Balancing Head may be equipped with various types of transducers (e.g.: piezoelectric for acoustic monitoring, weight position transducers).
Transducer	An apparatus or device for transduction (carrying) of energy, with or without converting it into a different form. The purpose of using transducers is to render the energy released by an event being monitored in an easily measurable form. In many cases, native signals generated in other forms are converted into electric signals. Examples of transducers include LVDT (inductive movement transducers), HBT ("bridge" movement transducers), Piezoelectric (high frequency acoustic vibration and acceleration transducers).
Wet area*	An unprotected zone that may be accessed by liquids. The machine tool working area is a typical example of a Wet Area.

*N.B.:

This term shall remain unchanged when this manual is translated into another language.

Note:

This image shows a blank sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

