DITTEL P6002UP MARPOSS

Installation, User and Programming Manual

Manual code No.:

D2DSP002GF

MARPOSS

P6002 UP PB / P6002A UP PB

MANUFACTURER	MARPOSS S.p.A.
ADDRESS	Via Saliceto, 13 - Bentivoglio (BO) Italy www.marposs.com
MODEL	P6002 UP line modules
COVERS DSCC SOFTWARE	Version 3.74 or later
COVERS MODULE SOFTWARE	Version 2.0
FUNCTION	Single or Two-Planes Pre-Balancing Module
MANUAL CODE	D2DSP002GF
ISSUE	03/2024
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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

This product conforms to the following directives: • 2014/30/EU EMC directive • 2011/65/UE RoHS & 2015/863/EU RoHS III The applicable standards are: • EN 61326 -1 (EMC) • EN 61010 - 1 (SAFETY) • EN IEC 63000 (RoHS)	This product conforms to the following UK regulations: • SI 2016/1091 The Electromagnetic Compatibility Regulations 2016 • SI 2012/3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 The applicable standards are: • EN 61326 -1 (EMC) • EN 61010 - 1 (SAFETY) • EN IEC 63000 (RoHS)

About the directive "**ROHS**" regulating the presence of certain hazardous substances in electrical and electronic equipment: http://www.marposs.com/compliance_detail.php/eng/rohs

For information about possible use in Marposs products of materials coming from conflict areas, refer to:
http://www.marposs.com/compliance_detail.php/eng/conflict_minerals

INFORMATION FOR USERS

European Directive 2006/66/EC and United Kingdom regulations UK SI 2009/890 and UK SI 2008/2164
DISPOSAL OF EXHAUSTED REMOVABLE CELLS/BATTERIES

The crossed out wheelie-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/EC and UK regulations SI 2009/890 and SI 2008/2164, therefore it must be separated 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 of the European Union and the United Kingdom (UK), collection and disposal must be carried out in compliance with the Standards in force or with other Laws of that Country regarding treatment of obsolete 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

pursuant to the European Directive 2012/19/EU and UK Regulation SI 2013/3113 regarding waste from electrical and electronic equipment (RAEE-WEEE).

The crossed out wheelie 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 WARNINGS

1.1 *Warnings for users*

This manual provides all the specific information necessary for knowledge and correct use of the Marposs P6002 UP line device in your possession. The buyer must ensure that all personnel assigned to install, operate and service the equipment read this manual. The information contained in this manual is intended for use by the following categories of personnel:

- Marposs personnel, or personnel assigned by the manufacturer of the machine tool that will house the P6002 UP line module (hereafter the “Customer”), who will be directly responsible for installing the equipment.
- Technical personnel employed by the end user (hereafter the “User”) who will be directly responsible for operating the Marposs equipment.
- Technical Personnel assigned by the User to carry out maintenance work on the production line where the P6002 UP line module is installed.

The manual is an integral part of the equipment, therefore the user must ensure that it is always available and is kept good condition throughout the working life of the equipment. The liability of Marposs is limited to correct use of the P6002 UP line module as defined in this manual and its attachments. Marposs shall provide the customer with a copy of this manual and its attachments. Preparations that are the responsibility of the Customer.

- Switch OFF the machine tool when installing or adjusting components of the Process Monitoring System. Be sure the machine spindle has come to a standstill before working on it. Secure the machine against unauthorized or accidental switching on.
- NEVER use the rev counter of the P6002 UP line module to check for standstill of the spindle! Even if the display shows “0” 1/min or the output at pin 24 of connector # 2 is 0 Volt, the actual speed may be between 0 and 72 rpm!
- Do not put any solid objects or liquids such as water into the unit. In case of an accident cut off the power supply.
- Using the unit with any object inside may cause fire or electric shock.
- Do not remove the cover. Refer servicing to qualified personnel only.
- Do not pull or bend the power cable and the signal cables. Replace damaged cables right away. Unused ports and connectors must remain covered with protecting ESD caps.
- Only personnel ordered and instructed by the management may operate the P6002 UP line module.

The customer shall:

- Correctly position the P6002 UP line module on its own machine and secure it.
- Make the electrical connections.
- Setup the P6002 UP line module.

The User shall:

- Program the P6002 UP line module
- Perform the routine and extraordinary maintenance operations.

The safety of any system that incorporates this device and its accessories is the sole responsibility of the system assembler.

1.2 *Testing and guarantee*

Materials are guaranteed against defects, with the following limitations:

- DURATION OF THE WARRANTY: the warranty covers the product and all repairs carried out on it during the standard guarantee period.
- SUBJECT OF THE WARRANTY: the warranty applies to the product or its parts marked with the serial number or other identification systems used by Marposs.

The above guarantee applies unless other agreements are reached between Marposs and the Customer.

1.3 *Requesting technical assistance and maintenance*

In case of failures or faults that require the intervention of Marposs personnel contact your local technical support centre (for a complete list, go to: http://www.marposs.com/worldwide_addresses.php/eng).

1.4 *How to order spare parts*

To order spare parts contact your closest Marposs centre (see: http://www.marposs.com/worldwide_addresses.php/eng).

1.5 *Original version*

This document was originally written in Italian. In case of any dispute arising from translation errors and inaccuracies, even where carried out by Marposs, the definitive version shall be in Italian.

1.6 *Authorised and unauthorised use*

1.6.1 *Intended use*

- Use the P6002 UP line module exclusively to pre-balance rotors using balancing weights or masses.
- Operate the Module in industrial environment only.
- The device is suitable for indoor use only.
- Do not operate the device in explosive areas. Operation of the P6002 UP line module in such an environment means an essential endangering of safety.
- The device is not a safety component in accordance with the EU machine directive.
- The monitoring criteria of the rotor to be balanced, the “Filtered Unbalance Signal” (equivalent to numeric display, display of coordinates and signal at connector # 2, pin 22 and 23 and PROFIBUS signal at connector # 13), may be used exclusively at a speed range between 450 RPM and 30,000 RPM
- The settling time of the “Filtered Unbalance Signal” can take up to 15 seconds, when the speed changes between 0 RPM and 30,000 RPM. When the speed changes between 0 RPM and 6,000 RPM the settling time can take up to 8 seconds.
- Unauthorized modifications and changes of the system are forbidden. When replacing defective parts use only original spare parts or standard parts recommended by the manufacturer.

1.6.2 *Unauthorised uses*

Under no circumstance may the P6002 UP line module be used for any purpose other than that for which it was designed.
Any use that differs from the use described in this manual shall be considered unauthorised.
The following are also prohibited:

1. Modification of the original P6002 UP line module configuration;
2. Connection of the P6002 UP line module to power supplies other than those described in this manual;
3. Use the components for purposes not envisaged by Marposs;
4. Allow unauthorised personnel to carry out maintenance work on the system;
5. Removal of safety indications and warnings displayed on the equipment.

All modifications or maintenance operations not covered by the technical documentation shall be considered arbitrary.
Marposs declines any responsibility for non-compliance with this requirement.

1.7 *Identification Labels and Pictograms*

Various different text formats were used when preparing this manual. Various safety warnings have been defined.

1.7.1 *Symbols used in the manual*

ATTENTION / WARNING
This type of note indicates a risk of damage to the electronic unit or other devices connected to it, or risk conditions for the operator or technician.

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.

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

CAUTION
Observe the procedures for handling devices that are sensitive to electro-static discharges. Failure to comply may cause malfunctions or damage the equipment.
For the P6002 UP line module, this symbol is on the packaging of the I/O BOX (“3.6 Removing the P6002 UP line module from its packaging” on page 16)

ELECTRIC SHOCK HAZARD
Dangerous voltages: There may be electric shock hazards when troubleshooting on live components.

GENERIC HAZARD
Warning sign that indicates the possibility of damage to things or a generic risk to people.

1.7.2 *Symbols present on the equipment*

Below there is a list of the pictograms on the device and referred to in the manual:

CAUTION
Observe the procedures for handling devices that are sensitive to electro-static discharges. Failure to comply may cause malfunctions or damage the equipment.
For the P6002 UP line, this symbol is on the packaging of the I/O BOX (“3.6 Removing the P6002 UP line module from its packaging” on page 16)

ELECTRIC SHOCK HAZARD
Dangerous voltages: There may be electric shock hazards when troubleshooting on live components.

GENERIC HAZARD
Warning sign that indicates the possibility of damage to things or a generic risk to people.

1.7.3 *Plates/markings on the P6002 UP line modules and components*

The identification plate is positioned on the side part of the **P6002 UP** line device. The following information appears on the plate:

- The Marposs product identification CODE.
- The SERIAL N. of the individual **P6002 UP** line device.
- The CE mark.
- The UKCA mark.
- The MARPOSS Logo.
- The MADE IN ITALY mark.
- The MARPOSS QR code.

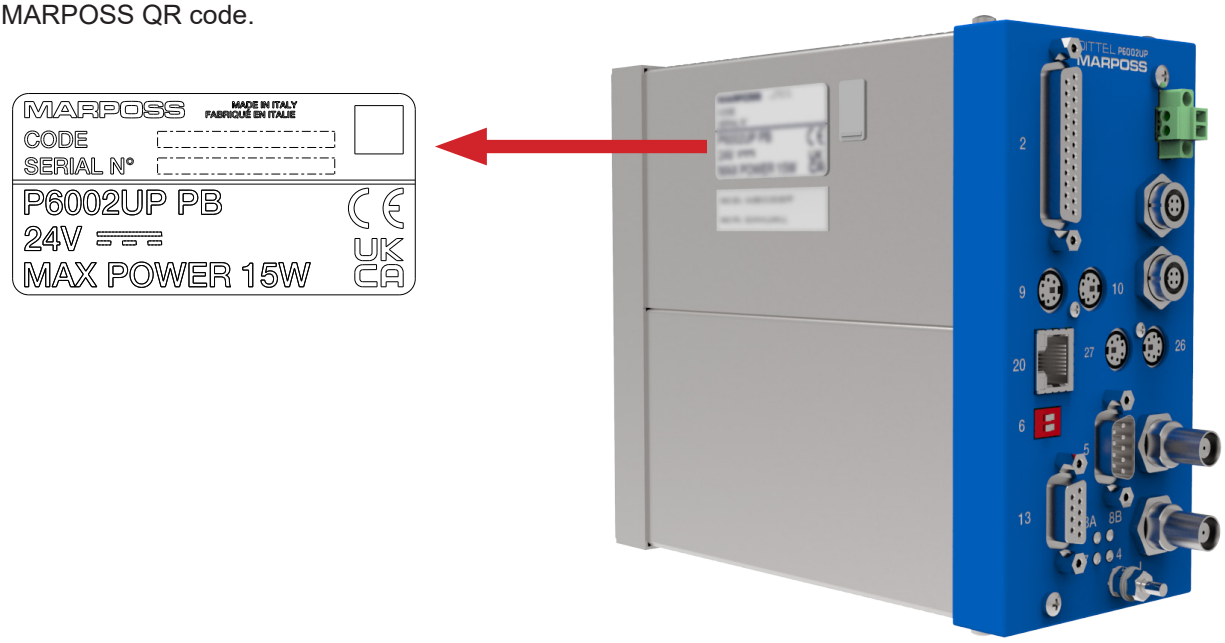


Fig.1. Examples of P6002 UP line module. Position of data plates

N.B.
All the data listed on the plate must always be legible.
If a data plate is damaged or even partially illegible due to wear, ask MARPOSS for another one, quoting the data in these instructions or on the original data plate.

2 SAFETY DEVICES

2.1 General safety information

2.1.1 Reference directives

The P6002 UP line has been designed and manufactured in accordance with the directives indicated on pages 2 and 3 of this manual.
The P6002 UP line module must be managed by a machine tool used to machine mechanical parts, in compliance with the applicable safety standards for machinery equipment in the user's country.

2.1.2 Product conformity

The safety warnings are intended to prevent injuries to personnel and damage to both the P6002 UP line module and the environment in which it is used. All operators are expected read the safety warnings, and respect them at all times.
The P6002 UP line module is a state-of-the-art device that guarantees a high level of safety, provided all the appropriate safety measures are implemented during daily use.
The End User's responsibilities include defining such measures, and ensuring that they are implemented. Failure to observe the following instructions may result in serious injury as an indirect consequence of improper usage of the device. Device safety may only be guaranteed if the following instructions are adhered to.

WARNING
Any modification that alters the P6002 UP line design and/or build specifications may only be implemented by Marposs, who shall be responsible for certifying compliance with the safety standards.
Therefore the modifications or maintenance interventions not set out in this document shall be considered unauthorised.
Marposs declines all responsibility in case of any non-compliance with the above.

2.2 P6002 UP line module User Categories and Duties

Installation technician: person qualified to install the P6002 UP line system inside the machine.
Duties:
1. lift, transport and store the P6002 UP line;
2. assemble and program the P6002 UP line module;
3. remove the P6002 UP line module.

Maintenance technician: person who is trained and qualified to carry out routine and extraordinary maintenance work on the P6002 UP line module.
Duties:
1. routine maintenance;
2. extraordinary maintenance;
3. Notify Marposs customer service personnel of unexpected situations (e.g. wear, failures, breakages, errors, etc.) not set out in this document and therefore generated by unforeseen causes.

Operator: person assigned to activate the measurement acquisition cycle and monitor the correct operation of the P6002 UP line module.
Duties:
1. Monitor the process
2. Modify the programmed parameters via the control panel, when necessary.

The operator is not required to intervene in any way while the P6002 UP line module is operating.

2.2.1 Physical and mental health of the operator/installation personnel

The operator assigned to install the P6002 UP line module must be aware of the dangers that may be created while installing machining equipment, and be capable of dealing with them.

2.3 *Training*

THE FINAL MACHINE DOCUMENTATION MUST BE READ
The training of operators assigned to normal operation must follow the instructions set out in the documentation of the final machine that the P6002 UP line module is installed in, as this documentation cannot be exhaustive.

Personnel included in the following categories are obliged to read the manual supplied with the equipment.

Installation technicians personnel assigned to transport, store and install the gauge, in order to:
- Ensure they are aware of the appropriate lifting and transport methods used for the parts of the P6002 UP line module, as stipulated by Marposs, in order to prevent the risks associated with moving loads;
- Ensure they are aware of the correct storage procedures for the parts of the P6002 UP line module in order to avoid damaging important parts, not only in terms of safety but also from an operational point of view;
- Ensure they are aware of the correct P6002 UP line module installation procedures, such as wiring the electrical parts, in order to prevent assembly errors that could lead to dangerous situations for the health and safety of the operators.

Operators assigned to supervise normal operation of the equipment, in order to:
- Ensure they adhere to the applicable regulations governing use of the equipment, and that they read and following the instructions and other information provided in the attached documentation.

P6002 UP line maintenance technicians, in order to:
- Ensure they are aware of the correct procedures for carrying out scheduled and unscheduled maintenances activities on the P6002 UP line module.

2.4 *Electrical Dangers*

Every effort has been made to adopt all the necessary safety and protection measures during the design phase, however some electrical dangers remain. These risks are listed below.

ELECTRICAL PARTS
The system is energized by an electrical power supply. Personnel may be exposed to the risk of electric shocks in the event of electrical faults or when working on electrical parts. Ensure that all electrical work is carried out exclusively by qualified personnel.
Display the appropriate warning signs. After deactivating the machine, and before starting working on its electrical parts, make sure that the control panel or system controls are not connected to the electrical power supply.

Moreover, it is important to remember that:
Incorrect actions by the operator can cause residual risks.
The risks and dangers generated by:
- Operator carelessness,
- Failure to comply with the information and instructions contained in these operating instructions,
- Deliberate tampering with the P6002 UP line modules or its safety devices.

Any modification that alters the P6002 UP line module build specifications, whether mechanical or electrical, can only be performed by Marposs, which will certify compliance with the safety standards. Any modification or maintenance not indicated in this document shall be considered unauthorised.
Marposs declines all responsibility in case of any non-compliance with the above.

3 TRANSPORTATION. STORAGE

3.1 Personal protection equipment (PPE)

The operators assigned to transportation, storage and installation of the P6002 UP line module must obtain and use the PPE indicated in this manual, as well as the mandatory PPE for the environment in which the P6002 UP line module is used.

3.2 Training

The operators assigned to transportation, storage and installation of the P6002 UP line module must be trained and informed as required by the applicable directives in the relative countries.

3.3 State of tools and equipment

The operators must use the equipment listed in the corresponding paragraphs when carrying out transportation, storage and installation operations.
It is important to ensure that the equipment and tools are in good condition and that they are not worn, excessively aged or fatigued in any way.
The tools must be selected in accordance with the applicable laws and regulations governing working tools and must be used in accordance with the manufacturers' instructions.

3.4 Taking delivery of the material

During packing, all the P6002 UP line module technical material is thoroughly checked in order to ensure that no damaged material is shipped.
When unpacking the material, check that the P6002 UP line module is in perfect condition and not damaged in any way.
Notify Marposs immediately if it is damaged.

3.5 Packaging, handling, transport

3.5.1 Packaging

The P6002 UP line module is protected with carton and an internal insert for handling and transportation.

3.5.2 Handling the package

No specific equipment is required for handling the package.

3.5.3 Transporting the package

The package containing the P6002 UP line module must be transported on covered transport vehicles so that it and the P6002 UP line module are not exposed to the weather.

3.5.4 Disposing of packaging materials

The packaging used for the P6002 UP line module consists of materials that can 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
- Polyurethane film: internal insert.

ENVIRONMENTAL HAZARD
The polyurethane film is NOT biodegradable. It must NOT be disposed of in the surrounding environment: recycle and/or dispose of materials in accordance with local regulations.

3.6 *Removing the P6002 UP line module from its packaging*

Marposs has not indicated special devices for removing the P6002 UP line module from the packaging.

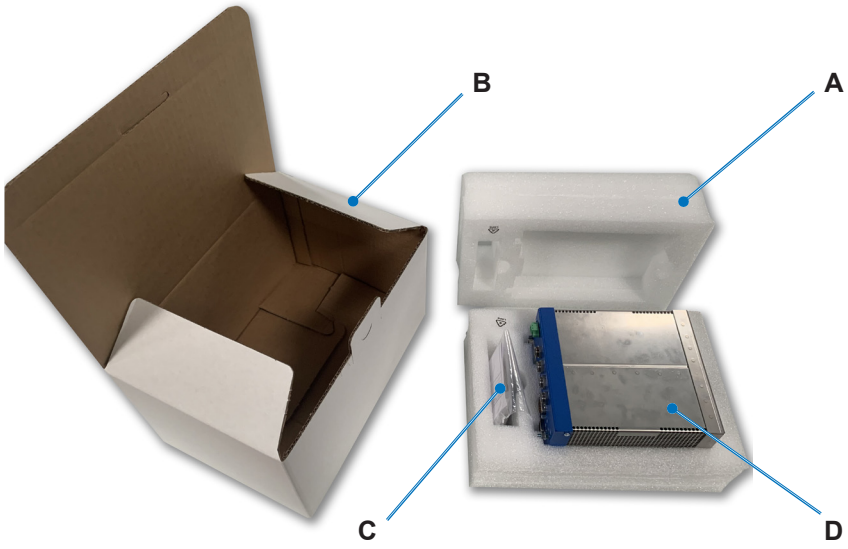


Fig.2. P6002 UP line module system packaging

- Remove the P6002 UP packaging (A) from the box (B)
- Remove from the packaging the CDs (C) containing the manuals (to be kept)
- Finally, remove the connector and the P6002 UP line module (D) from the packaging.

4 ENVIRONMENTAL CONDITIONS

The mechanical and electronic components installed in the P6002 UP line module have been selected for their reliability and durability. The components meet the manufacturing safety requirements in force and have been designed to withstand temperatures from -20 °C to +70 °C (from -4 °F to 158 °F) during transport and storage.

4.1 *P6002 UP line module Storage Environment*

The P6002 UP line module must be stored in a covered area where dust and humidity levels are kept to a minimum.
The warehouse storage shelf must be level and smooth.
Do not rest other materials, even light items, on top of the P6002 UP line module package or the P6002 UP line module itself, as this may damage it.

4.2 *P6002 UP line module Working Environment*

When installing the unit, the operator must check that the final machine has been designed and built to operate in the environmental conditions set out below.

TYPE OF ENVIRONMENT:

The P6002 UP line module and the relative electrical components have been designed and built to be installed in a heavy industrial environment, and to be used only in closed environments where they are protected from the weather. Do not use the equipment in residential or light industrial environments.
Atmosphere must be free of conductive substances, corrosive gases, vapours, oily mist, and dripping water. In addition, avoid salty air, as well as localities where condensation can appear by temperature variation.
The P6002 UP line module is intended to be installed in control cubicles. Mounting hardware is available for installation on vertical surfaces, either a mounting panel or a clamping device for DIN mounting rails.
Unless otherwise specified in the contract, the P6002 UP line module can only operate regularly in the environmental conditions set out below. Environmental conditions other than those described may damage the machine or cause it to malfunction, giving rise to potential hazardous situations for the operator and exposed personnel.

AMBIENT AIR TEMPERATURE

The P6002 UP line module components will operate correctly at temperatures: +0 ÷ +50 °C (32 to 122 °F). No direct sunlight.

OPERATING RELATIVE HUMIDITY

Relative humidity when in use: 20% ÷ 80%.

ENVIRONMENTAL POLLUTION GRADE

Grade 2

ALTITUDE

The electrical components are designed to operate correctly: 0 ÷ 2,000 m / 0 ÷ 6,600 ft.

POLLUTANTS

The electrical components are adequately protected against the infiltration of solid bodies when using the P6002 UP line module for the intended purposes and in the specified operating environment.
Unless otherwise stated in the contract, the electrical components DO NOT have specific protections against contaminating agents such as dust, liquids, acids, corrosive gases, salt, etc.
If it is necessary to use the electrical components and the complete equipment in environments subject to such contaminating agents contact Marposs immediately. Marposs will check the suitability of the assembly based on the environments they are used in.

“NORMAL” ENVIRONMENTAL LIGHTING

The installation procedure must be carried out under “normal” lighting conditions, i.e. without dazzling the operators with too much light or causing them to strain their eyes in insufficient lighting.
The personnel responsible for installing the P6002 UP line module must comply with the minimum requirements set out by the applicable laws in the respective countries in terms of natural and artificial lighting of the premises.
If there is poor lighting in the workplace the operator must use portable lighting equipment.

5 GENERAL DESCRIPTION OF THE SYSTEM

The P6002 UP line has been designed and built as an a state-of-the-art Single- or Two-Plane Pre-Balancing Module developed and produced according to recognised safety directives, rules, standards, and regulations.
The Standard ISO 1925 defines Single-Plane Balancing (static balancing) as follows: "**Procedure by which the mass distribution of a rigid rotor is adjusted to ensure, that the residual resultant unbalance is within specified limits**". Normally, single-plane balancing is required and sufficient at disc shaped rotors provided that the rotor is placed exactly vertical on the spindle axis. Typical rotors, which are often and particularly singleplane balanced in situ, are grinding wheels, blowers, ventilators, chucks, pulleys, or flywheels.
The Standard ISO 1925 defines Two-Plane Balancing (dynamic balancing) as follows: "**Procedure by which the mass distribution of a rigid rotor is corrected by compensation in two planes to make sure that the residual dynamic unbalance is within specified limits**". Normally, Two-Plane Balancing is required at longish rotors. A good rule-of-thumb is the rotor's width-to-diameter ratio. Above 1000 rpm and a ratio more than 0.5 Two-Plane Balancing should be used. A typical example is two grinding wheels on one spindle.
Unbalance is the most frequent cause of inadmissible machine vibrations to machine tools during operation and therefore causes damage to workpieces, bearings, foundations and the grinding wheels. Due to regular raise in cutting speed and resulting increase of grinding wheel speed, balancing plays an important role. The industry tries to miniaturise the spindles to keep the rotating masses small.
At disk shaped rotors the part of the dynamic unbalance can usually be neglected, static balancing is sufficient (refer to "Single-Plane Pre-Balancing"). All other rotors have to be balanced preferably dynamically (Two-Plane Pre-Balancing). During pre-balancing the unbalance is compensated in one or two planes either by two equal fixed balancing weights which can be positioned and clamped at any specific angle on the wheel holder or by two or three correction masses (e.g. differently heavy screws) which are placed on equidistant fixed locations. The rotor (e.g. a grinding wheel) is balanced in its own bearings and support structure, no extra balancing machine is required. Single- or Two-Plane Pre-Balancing when using our DSCC Software is achieved at a minimal number of test-runs in shortest time. All necessary rotor data are stored in a non-volatile memory and are ready on hand when Re-Balancing.
Error messages are displayed for example, when the balancing speed is not correct, if an unacceptable change in speed occur, when unsuitable balancing weights are used or an insufficient Acceleration Sensor signal appears.
All the data, which guide you through the Setup and Re-Balancing process, are displayed graphically and digitally in one of the standard languages selectable from the menu: German, English, French, Italian, Czech, Spanish, Portuguese, Hungarian, Rumanian, Turkish, and Swedish. Other languages are available upon request.
All settings, display and operation of the P6002 UP line module are exclusively carried out on a PC integrated Automation System for machine tools or a standard PC based on Microsoft Windows®. Predefined, individual adjustable user levels are provided like Service / Administrator / Expert / Operator / Observer. The display window can be specified individually as well with regard to graphic representation, or window width.
By additional Pre-Balancing modules, it is possible to supervise many machine spindles at the same time; complicated switching-over is dropped. Carried out just as simple is the extension for process monitoring by one or more Acoustic Emission (AE) module(s) AE6000 UP. The total number of all modules and control units (PC, Automation System) is restricted to 15.
A serial and parallel interface as well as a PROFIBUS interface are available. An overview can be found in the following table.

Variants	RS232	ETHERNET	PROFIBUS	PROFINET	Hardwire interface
P6002 UP PB 830L840002	X	X	X		X
P6002A UP PB 830L840004	X	X	X		X

P6002 UP PB / P6002A UP PB

Fig.3. P6002 UP variants

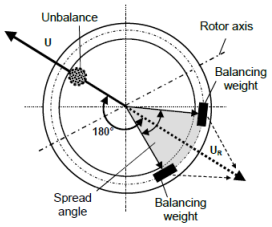
5.1 *Necessary components to pre-balance a machine spindle or rotor in one or two planes*

A complete Balancing System to pre-balance machine tool spindles or rotors in one or two planes consists of the following components:

- A P6002 UP line module for Single- or Two-Plane Pre-Balancing,
- An Automation System or a standard PC based on Windows®, and corresponding hardware,
- A DSCC Software,
- Two acceleration sensors like BA 320D / BA 1020D for fixed mounting or two acceleration sensors like BA 320M / BA 1020M with magnetic base,
- An active acceleration sensor with stud for fixed mounting or with magnetic base (additional A/N O20L0001002 or similar) (for P6002A UP module),
- One or twoSpeed Sensors M8×1 or M12×1,
- Connection and extension cables, as required.

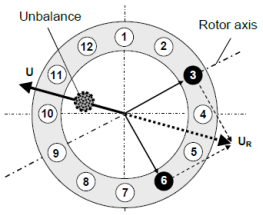
Angular Method

The rotor to be balanced is fitted with one or two wheel clamping flanges and two equal fixed mass correction weights each, which can be positioned and clamped at any specific angle on the wheel clamping flange (see e.g. DIN 6375 / ISO 666).
On each wheel clamping flange an angle scale must be provided for location of the weights relative to some zero point (0°-360° scale) or a suitable protractor used (mark the 0-point at the wheel holderpermanently).



Fixed Position Method

The rotor to be balanced is fitted with one or two wheel clamping flanges or tool holders with equidistant tapped holes at the rotor. The tapped holes must be numbered permanently.
A set of suitable balancing screws, either commercially available or by weighing suitable screws.



Defined balancing screws in the calculated positions 3 + 6

5.2 *Example: Single Plane Pre-Balancing using P6002 UP line modules*

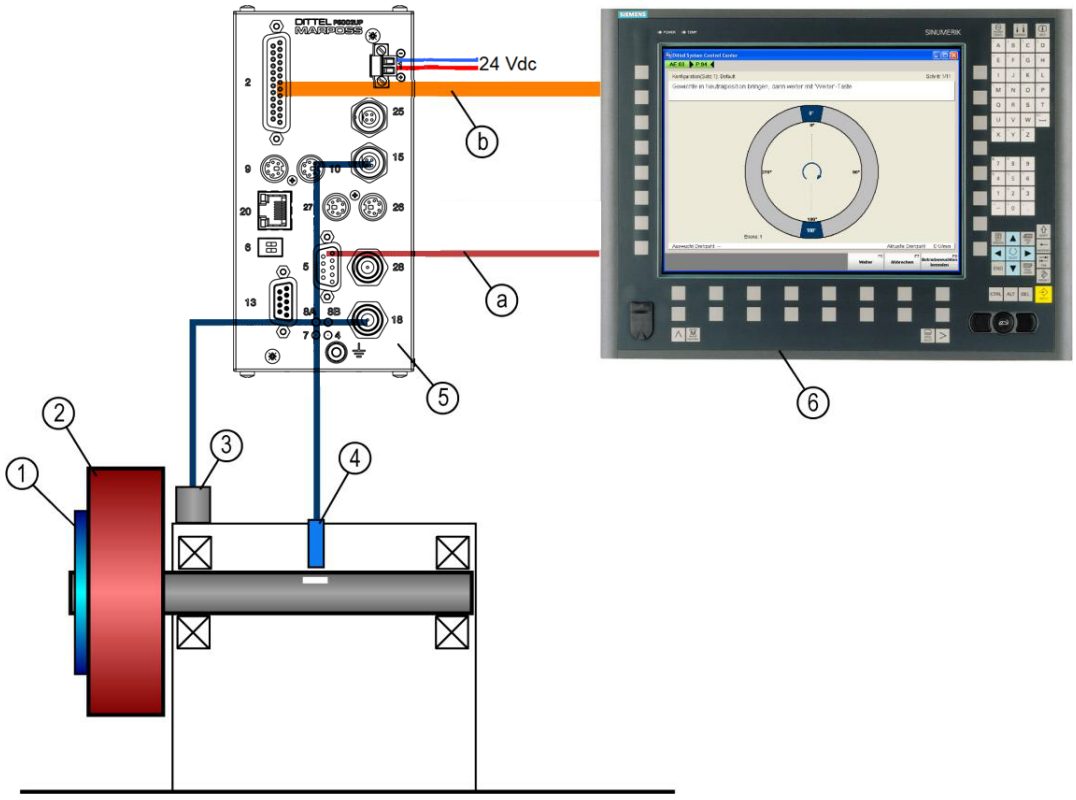


Fig.4. Example of Single Plane Pre-Balancing using P6002 UP line modules

1	Wheel holder with a circular groove and two moveable balancing weights; or wheel holder with equidistant tapped holes to carry the correction masses (e.g. balancing screws).
2	Rotor, e.g. a grinding wheel
3	An acceleration sensor (only active acceleration sensor in case of P6002A UP module), Input # 18
4	Speed Sensor (Proximity Switch) with one mark on the spindle to determine speed, RPM Input # 15
5	P6002 UP line module.
6	Automation System, e.g. SINUMERIK®
a	Serial interface cable (RS-232)
b	Static interface (hardwire) cable to connector # 2 or PROFIBUS connection to connector # 13

5.3 *Example: 2x Single-Plane Pre-Balancing using P6002 UP line modules (Alternate pre-balancing of rotor A or rotor B)*

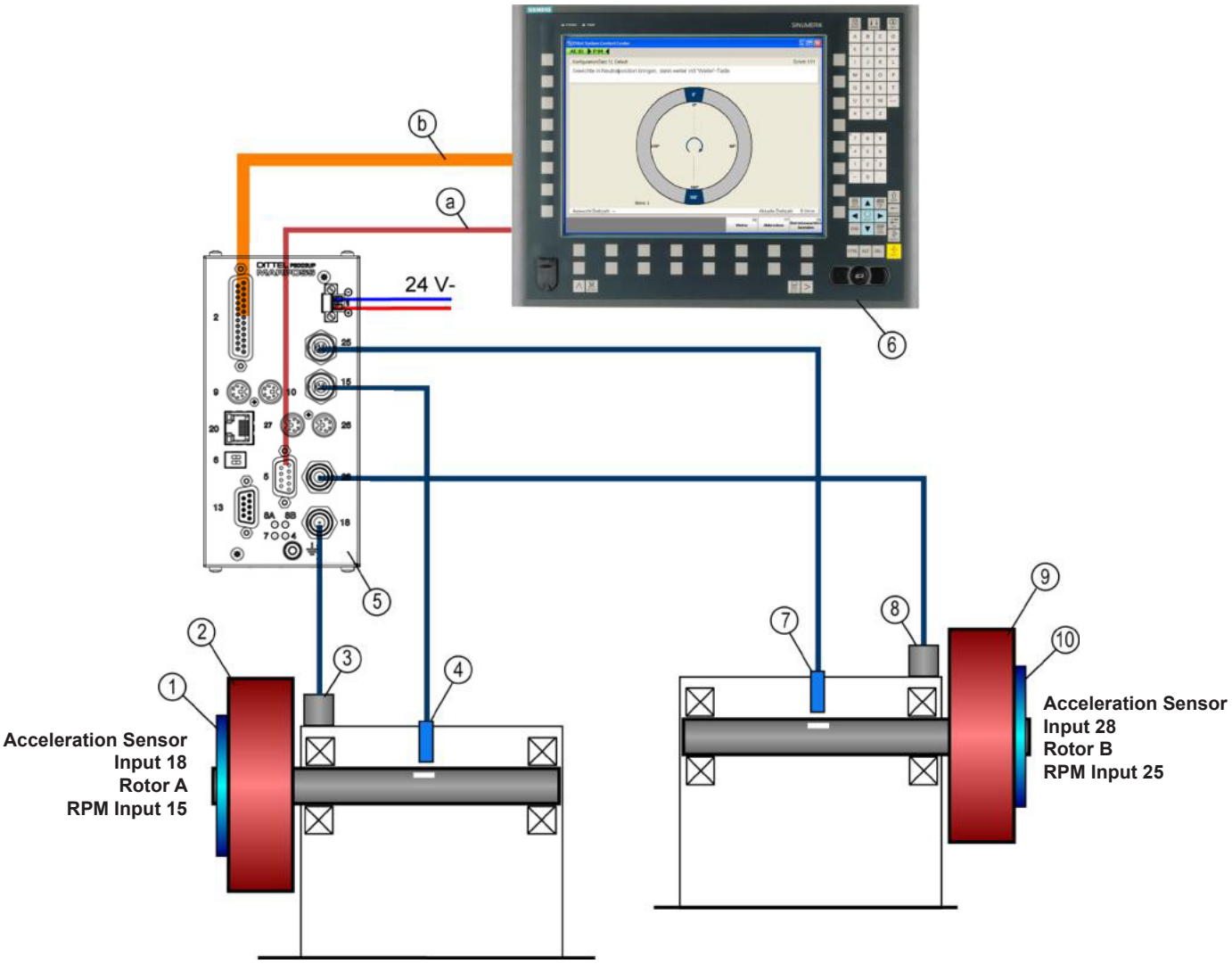


Fig.5. Example of 2x Single-Plane Pre-Balancing using P6002 UP line modules

1	Wheel holder with a circular groove and two moveable balancing weights, or wheel holder with equidistant tapped holes to carry the correction masses (e.g. balancing screws)
2	Rotor A, e.g. a grinding wheel
3	An acceleration sensor (only active acceleration sensor in case of P6002A UP module), Input # 18
4	Speed Sensor (Proximity Switch) with one mark on the rotor to determine speed. RPM Input # 15
5	P6002A UP line module
6	Automation System, e.g. SINUMERIK®
7	Speed Sensor (Proximity Switch), with one mark on the spindle to determine speed, RPM Input 25
8	An acceleration sensor (only active acceleration sensor in case of P6002A UP module), Input # 28
9	Rotor B, e.g. a grinding wheel
10	Wheel holder with a circular groove and two moveable balancing weights, or wheel holder with equidistant tapped holes to carry the correction masses (e.g. balancing screws)
a	Serial interface cable (RS-232)
b	Static interface (hardwire) cable to connector # 2 or PROFIBUS connection to connector # 13

5.4 *Example: Two-Plane Pre-Balancing using P6002 UP line modules*

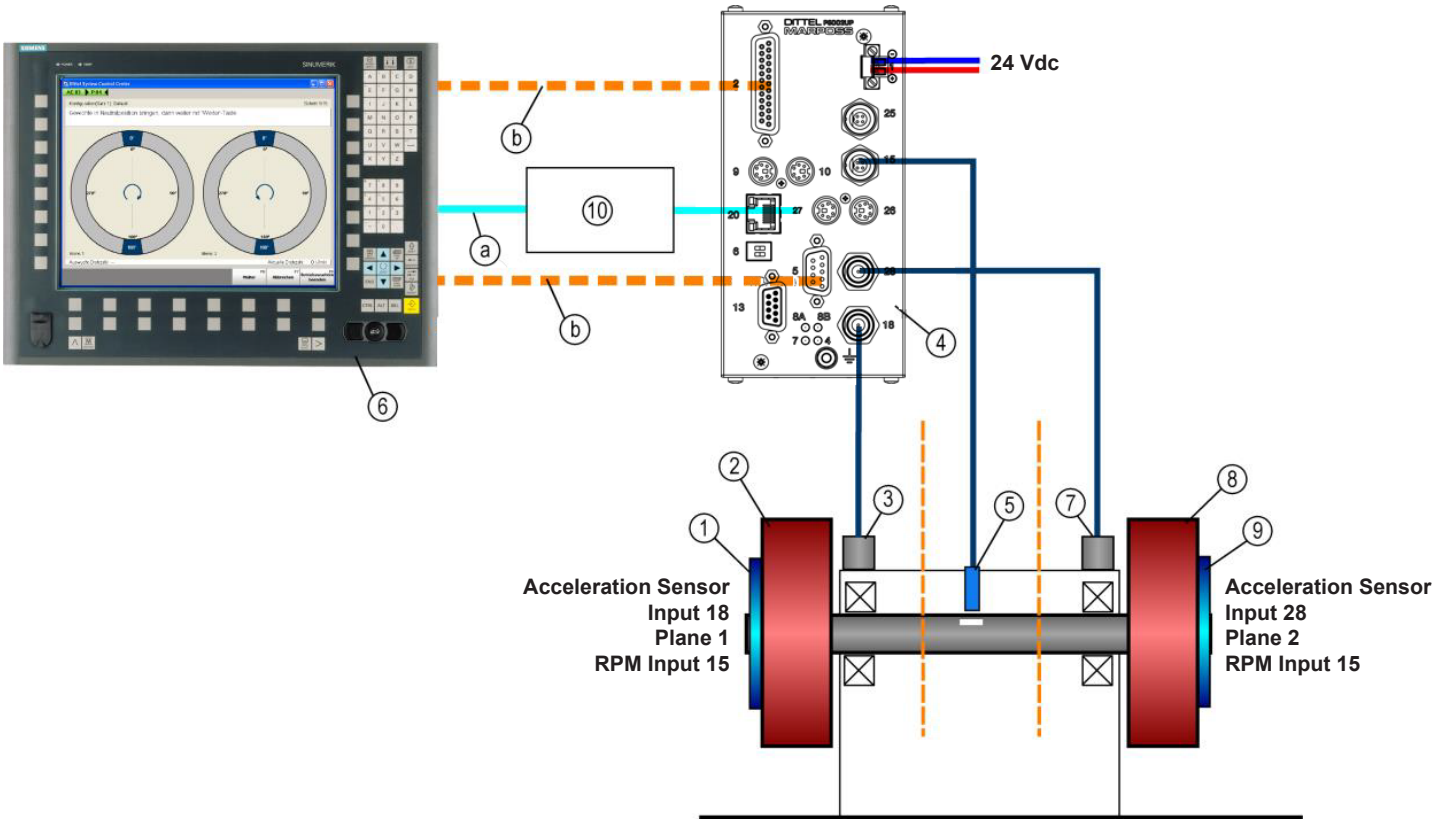


Fig.6. Example of Two-Plane Pre-Balancing using P6002 UP line modules

1	Wheel holder with a circular groove and two moveable balancing weights, or wheel holder with equidistant tapped holes to carry the correction masses (e.g. balancing screws)
2	Rotor, e.g. a grinding wheel
3	An acceleration sensor (only active acceleration sensor in case of P6002A UP module), Input # 18
4	P6002A UP line module
5	Shared Speed Sensor (Proximity Switch) with one mark on the rotor to determine speed. RPM Input # 15
6	Automation System, e.g. SINUMERIK®
7	An acceleration sensor (only active acceleration sensor in case of P6002A UP module), Input 28
8	Rotor, e.g. a grinding wheel
9	Wheel holder with a circular groove and two moveable balancing weights, or wheel holder with equidistant tapped holes to carry the correction masses (e.g. balancing screws).
10	Ethernet Switch or Hub
a	Ethernet connection (Patch cord)
b	Static interface (hardwire) cable to connector # 2 or PROFIBUS connection to connector # 13

5.4.1 *Connection of different DS6000 UP Modules*

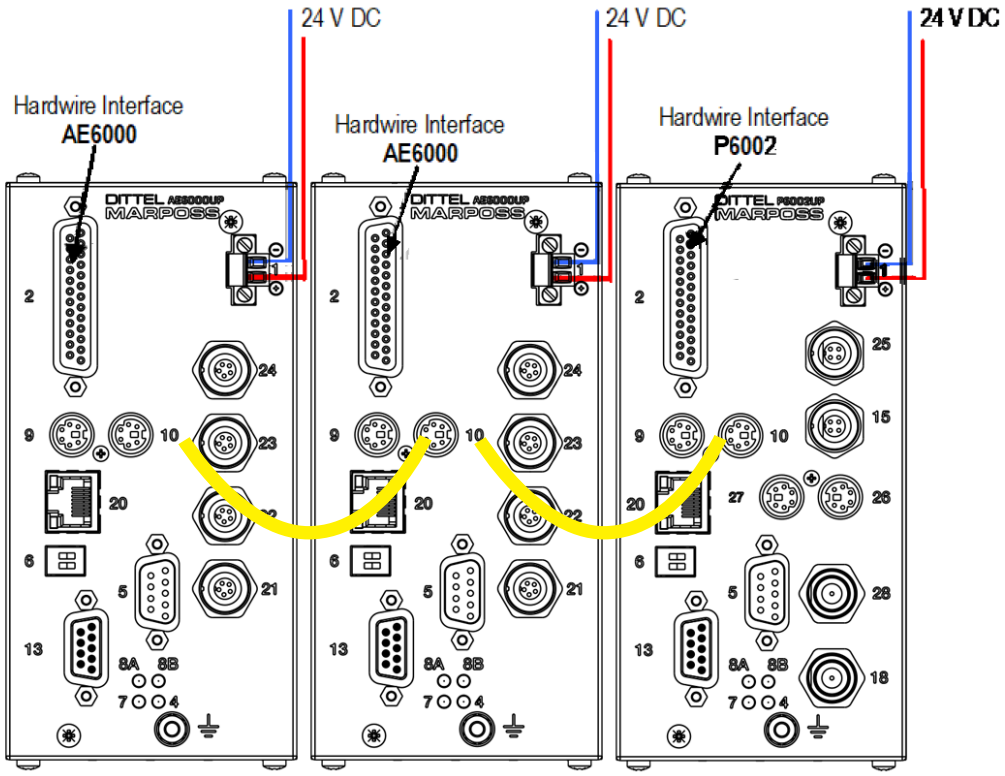


Fig.7. Example of a monitoring of connection of different DS6000 UP Modules

5.5 *Overall dimensions*

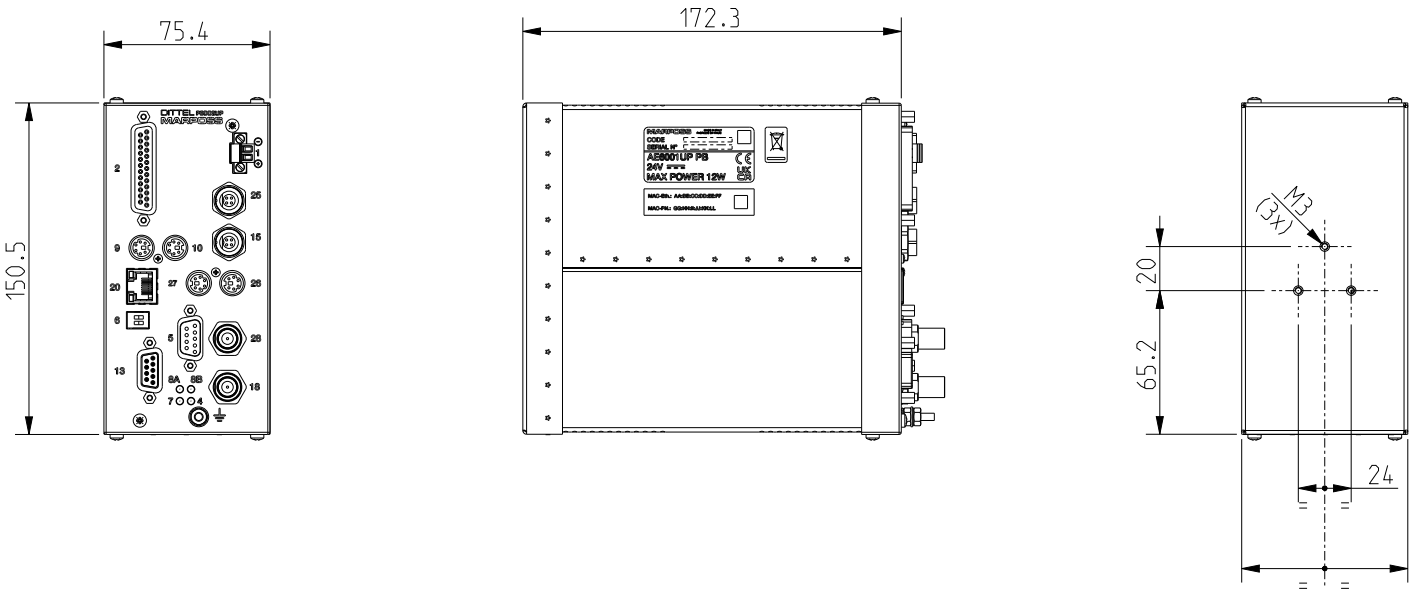


Fig.8. P6002 UP line module dimensions

5.6 *Technical Specifications*

Supply, nominal Range	Direct current ⎓ 24 Vdc ± 6 Vdc, ripple ≤ 5% (DIN 19 240),SELV type	
Power Consumption	ca. 13 Watts	
Internal Fuse	2.5 Amps, resettable fuse (Poly Switch RUE 250)	
External Fuse	4 Amps, time-lag, IEC 60127 type, (T4A)	
Environmental Temperature	0 °C … +50 °C (32 °F … 122 °F)	
Pollution Degree 2	Do not use in environment with conducting pollutants	
Altitude	0 - 2,000 m (0 - 6,562 ft.)	
Relative Humidity	20% - 80%, without Condensation	
Safety Class	IP 20	
In-/Outputs	24 Vdc, according EN 60950 SELV Hardwire Interface Serial Interface RS-232 Ethernet Interface Serial Interface RS-422 PROFIBUS Interface Input Speed Sensor Input RS-422 Rotary Encoder Input Acceleration Sensor Chassis Ground	# 1 # 2 # 5 # 20 # 9 and # 10 # 13 # 15 / # 25 # 26 / # 27 # 18 / # 28 Stud and Hex Nut M4
Displayed Unbalance Range	0 µm/s to 1000 µm/s; the unbalance display is only true with a Acceleration Sensor having a sensitivity of 1000 pC/g and an Acceleration Sensor Adaptation setting of :1.	
Displayed Speed Range	72 rpm to 30,000 rpm	
Speed Range while Pre-Balancing	450 rpm to 30,000 rpm	
Hardwire Interface Connector # 2		
All digital Inputs	Input Signal LOW Input Signal HIGH Input Current	-30 Vdc … +3 Vdc +13 Vdc… +30 Vdc typical 5.5 mA at 24 Vdc
Digital Outputs, pin 2 to 5, 8 and 11	Output Current Recommended Load Power Dissipation of Switching Transistor	10 mA 2k2 … 4k7 at 24 Vdc **Drive inductive load with clamping diode only!** maximum 75 mWatts
Digital Outputs, pin 6 and 7	Output Current Total of Output Currents Voltage Drop at Output Output Leak Current Recommended Load	maximum 500 mA, short-circuit and overload proof maximum 2 Amps maximum I_{Load} × 0.4 ohm maximum 10 µA 2k2 … 4k7 at 24 Vdc
Analog Output 22	“Filtered Unbalance Signal” , Acceleration Sensor Input 18: 500 rpm to 30,000 rpm 0 … 1,000 µm/s correspond to 0 … 10 Vdc / -5%	
Analog Output 23	“Filtered Unbalance Signal” , Acceleration Sensor Input 28: 500 rpm to 30,000 rpm 0 … 1,000 µm/s correspond to 0 … 10 Vdc / -5%	
Analog Output 24	“Speed Signal” 72 … 10,000/ 20,000/ 30,000 rpm (adjustable) correspond to 0 … 10 Vdc Scaling of Speed Sensor signal coming either from rotor, rotor A or plane 1+2. Depends on setting in actual Set Number.	

Serial Interface, Connector # 5	
	RS-232-C Interface Hardware-handshake RTS/CTS, 8 Data bits, Baud Rate adjustable via DSCC Software to 19,200, 38,400 or **57,600 Baud**, 1 Stop bit, no Parity.
PROFIBUS interface, Connector # 13	
	Standard DB-9 Connector, female All input and output signals managed through Hardwire Interface of standard DB-25 Connector # 2 can be driven even through PROFIBUS/PROFINET interface.
Ethernet interface, Connector # 20	
	RJ45 Port, Ethernet 10BASE-T or 100BASE-TX (Auto-Sensing) LED indicators Network connected (lights green) and Data transfer (flashes yellow)
Maximum number of modules on a machine control unit (computer, automation system)	15
Accessory supplied	CD-ROM or DVD containing DSCC Software and Installation Manuals (1) 24 Vdc Cable Plug (1), Standard DB-25 Connector, male, with shell (1)
Module Weight	ca. 1.3 kg (2.9 lbs.) without mounting hardware
Dimensions	Mounting Panel width 79 mm, height 186 mm, Front Panel width 75.4 mm height 150.5 mm Depth 180 mm including Mounting Panel to leading edge of Front Panel

6 INSTALLATION

The P6002 UP line module is intended to be installed in control cubicles. Mounting hardware is available for installation on vertical surfaces, either a mounting panel (Mounting Set 6000-rear panel, article number O10L0001001) or a clamping device for DIN mounting rails (Mounting Set 6000-clamping device, article number O20L0001001).

6.1 *Mounting on vertical surface or on DIN guide*

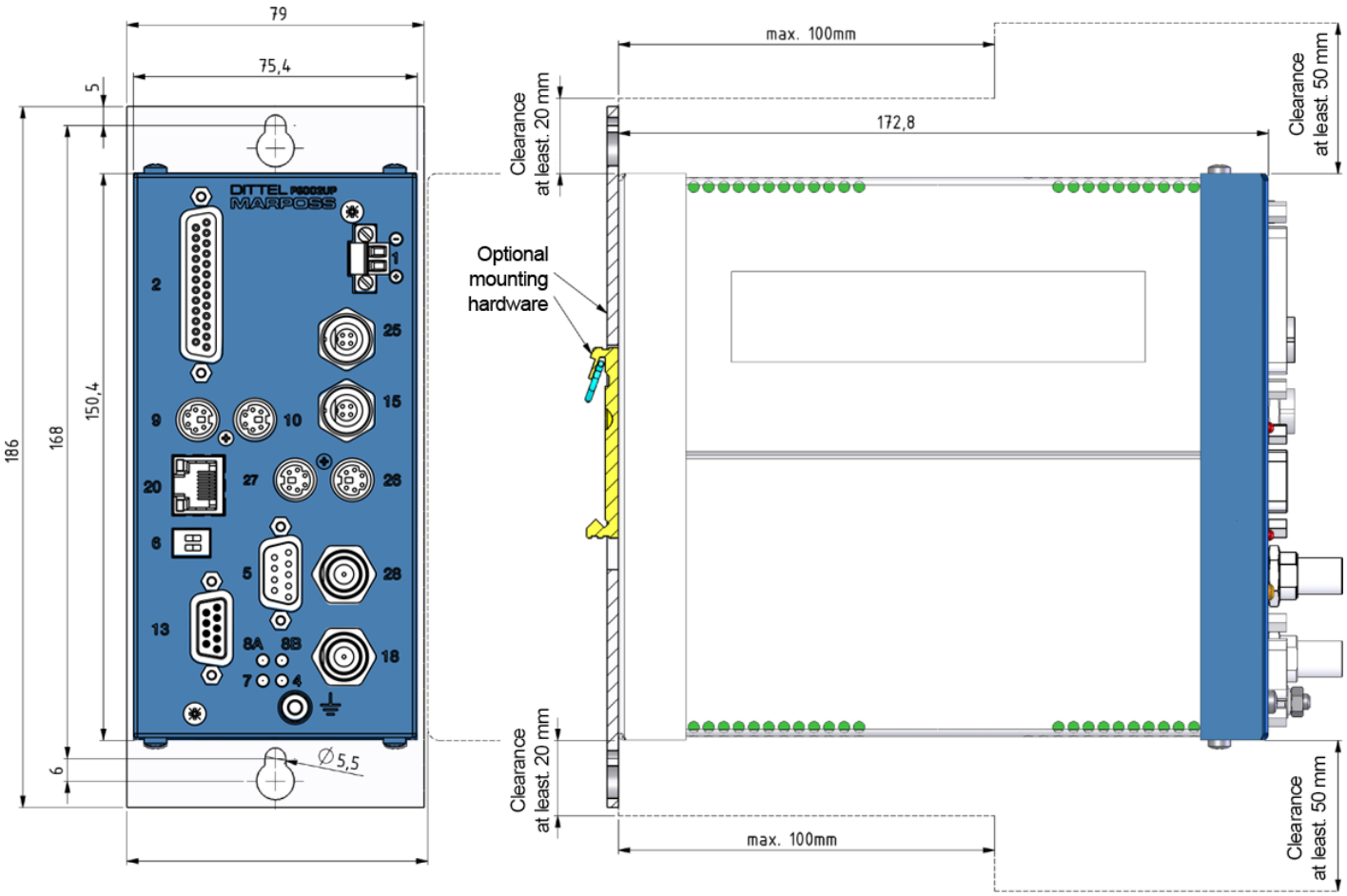


Fig.9. Example of P6002 UP line module mounting on vertical surface or on DIN guide

6.2 *Acceleration Sensor*

The location and installation of the Acceleration Sensor are crucial to successful operation of the P6002 UP line Pre-Balancing System!
Each rotor or each plane to be balanced must be equipped with its own Acceleration Sensor!
For P6002 UP and P6002A UP line modules the unbalance display is only true with an Acceleration Sensor (Active Acceleration Sensor for P6002A UP module) having a sensitivity of 1000 pC/g (300 mV/g for P6002A UP module) and a Sensor Adaptation setting of :1 (see Vibration Transducer Adaptation).

6.2.1 *General Installation of Acceleration Sensor*

The Acceleration Sensor (Active Acceleration Sensor for P6002A UP module) can be mounted on the machine tool, either permanently stud mounted, or kept by magnetic force. Use the magnetic mount Acceleration Sensor preferably for temporary unbalance measurements or/and to localize the best place for a stud mounted Acceleration Sensor.
Due to the wide variety of grinding machine characteristics, no statement about the best Acceleration Sensor location can be made. Following are two general rules that should help to find the proper Sensor location:

- Mount the Acceleration Sensor (Active Acceleration Sensor for P6002A UP module) on a rigid part of the machine structure, where vibration from the spindle (rotor for P6002A UP line modules) will be accurately transmitted. For example, a good location is on the spindle housing (rotor housing for P6002A UP line modules), as close as possible to the spindle bearing at the wheel side (rotor bearing for P6002A UP line modules).
- For P6002 UP and P6002A UP line modules mount the Acceleration Sensor (Active Acceleration Sensor for P6002A UP module) in the same direction as the centreline between the grinding wheel and the work piece. The Acceleration Sensor should always be aligned at the wheel end of the machine.

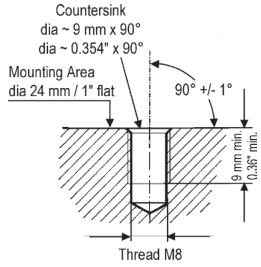
For standard dimensions of Acceleration Sensors, please contact our nearest representative.

For P6002 UP line modules

For P6002A UP module

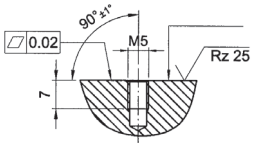
For P6002 UP line modules, for best measurement results grind or machine a smooth, flat area of at least 24 mm diameter. For permanent stud mounting (type BA 320D/BA 1020D) prepare a tapped hole M8 with a depth of at least 9 mm, which must be perpendicular within 1° of the mounting surface to ensure no gaps are present between the base of the Transducer and the structure.
For P6002A UP module, for best measurement results grind or machine a smooth, flat area of at least 19 mm diameter. For permanent stud mounting prepare a tapped hole M5 with a depth of at least 7 mm, which must be perpendicular within 1° of the mounting surface to ensure no gaps are present between the base of the Sensor and the structure.

For P6002 UP line modules



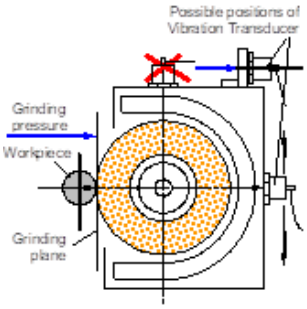
Before mounting the Acceleration Sensor inspect the area to insure that no metal burrs or other foreign particles interfere with the contacting surfaces. Apply a coupling fluid like silicone grease to achieve a high degree of intimate surface contact.

For P6002A UP module



WARNING
To avoid risk of damage, tighten the Sensor with not more than 10 N-m (1 kilogram-meter) (for P6002A UP module 8 N-m - 0.8 kilogram-metre).

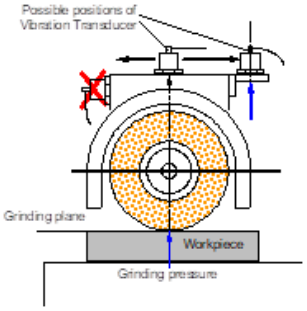
MOUNTING EXAMPLES



Cylindrical or Centerless Grinder (for P6002 UP and P6002A UP line modules)

Arrangement of a Acceleration Sensor (Active Acceleration Sensor for P6002A UP module) in horizontal direction on a cylindrical or centerless grinder.

N.B.
Measurement direction parallel to the direction of grinding pressure or perpendicular to the grinding plane.



Surface grinder (for P6002 UP and P6002A UP line modules)

Arrangement of a Acceleration Sensor (Active Acceleration Sensor for P6002A UP module) in vertical direction on a surface or creep feed grinder.

N.B.
Measurement direction parallel to the direction of grinding pressure or perpendicular to the grinding plane.

6.2.2 *Proximity Switch (Speed Sensor)*

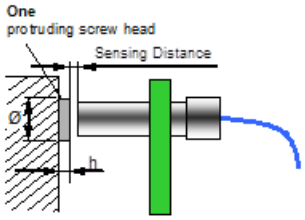
WARNING
Risk of injury from rotating parts!
Switch OFF the machine when installing or adjusting the Speed Sensor! Ensure that the rotor has stopped, before working on it!
Protect the machine against unauthorized or accidental switching ON!
NEVER operate a machine tool without all proper safety guarding in place!

The Proximity Switch or Speed Sensor provides information on the speed or rotation. This is necessary to determine the phase relationship between measured vibration and the rotating spindle. Some of our Transmitter Coils (Stators) are equipped with a Proximity Switch. Installation of the Proximity Switch has to be done according to local conditions on the machine.

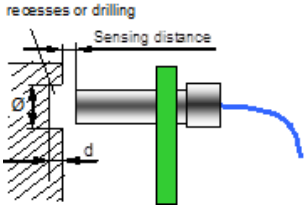
N.B.
For the phase related Single-Plane/Two-Plane Pre-Balancing, the P6002 UP line module may receive only ONE switching pulse per revolution of the rotor!
For each rotor a separate Speed Sensor must be installed.
Take the speed direct from the rotor. A protruding screw head or a milled/drilled recess in the pulley may obtain this..

MOUNTING EXAMPLES

The Proximity Switch should be mounted such that the recess(es) or protrusion(s) pass(es) directly under the Proximity Switch's face.
For safe switching the following dimensions should be kept:



	Speed Sensor M 12 × 1	Speed Sensor M 8 × 1
Ø	> 15 mm	> 10 mm
h / d	≥ 2 mm	> 1 mm
Sensing Distance	≤ 4 mm	≤ 2 mm



The diameter of the screw head or the milled recess or drilling must be bigger than the diameter of the Speed sensor. Increase "h" / "d" at other materials as iron.

N.B.
The type of the Speed sensor (PNP or NPN) must be set using the Tab "Parameter" (refer to Speed sensor Type Figure). After installing and adjusting all components on the machine, turn machine spindle or grinding wheel slowly by hand, if possible. Check for protruding or scratching parts..

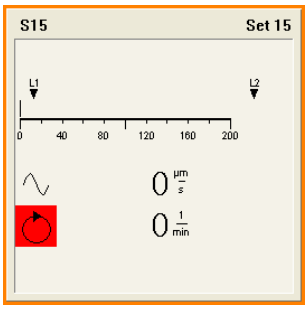
CHECKING THE SPEED SENSOR

Required:

- The P6002 UP line module is completely installed, powered by 24 Vdc, the software is ready to run.
- For each rotor a Speed Sensor is assembled on the machine and connected to the P6002 UP line module, socket # 15, and/or socket # 25. For Two-Plane Pre-Balancing one Speed Sensor is sufficient.
- The rotor is not turning!
- Open the Module View »Monitoring Standard« or »Monitoring Reduced« of the P6002 UP line module concerned.
- Depending on Operating Mode one of the following screen is displayed:

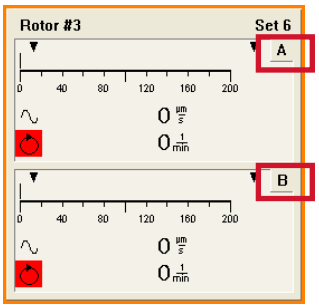
Operating Mode: **Single-Plane**
For rotor it shows:

- Unbalance: 0 µm/sec
- Speed: 0 1/min (rotor is not turning)
- Error: Speed error, since rotor is not turning



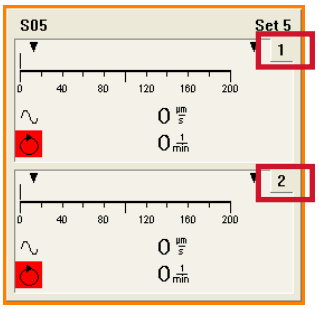
Operating Mode: **2x Single-Plane**
For rotors A and B it shows:

- Unbalance: 0 µm/sec
- Speed: 0 1/min (rotors are not turning)
- Error: Speed error, since rotors are not turning

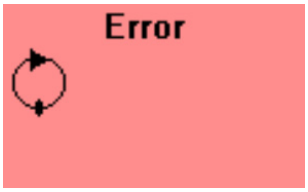


Operating Mode: **Two-Plane**
For Plane 1 and Plane 2 it shows:

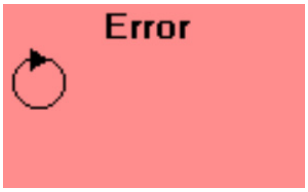
- Unbalance: 0 µm/sec
- Speed Plane 1 = Plane 2: 0 1/min (rotor is not turning)
- Error: Speed error, since rotor is not turning



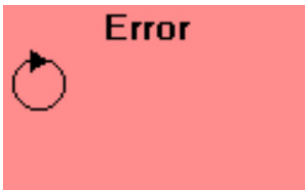
Check of Speed Sensor, when using a protruding screw head as reference:
Turn rotor slowly by hand, until the protruding part is congruent to the Speed Sensor's face.
A vertical mark must appear on the Speed Sensor Error message.



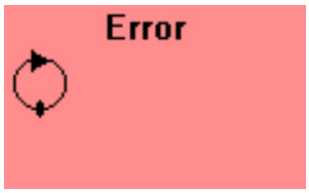
Turning the machine spindle further, the vertical mark must disappear.



Check of Speed Sensor, when using a milled recess or drilling as reference:
Turn rotor slowly by hand until the recess or drilling is congruent to the Speed Sensor's face.
A Speed Sensor Error message without vertical mark must appear.



Turning the rotor further, the vertical mark must appear again.



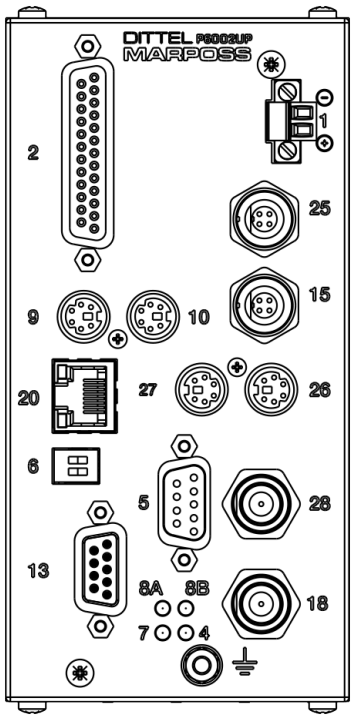
N.B.
Depending on the manufacturer of the Speed Sensor (Proximity Switch), a shining LED can also show the switching state. Please notice the respective data sheet of the manufacturer.

6.3 *Electrical Installation*

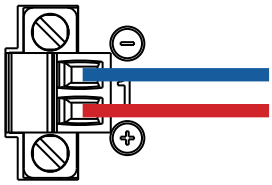
N.B.
To ensure proper function of the P6002 UP line modules use only connection cables or extension cables supplied by Marposs.

N.B.
Secure all Standard DB Connectors by using the provided screw locks.
Safeguard cables with strain relief. Make sure that no tensile stress is exerted on the connectors by the connected cables.

P6002 UP PB / P6002A UP PB



CONNECTOR # 1, 24 VDC SUPPLY



The supplied 2-pole DC plug with coded lugs fits the DC input of the P6002 UP line module.
For wiring, use stranded wires, cross section 1.0 to 1.5 mm², and wire-end sleeves.
Fix plug with both screws!
The P6002 UP line module is switched ON and OFF by the external power supply, the Module itself contains NO ON/OFF switch.
Lack of supply voltage does not result in loss of information of the memory.

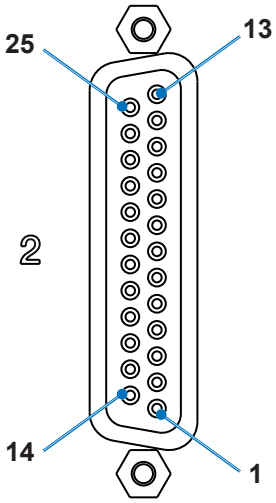
Contact	Signal
+	+ 24 Vdc ± 6 Vdc
-	Power Ground

N.B.
Wiring the supply must be made by qualified staff of the customer!

N.B.
Power the device from a 24 Vdc supply only! The power source must comply with EN 60950 SELV (Safety Extra Low Voltage). Applying a higher voltage can cause a damage of the device.

N.B.
The P6002 UP line module must be protected by an external fuse of 4 amps time-lag (T4A). This fuse must comply with IEC 60127 and must blow within 120 sec or less at a current of 8.4 amps.

CONNECTOR # 2, HARDWIRE INTERFACE OF THE PRE-BALANCING FUNCTION



Type: Standard DB-25 Connector, female
Static interface to the Automation System.
Via the inputs, the Automation System using HIGH or LOW signals can control the Pre-Balancing P6002 UP line module.
Via the outputs, the Automation System receives various messages from the P6002 UP line module as HIGH or LOW signals.

N.B.
Wiring the interface mating plug # 2 (supplied) to the machine control must be made by qualified staff.

N.B.
Use only shielded cable (shield connected to mating plug housing), cross-section of the cable 0.25 sq mm (#24 AWG) minimum.

N.B.
Cover the solder joints on the 25-pole mating plug with shrinking tube.

N.B.
Safeguard cables with strain relief.

Pin no.	Function	Input/ Output	Signal name / Action
1	Reserved	X	Do not wire
2	System Monitor 1: Acceleration sensor Input 18 and belonging RPM Input	O	RPM signal and Vibration signal OK: HIGH at the Output
3	System Monitor 2: Acceleration sensor Input 28 and belonging RPM Input	O	Speed signal and Vibration signal OK: HIGH at the Output
4	Unbalance Limit 1: signal coming from Acceleration sensor Input 18	O	Below Unbalance Limit 1: HIGH at the Output Above Unbalance Limit 1: LOW at the Output
5	Unbalance Limit 2: signal coming from Acceleration sensor Input 18	O	Below Unbalance Limit 2: HIGH at the Output Above Unbalance Limit 2: LOW at the Output
6	RPM signal coming from Speed Sensor which belongs to Acceleration sensor Input 18	O	Speed below RPM Limit: HIGH at the Output Speed above RPM Limit: LOW at the Output
7	RPM signal coming from Speed Sensor which belongs to Acceleration sensor Input 28	O	Speed below RPM Limit: HIGH at the Output Speed above RPM Limit: LOW at the Output
8	Unbalance Limit 1: signal coming from Acceleration sensor Input 28	O	Below Unbalance Limit 1: HIGH at the Output Above Unbalance Limit 1: LOW at the Output
9	CM	I	+24 Vdc, must comply with EN 60950 SELV, for example from Machine CNC Control
10	Reserved	X	Do not wire
11	Unbalance Limit 2: signal coming from Acceleration sensor Input 28	O	Below Unbalance Limit 2: HIGH at the Output Above Unbalance Limit 2: LOW at the Output
12	Reserved	X	Do not wire
13	Reserved	X	Do not wire
14	Operation via keys or buttons inhibit	I	Static HIGH Signal: Operator actions on the PC or Automation System keyboard/softkeys are disabled
15	Set Number Selection 1	I	see following Truth Table
16	Set Number Selection 2	I	see following Truth Table
17	Set Number Selection 3	I	see following Truth Table
18	Set Number Selection 4	I	see following Truth Table
19	Reserved	X	Do not wire
20	24 Vdc Ground	I	24 Vdc Power Ground
21	Reserved	X	Do not wire
22	Analog Output “Filtered Unbalance Signal” coming from Acceleration sensor Input 18	O	500 rpm to 30,000 rpm: 0 …1000 µm/s correspond to 0 … 10 Vdc / -5% Output equivalent to reading at display, coordinates, PROFIBUS
23	Analog Output “Filtered Unbalance Signal” coming from Acceleration sensor Input 28	O	500 rpm to 30,000 rpm: 0 …1000 µm/s correspond to 0 … 10 Vdc / -5% Output equivalent to reading at display, coordinates, PROFIBUS
24	Analog Output "Speed"	O	72 … 10,000/ 20,000/ 30,000 rpm (adjustable) correspond to 0 … 10 Vdc Scaling of Speed Sensor signal coming either from Rotor, Rotor A or Plane 1+2. Depends on setting in actual Set Number
25	Analog Ground	-	Common Analog Ground of Outputs 22, 23, 24

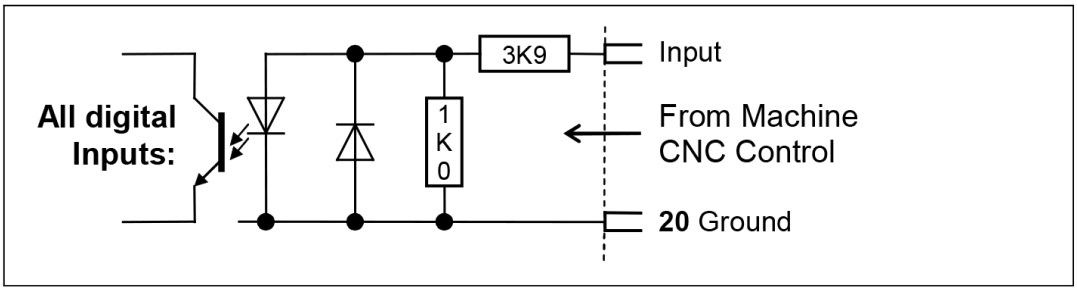
X = not specified, should not be wired!

Connector # 2
Truth table, to select appropriate Set no. by the machine CNC control:

N.B.
During Pre-Balancing, NO change of the Set Number is permitted. The consequence is an immediate abortion of the function!

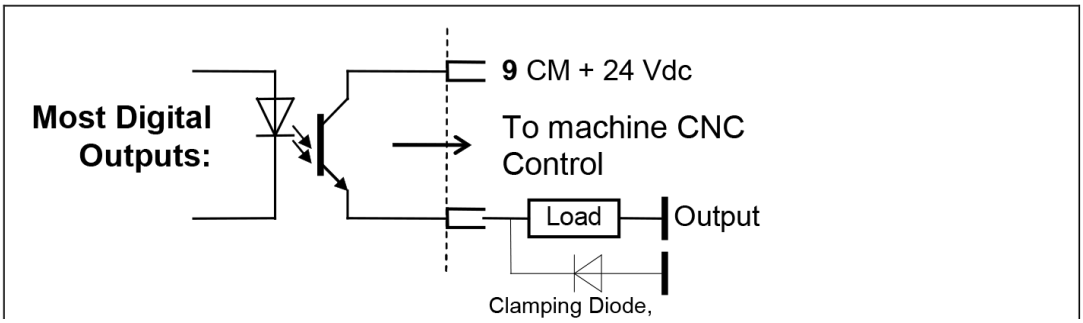
Set no.	# 2/pin 15	# 2/pin 16	# 2/pin 17	# 2/pin 18
No change	LOW	LOW	LOW	LOW
1	HIGH	LOW	LOW	LOW
2	LOW	HIGH	LOW	LOW
3	HIGH	HIGH	LOW	LOW
4	LOW	LOW	HIGH	LOW
5	HIGH	LOW	HIGH	LOW
6	LOW	HIGH	HIGH	LOW
7	HIGH	HIGH	HIGH	LOW
8	LOW	LOW	LOW	HIGH
9	HIGH	LOW	LOW	HIGH
10	LOW	HIGH	LOW	HIGH
11	HIGH	HIGH	LOW	HIGH
12	LOW	LOW	HIGH	HIGH
13	HIGH	LOW	HIGH	HIGH
14	LOW	HIGH	HIGH	HIGH
15	HIGH	HIGH	HIGH	HIGH

Connector # 2, specification of all digital inputs:



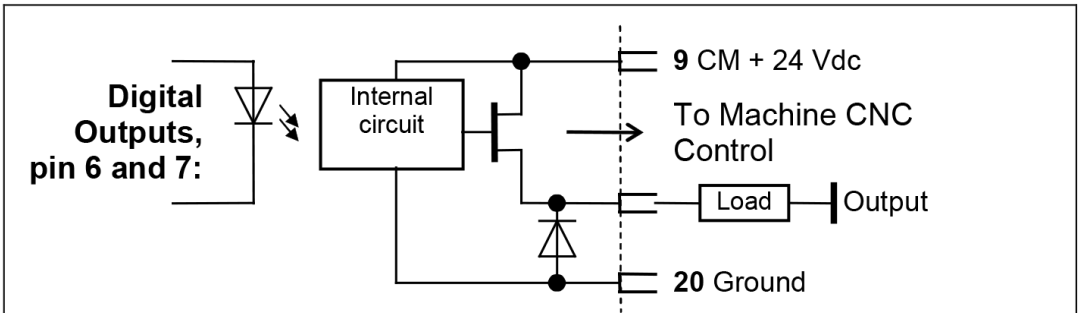
Input Signal LOW:	-30 Vdc … +3 Vdc
Input Signal HIGH:	+13 Vdc … +30 Vdc
Input Current:	typical 5.5 mA at 24 Vdc

Connector # 2, specification of digital outputs, refer to pins 2 to 5, 8 and 11:



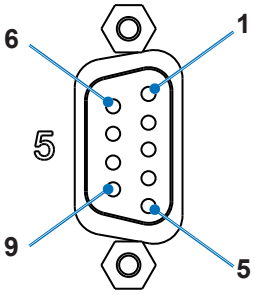
Output Current:	10 mA
Recommended Load:	2.2 kΩ – 4.7 kΩ at 24 Vdc **Drive inductive load with clamping diode only!**
Power dissipation of Switching Transistor:	75 mW maximum

Connector # 2, specification of digital outputs, refer to pin 6 and 7:



Output Current:	500 mA max. short circuit proof and over-load protected
Total of all Output Currents:	2 amps maximum
Voltage Drop across Output:	I_{Load} × 0.4 ohm maximum
Output Leak Current:	10 µA maximum
Recommended Load:	2.2 kΩ – 4.7 kΩ at 24 Vdc

CONNECTOR # 5

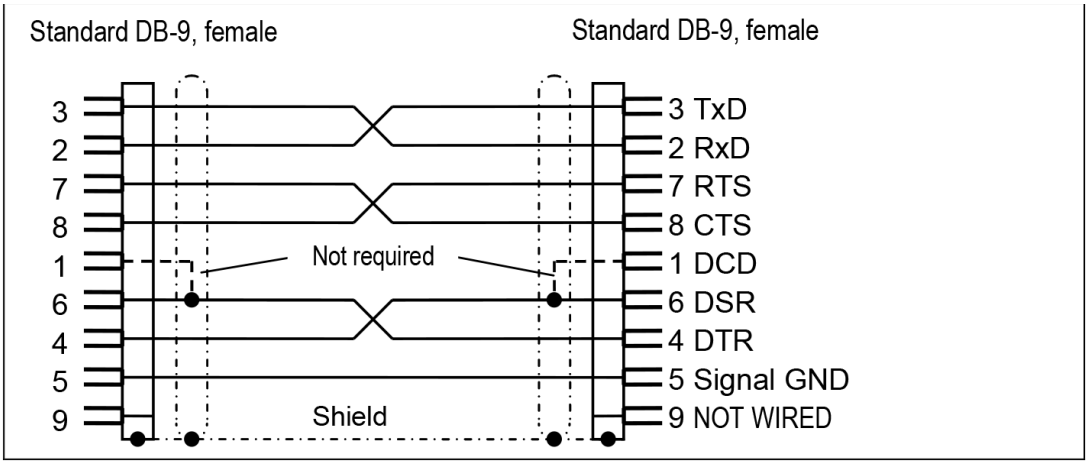


Type: Standard DB-9 Connector, male
RS-232-C Software Interface to operate the P6002 UP line module through a computer based Automation System or a standard Windows® Computer (Windows® 7 / 10) and additional DSCC Software.

Pin no.	Input/ Output	Signal name
1	In	DCD
2	In	RxD
3	Out	TxD
4	Out	DTR
5	-	Signal GND
6	In	DSR
7	Out	RTS
8	In	CTS
9	-	not wired

Connect Module's Connector # 5 by a shielded 9-pole Serial Interface cable to an available serial port of your Automation System or Computer.

Serial Interface Cable to connect a PC or Automation System

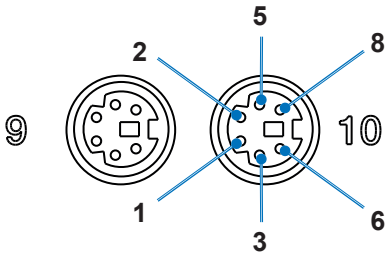


Serial Interface Cable

5 m	A/N O67L0010500 (A/N K0010500)	10 m	A/N O67L0011000 (A/N K0011000)
15 m	A/N O67L0011500 (A/N K0011500)	20 m	A/N O67L0012000 (A/N K0012000)

CONNECTORS # 9 AND # 10

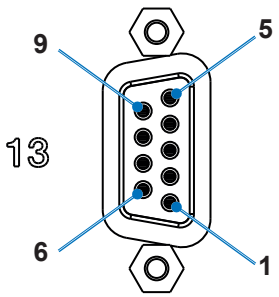
N.B.
These sockets are used to connect up more than one DS6000 UP Module!
The first and last Module of the network has to be terminated (refer to paragraph “6.4.1 Setting the Dip-Switch # 6” on page 41, switch SW2 = ON).



Type: 6-pole Miniature Sockets
When operating more than one DS6000 UP Module they must be connected up by special Patch Cords, length e.g. 18 cm/ 7” (A/N O67L0020018, formerly A/N K0020018).
At Modules placed side by side, practically Connector # 9 is connected to Connector # 10 of the next Module and so on. However, connecting Connector # 9 to # 9 or Connector # 10 to # 10 is permitted as well.

Pin no.	Signal name
1	not connected
2	not connected
3	CAN-H
5	COMM GND
6	not connected
8	CAN-L

CONNECTOR # 13, PROFIBUS INTERFACE OF THE PRE-BALANCING FUNCTION (ONLY FOR PROFIBUS INTERFACE MODULES)

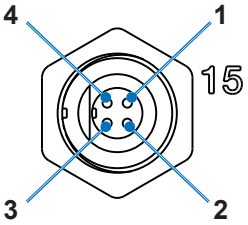


Type: Standard DB-9 Connector, female
All input and output signals managed through Hardwire Interface of standard DB-25 Connector # 2 can be driven even through PROFIBUS/PROFINET interface.
Connection to a PROFIBUS Interface of an Automation System or PC requires special PROFIBUS-cable and -plug.

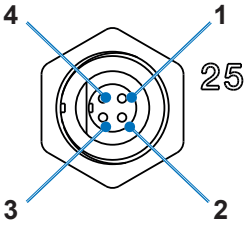
N.B.
Qualified staff of the customer must make the wiring of the PROFIBUS Interface, Connector # 13, to the PC or Automation System!

Pin no.	Signal name
1	not connected
2	not connected
3	RxD/TxD-P (Data line B)
4	CNTR-P
5	DGND (Data reference potential)
6	VP (Power supply plus)
7	not connected
8	RxD/TxD-N (Data line A)
9	not connected

CONNECTOR # 15 AND # 25



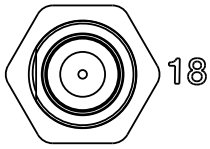
Type: Two 4-pole Miniature Socket
Standard connectors of the Speed Sensors. The Speed Sensors are mounted separately at the machine tool to provide information on the speed of the rotor(s).
Connect the Speed Sensor(s) via Speed Sensor Cable(s) to this socket # 15 or # 25.
Mechanical installation of the Speed Sensor, see paragraph “6.2.2 Proximity Switch (Speed Sensor)” on page 30.



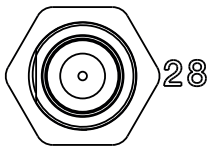
N.B.
The assignment of the respective **RPM Input** to the **Acceleration Sensor’s Input** is carried out in the DSCC Programme (**Settings** → **Tab Set Parameters** → **RPM Input**).
Setting the type of the Speed Sensor (either PNP or NPN) is done in the DSCC Software (**Settings** → **Tab Parameter**).

Pin no.	PNP Speed Sensor	NPN Speed Sensor
1	Supply +24 Vdc	Supply +24 Vdc
2	PNP rpm signal	NPN rpm signal
3	Supply 0 Vdc (Gnd)	Supply 0 Vdc (Gnd)
4	Screen/Chassis Ground	Screen/Chassis Ground

CONNECTOR # 18 AND # 28

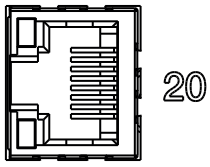


Type: Two Female BNC-Sockets
Connectors of the Acceleration Sensors. The Acceleration Sensors are mounted separately at the machine tool to provide information on the unbalance.
For the mechanical installation of the Acceleration sensor see paragraph “6.2.1 General Installation of Acceleration Sensor” on page 29.



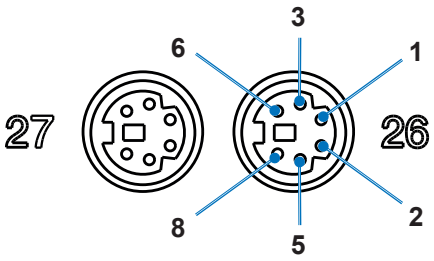
N.B.
The assignment of the respective **Acceleration Sensor Input** to the rotor or plane is carried out in the DSCC Programme (**Settings** → **Tab Set Parameters** → **Vibration Transducer ... Input ...**).
To avoid electrical interference route the coaxial cable of the Acceleration Sensor as far as possible from cables carrying heavy current!

CONNECTOR # 20



Type: RJ45-Jack
Connect the RJ45 jack via a ready-made Ethernet cable with an Ethernet Hub or Switch, which in turn is connected to the Ethernet network interface card of the Automation System.
If you want to connect the P6002 UP line module directly to the Ethernet network interface card of a notebook computer, an Ethernet Cross Over cable may be required.
LED indicators: Ethernet cable connected (lights green) and Data transfer (flashes yellow)

CONNECTOR # 26 AND # 27



Type: Two 6-pole Miniature DIN-Sockets
Special input for speed measurement, for example for the switching pulses from the encoder interface of SIEMENS® Terminal Module TM41.
Pulse duration 20 µsec minimum!
Use a suitable data cable with nominal impedance of 120 Ohms or our prefabricated special cable, A/N O67L1160XXX, formerly K1160XXX.

N.B.
Connect the Rotary Encoder(s) via a Data Cable to input(s) Socket # 26 and or # 27.
The P6002 UP line may receive only ONE pulse per revolution from the encoder interface!
For the phase-related **Single-Plane/Two-Plane Pre-Balancing** the encoder interface must supply a speed signal, the phase of which is related to the rotor.
Without phase reference, pre-balancing is not possible.
The assignment of the respective “RPM Input” to the “Acceleration Sensor Input” is carried out in the DSCC programme **(Settings → Tab Set Parameters → RPM Input).**

Pin no.	Signal name
1	not connected
2	not connected
3	Rotary Encoder Signal 0 Vdc (Ground)
5	RS-422 + (Rotary Encoder Signal HIGH)
6	RS-422 - (Rotary Encoder Signal LOW)
8	not connected

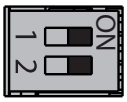
GROUND TERMINAL, STUD M4 AND HEX NUT

To reduce electrical interference make sure that the P6002 UP line module, all components and the machine CNC control are on a common mass potential. If this is not guaranteed by the installation on the machine all components must be bonded by suitable bonding straps to a common local earth (ground).

- The bonding straps should be as short as possible, the cross section as big as possible (recommended 16 mm²).
- Use cable lug for high-quality connection!

6.4 *Settings before getting started*

6.4.1 *Setting the DIP-SWITCH # 6*

6 

N.B.
Before getting started the P6002 UP line module, some settings must be carried out with the two switches, if applicable!

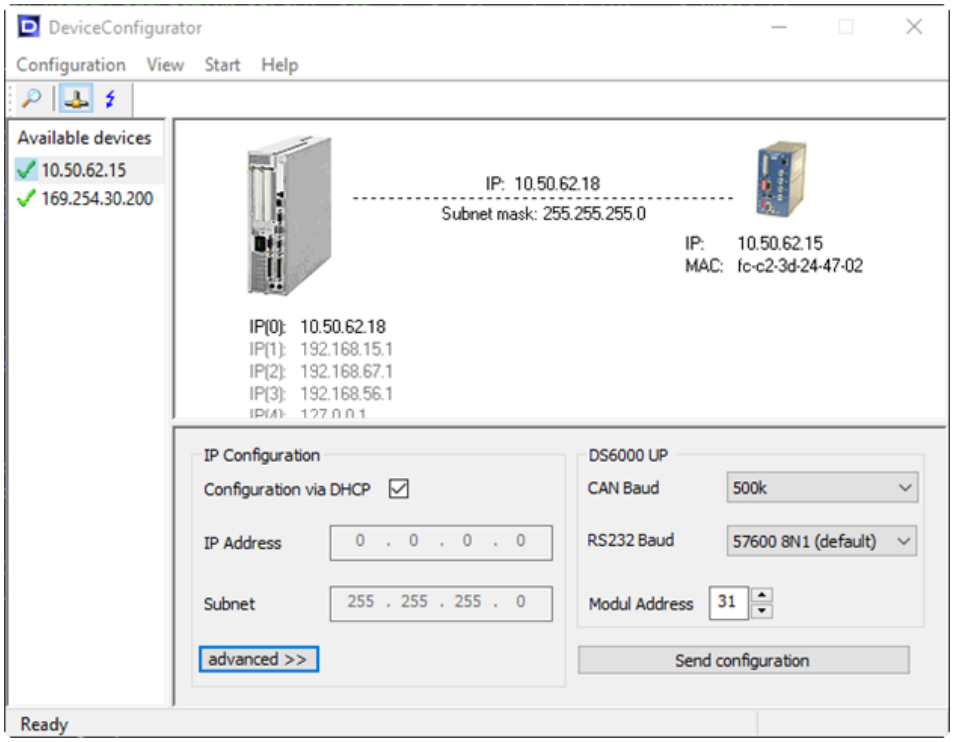
Switch no.	Signal name
SW1	Not used
SW2	CAN Terminator ON/OFF (Factory Setting: OFF)

SW2: The first and the last Module of a module network must be terminated, i.e. switch SW2 of these Modules must be set to ON!

6.4.2 *Perform P6002 UP line module DeviceConfigurator*

6.4.2.1 *Module configuration*

In the P6002 UP some of the settings previously available by physical switches are now possible via DeviceConfigurator software tool.
The Dip Switches for CAN BAUD-RATE and RS232 BAUD-RATE and the Rotary Switches for the MODULE ADDRESS are no more present.



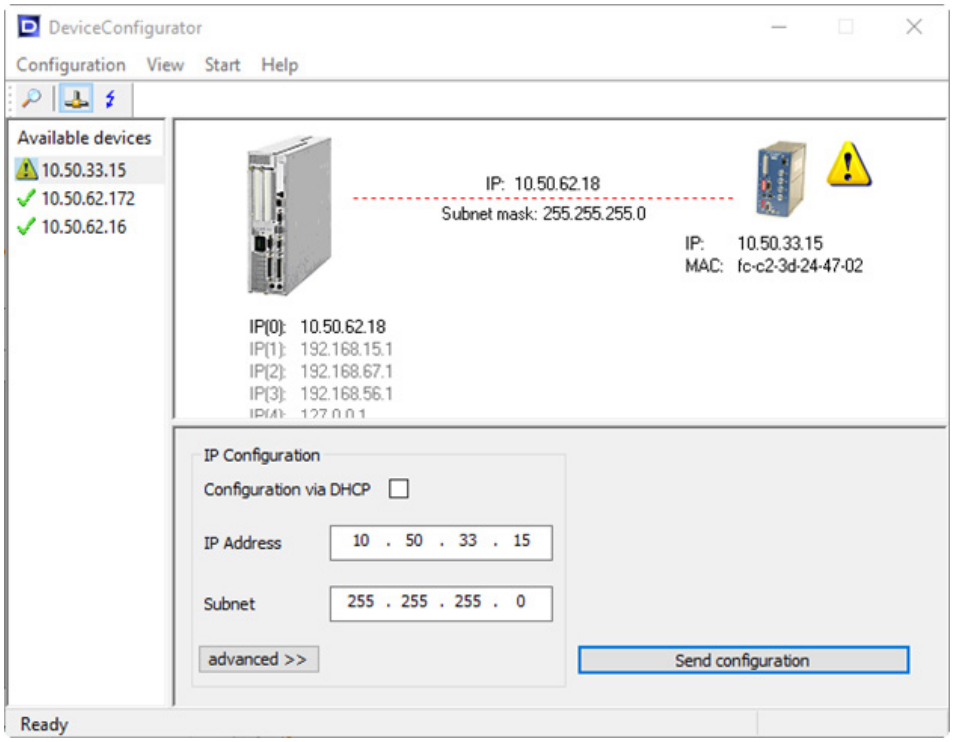
CAN BAUDRATE
All modules in the CAN network must have the same baudrate, the default one is 500K and is also recommended.
- 500K (Default)
- 125K
- 250K
- 1000K

RS232 BAUDRATE
This is for the configuration of the baudrates of the serial interface at the module only. Because the DSCC is in most cases independent of this parameter configured to 576008N1, it is not recommended to change this configuration. It is present because of compatibility issues with former DS6000 modules. The Baudrates of the USER depends on the configuration inside Parameter settings inside DSCC.
- 576008N1 (default)
- 38400 8N1
- 19200 8N1
- (USER)

MODULE ADDRESS
Each Module in the network must have unique module address; the allowed values are 1-99.
The module address is also the address to be selected for Profibus.

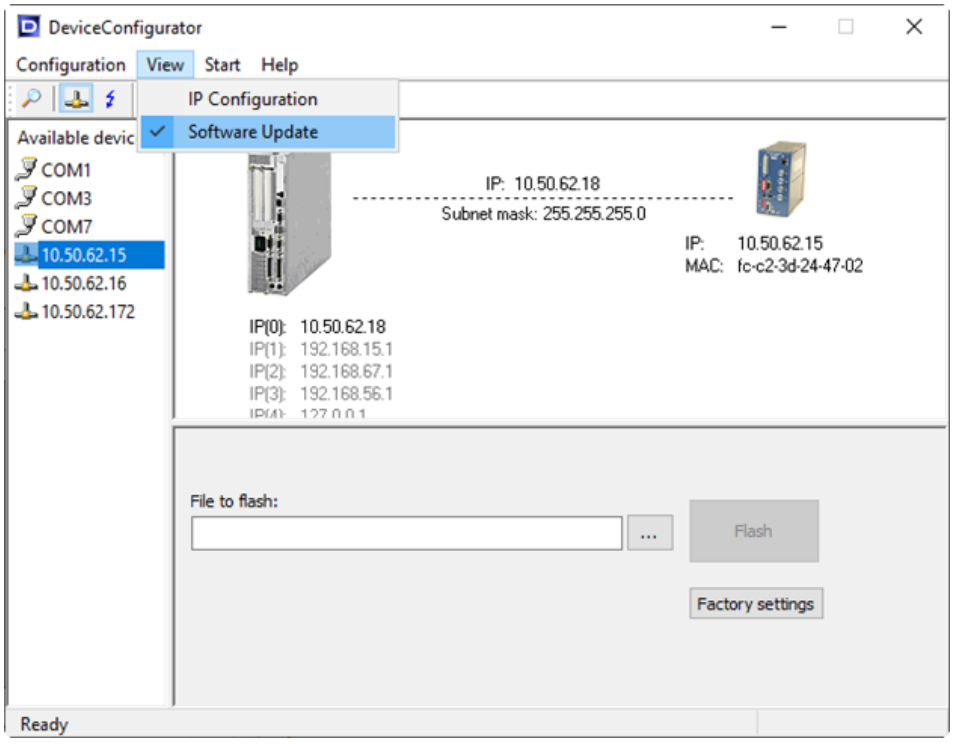
RESTRICTION

The configuration is only possible if the module is detected as a DS6000 UP and in the same subnet of the configurator. Otherwise the group box with the DS6000 UP configuration remains empty:



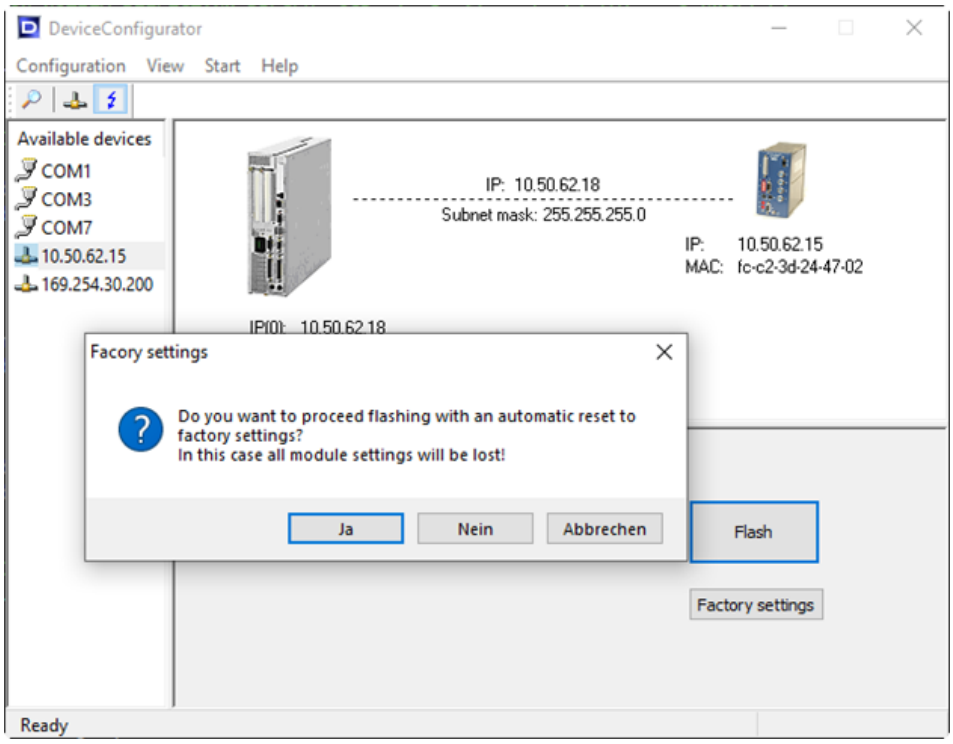
6.4.2.2 *Software Update*

Switch to “Software Update” Screen from Menu (View -> Software Update):



The Software update is easier than on former DS6000 devices, because no DIP-Switches are involved and there is no disconnection/connection of the 24V power supply necessary. The firmware package is an encrypted bin file supplied by Marposs.

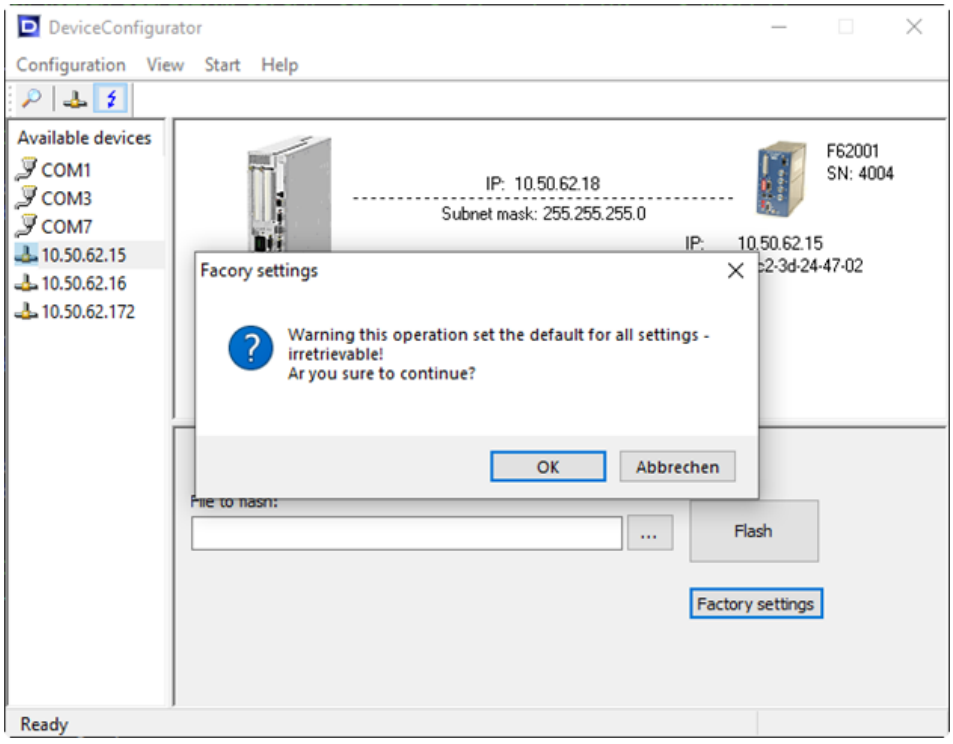
Select Firmware and click on Flash key.



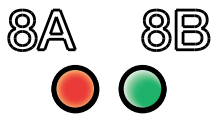
Before the update procedure starts the DSCC requests if you want to perform an additional Factory Reset of the stored settings. This is optional.

6.4.2.3 *Factory Settings*

At former DS6000 modules the factory reset was triggered by a special combination of the rotary encoder and DIP switches. This feature moved now to the Deviceconfigurator as follows:



6.4.3 *LED Displays while operating*



The LEDs 8A and 8B are for PROFIBUS operating status.

LED 8A

Operating Mode		
LED State	**Indication**	**Comments**
Off	Not online / No power	-
Green	Online, data exchange	-
Flashing Green	Online, clear	-
Flashing Red (1 flash)	Parameterization error	-
Flashing Red (2 flashes)	PROFIBUS Configuration error	-

LED 8B

Status		
LED State	**Indication**	**Comments**
Off	Not initialized	-
Green	Initialized	-
Flashing Green	Initialized, diagnostic events(s) present	-
Red	Exception error	-

The LED 7 is for System monitor status and the LED 4 is for the power status.

LED 7

System monitor		
LED State	**Indication**	**Comments**
Green	System is ok	-
Red	System is not ok (different for AE6000 UP and P6002 UP line modules)	for P6002 UP line module: - While in the Function Neutral Position: unsuitable Pre-Balancing Head or faulty Pre-Balancing Head, and/or speed above 500 rpm. - While in the Function Pre-Balancing: • Acceleration Sensor signal is missing and/or • Speed below 300 rpm (if not blanked by a HIGH signal at pin 21 of connector # 2) or above 30,000 rpm, and/or • Short circuited Transmitter Unit and/or • Pre-Balancing Time exceeded and/or • Pre-Balancing failure.

LED 4

Power		
LED State	**Indication**	**Comments**
OFF	The P6002 UP or AE6000 UP line module is not powered by a 24 Vdc source and/or the internal, resettable fuse and/or external fuse (2,5 Amp) has triggered.	-
ON (light green)	The P6002 UP or AE6000 UP line module is ready to operate.	-

N.B.
Except “Pre-Balancing Time exceeded”, all failures described above abort the Pre-Balancing Function immediately.
Simultaneously a System Monitor Failure Signal (LOW signal) is fed through pin 2 of connector # 2 to the machine CNC control or equivalent via PROFIBUS.
If the Pre-Balancing Time is exceeded, an additional LOW signal is fed through pin 3 of connector # 2 to the machine CNC control or equivalent via PROFIBUS.

7 DSCC SOFTWARE

7.1 General

7.1.1 Hardware Requirements

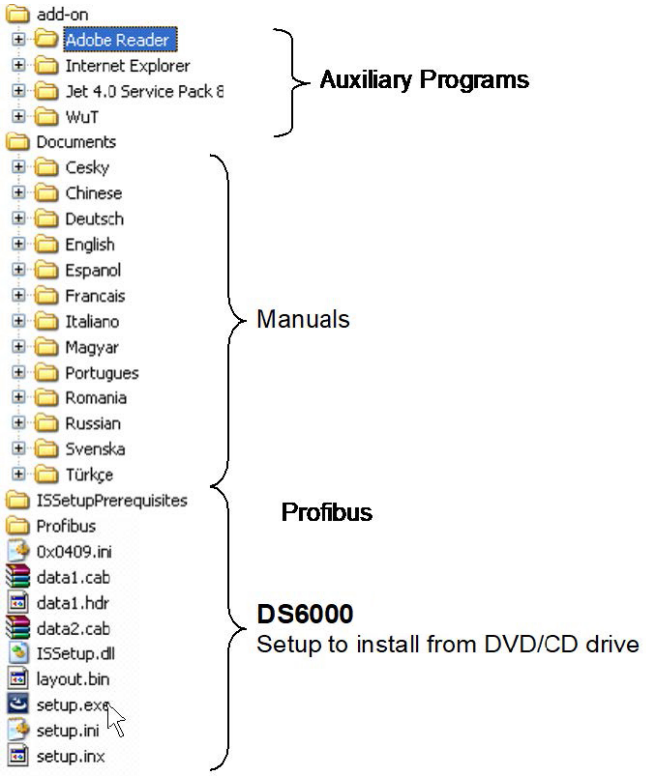
To use the DSCC Software the following hardware is required:
- a PC based Automation System for machine tools (e.g. SINUMERIK®) or a standard Windows® PC with Intel®- or AMD®- Processor and with a hardware equipment corresponding to the operating system,
- a free serial port (RS-232) on the Automation System or computer,
- or an Ethernet interface on the Automation System or computer.

7.1.2 Supported Operating Systems / System Requirements

Operating System	Remarks
Windows® 7	no restriction
Windows® 10	no restriction

Applies to all operating systems:
- TCP/IP-Stack must be installed.
- At least an 8-bit (256 colours) screen display is recommended.
- For the Online Help function a Microsoft Internet Explorer Version 5.x or later is required (refer to the following paragraph).

7.1.3 Directory Structure



7.1.4 *Running set-up program using CD-ROM or DVD*

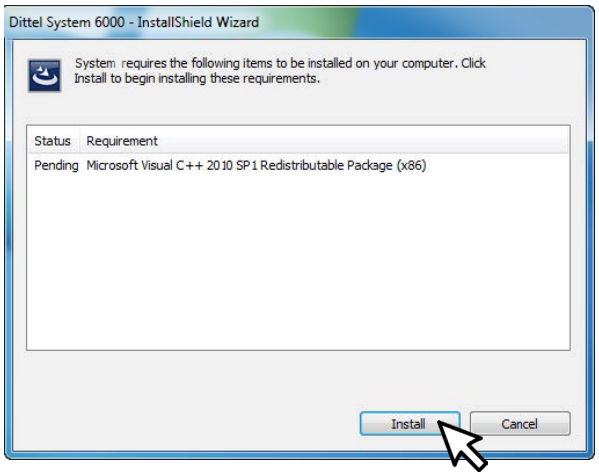
N.B.
Installing the set-up program on Windows® 7 / 10 must be done with administrator rights!

Proceed as follows:
- Insert the DSCC Software CD-ROM or DVD into the respective drive of your Automation System or computer.
- From Windows® start the file manager (e.g. Explorer) and select the appropriate drive.
- Start Setup.exe.
- Continue with running the set-up program as described in the following paragraph.
- If you want to update the program, continue as described in the paragraph “7.3 Software Update” on page 55.

7.2 *Software Installation*

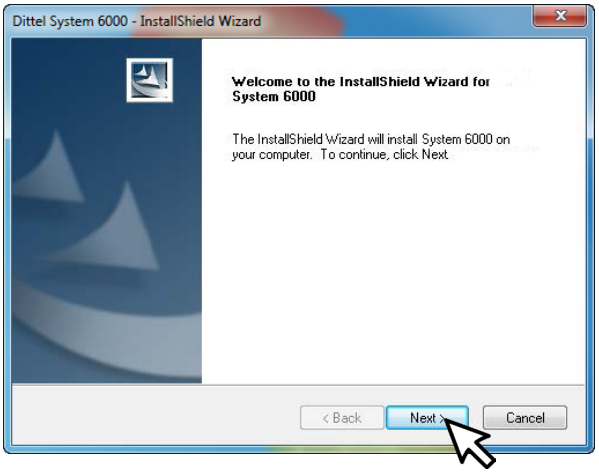
7.2.1 *Standard Windows®*

N.B.
Should the DSCC Software be installed on a SINUMERIK® 840D, skip this chapter and proceed as described in the paragraph “7.2.2 SINUMERIK® 840D” on page 51.



If not all prerequisites for installation have been met yet, the opposite dialog will be displayed.

Click on [Install >] to continue.



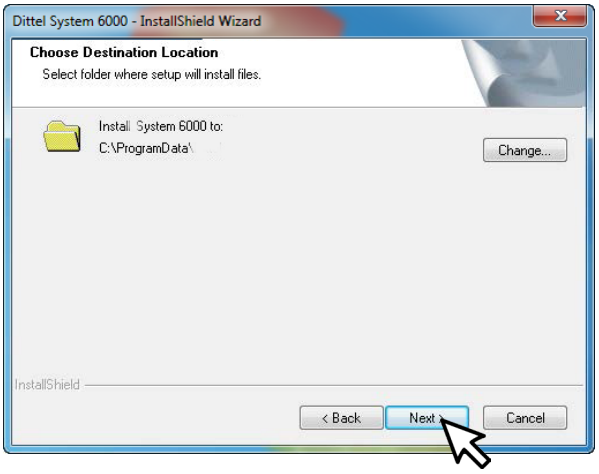
If all prerequisites for installation have been met, a Welcome screen opens after starting the set-up.

Click on [Next >] to continue.

Read the License Agreement thoroughly. If required, the License Agreement can be printed, see key [Print].

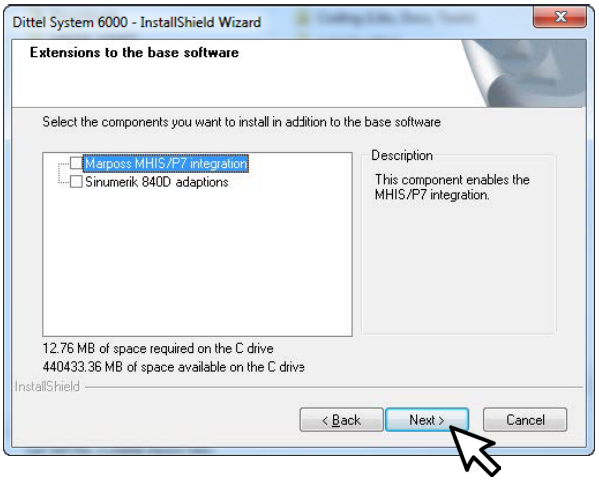
If you accept the License Agreement, click on [Next >].

The installation process will continue.



On the opposite screen select the folder where the set-up will install the files:

It is recommended not to change the path.
Click on [Next >] to continue.



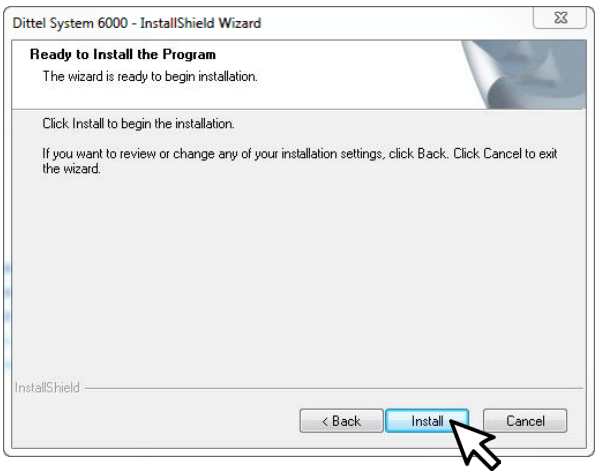
Additionally to the base software the following extensions may be installed:

1) Marposs MHIS/P7 integration.
With this option the Marposs MHIS software is integrated and activated or deactivated.

2) Sinumerik 840D adaptions
This option should NOT be selected when a standard Windows® installation is running.

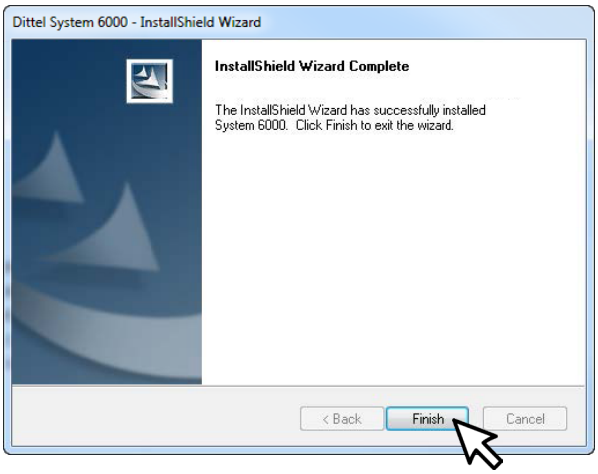
If no extension is highlighted only the base software is installed.

Click on [Next >] to confirm the extension - if any.



The installation starts with the opposite screen:

Click on [Install] to continue.



After successful installation the opposite screen is displayed:

Click on [Finish] to complete the installation of the DSCC Software.

N.B.
WHEN USING Windows® 7 / 10:
If the request for a restart should appear, then it is mandatory that you apply again with the same user name. The installation can be completed successfully only in such a way.

7.2.2 *SINUMERIK® 840D*

The following chapter describes the installation of the DSCC Software on a SINUMERIK® 840D (based on Windows® 7 / 10).

PCU 50

How to start the SINUMERIK® in the Service Mode:

- During the start-up phase of the SINUMERIK® the message “Please select operating system to start” is displayed. Press the [↓] key once.
- Confirm by pressing the yellow [Input] key and the main menu is displayed.
- Select “Standard Windows (Service Mode)” by pressing the [4] key.
- In the following menu select “Standard Windows (without starting SINUMERIK® HMI)” by pressing the [1] key.
- Without operating any key wait till the restart is complete.
- If you are asked for the password, enter <SUNRISE>.
- Run the set-up as described in the paragraph “7.1.4 Running set-up program using CD-ROM or DVD” on page 48.

PCU 50.3

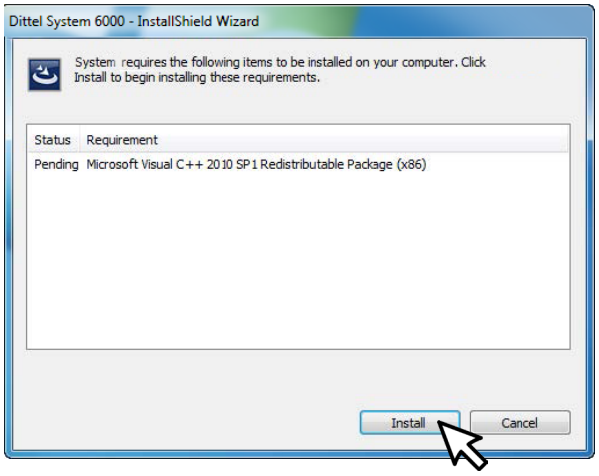
How to start the SINUMERIK® Service-Desktop:

- During the start-up phase of the SINUMERIK® press the [3] key as soon as the Version number is displayed in the lower right corner of the boot screen.
- If you are asked for the password, enter <SUNRISE>.
- In the following menu select “Service-Desktop” or press the [Return] key.
- Run the set-up as described in the paragraph “7.1.4 Running set-up program using CD-ROM or DVD” on page 48.

PCU 50.5

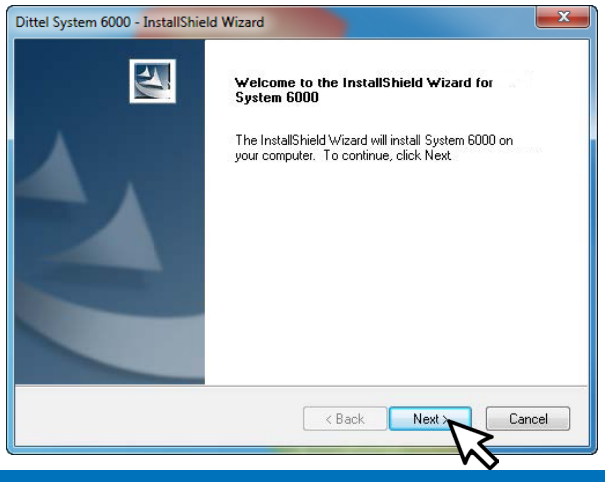
How to start the SINUMERIK® Service-Desktop:

- During the start-up phase of the SINUMERIK® press the [3] key as soon as the Version number is displayed in the lower right corner of the boot screen. Or if a Touch Panel is used, as soon as counted down from 3.
- Login with the administrator account, which was created by installing the PCU Base Software.
- Run the set-up as described in the paragraph “7.1.4 Running set-up program using CD-ROM or DVD” on page 48.



If not all prerequisites for installation have been met yet, the opposite dialog will be displayed.

Click on [Install >] to continue.



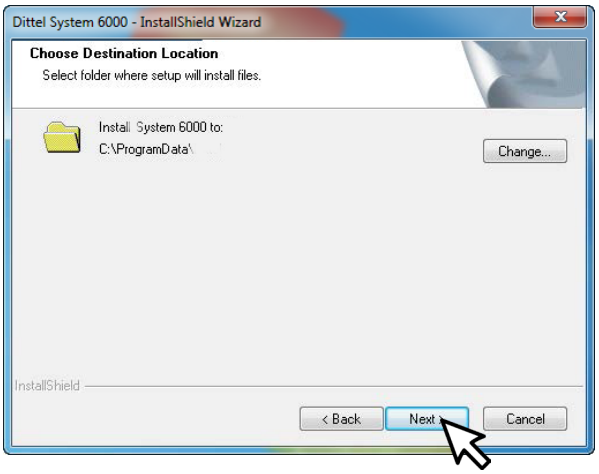
If all prerequisites for installation have been met, a Welcome screen opens after starting the set-up.

Click on [Next >] to continue.

Read the License Agreement thoroughly. If required, the License Agreement can be printed, see key [Print].

If you accept the License Agreement, click on [Next >].

The installation process will continue.

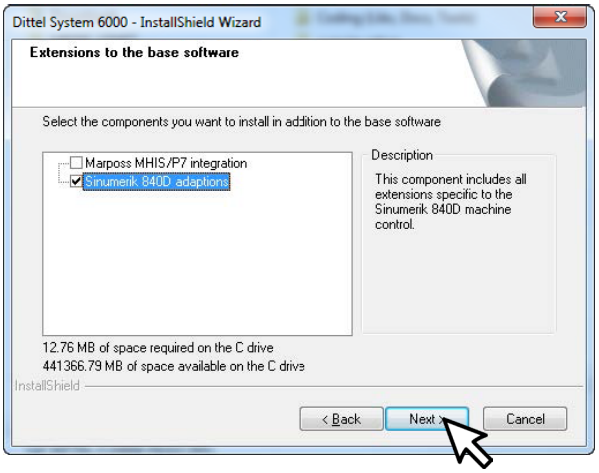


The target directory can be changed in the adjacent screen:

We recommend that you leave the path unchanged.

The following steps relate to the default installation path (see the paragraph “7.5.1 Default installation path” on page 57).

Click on [Next >] to continue.

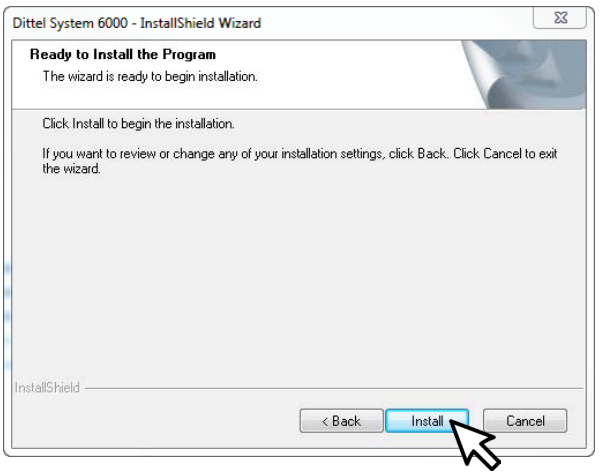


Additionally to the base software the following extensions may be installed:

1) Marposs MHIS/P7 integration.
With this option the Marposs MHIS software is integrated and activated or deactivated.

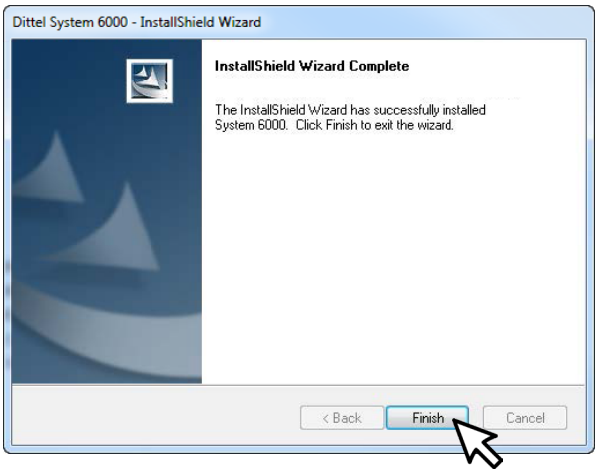
2) Sinumerik 840D adaptions.
Make sure this option is selected!

Click on [Next >] to confirm the extension.



The installation starts with the opposite screen:

Click on [Install] to continue.



After successful installation the opposite screen is displayed:

Click on [Finish] to complete the installation of the DSCC Software.

N.B.
WHEN USING Windows® 7 / 10:
If the request for a restart should appear, then it is mandatory that you apply again with the same user name. The installation can be completed successfully only in such a way. In this case start the SINUMERIK® in the “Service Mode” or with the “Service-Desktop” (as described at the beginning of this paragraph).

Now you can generate a softkey for the DSCC Software.

Additionally a directory oem was created in the directory %ALLUSERSPROFILE%\Marposs. Here you will find examples for the integration of the DSCC Software into SINUMERIK® HMI Advanced (regie.ini, oemframe.ini and language\re_xx.ini) or SINUMERIK Operate (systemconfiguration.ini and oemframe.ini).
The paths of the sample files (systemconfiguration.ini and regie.ini) to the executable files scc.exe and sccviewer.exe were adjusted automatically by the Setup.

N.B.
The system environment variable %ALLUSERSPROFILE% depends on the operating system and user settings.
To find out where the directory is actually located, enter the path %ALLUSERSPROFILE%/Marposs in the address bar of Windows® Explorer. Confirm the input with the [Enter] key.

SINUMERIK® HMI Advanced

Copy the files regie.ini, oemframe.ini and language\re_xx.ini into your OEM-directory (e.g. f:\oem) or extend your configuration files according to the example files.

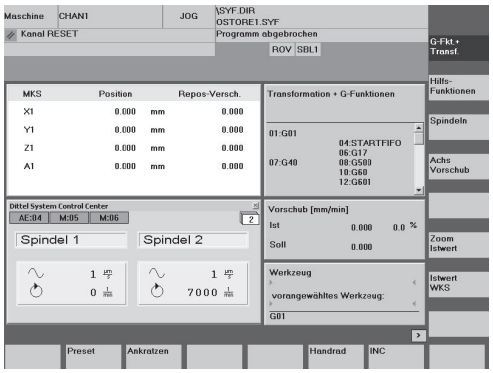
Now you can close the Service Mode or the Service-Desktop and start the Automation System normally. The DSCC Program starts when pressing the appropriate softkey.

N.B.
If only a pre-configured minimum view shall be started and not the complete application the following program arguments are available when calling the program “sccviewer” (see example file Regie.ini):
Task10 = name := oemframe, cmdline := “f:\\oem\\DS6000 UP\\sccviewer.exe /mode:start 0,400 220x140 /layer 1 /autohide”, Timeout := 6000, WindowName := “Marposs System viewer”, HeaderOnTop := FALSE, Preload:=TRUE
Please note: it may be necessary to adjust the path to the SCC.exe and the sccviewer.exe in the file regie.ini..

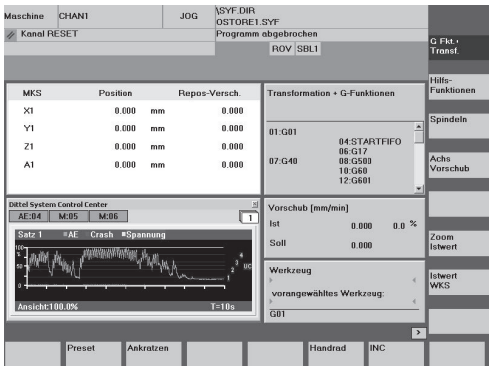
In the example /mode:start 0,400 220x140 /layer 1 /autohide

0,400	x/y Position of window (related to the coordinate origin (0/0) in the upper left screen corner)
220x140	Width and height of window
/layer 1	Program starts with Display Layer 1
/autohide	When the operating area ‘MACHINE’ is left, then the view is blanked automatically. In this context, it is useful to set the parameter ‘Preload’ to ‘TRUE’ (see above). Through this the program is started automatically when starting the machine control. Without this option, the view is always visible on a fixed display position (even when the operating area MACHINE is not selected).

Example:
Balancing
P6002 UP line module



Example:
AE-Module
AE6000 UP



N.B.
The full-screen mode and the minimum view mode are using the same interface settings. If one of these applications is already active and the second application is started additionally, the first application closes automatically to release the occupied interface.

SINUMERIK Operate

Copy the file systemconfiguration.ini into your User or OEM-directory (e.g. f:\oem).
• <Sinumerik_Operate_Installationspfad>/user/sinumerik/hmi/cfg
• <Sinumerik_Operate_Installationspfad>/oem/sinumerik/hmi/cfg or extend your configuration files according to the example files.

Copy the file oemframe.ini into your directory <Sinumerik_Operate_Installationspfad>/compat/user/oem
or extend an existing configuration file of the same name according to the example files.

Now you can close the Service Mode or the Service-Desktop and start the Automation System normally. The DSCC Program starts when pressing the appropriate softkey.

N.B.
In the systemconfiguration.ini find examples how the Marposs System Viewer can be embedded in „Sinumerik Operate“.

7.3 *Software Update*

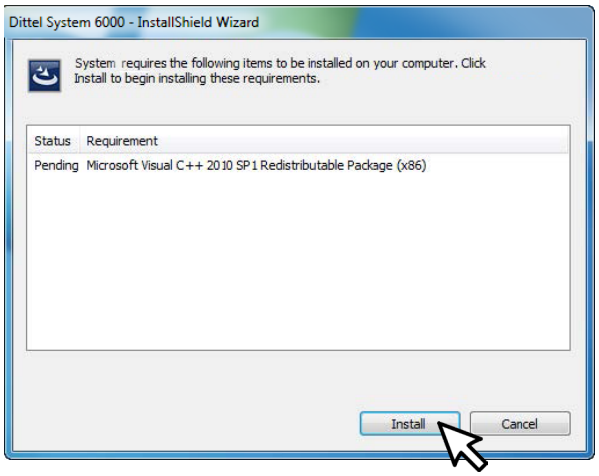
Due to improvements and extensions like functions, languages, operation, etc. but also corrections, it may be necessary to update your DSCC Software.

7.3.1 *Changing the Installation Directory*

If you run an update from a version earlier than 3.60, follow the instructions in the paragraph “7.2 Software Installation” on page 48. Your data are retained and imported into the new version.
Please note that from Version 3.60 on a change of the installation path took place. Now, the DSCC software is located at %ALLUSERSPROFILE%\Marposs, where the environment variable is resolved differently depending on the operating system and any adjustments (see paragraph “7.5.1 Default installation path” on page 57”).
Under Windows® 7 / 10 the resolved path is called by default C:\ProgramData\Marposs.

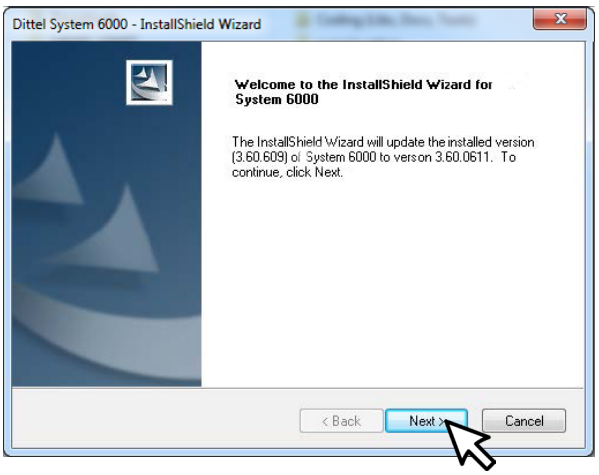
Proceed as follows:

Close the current DSCC Software on your Automation System or Computer, if applicable.
Install the new software version from the CD/DVD considering the instructions given in paragraph “7.1.4 Running set-up program using CD-ROM or DVD” on page 48.
Start the program Setup.exe by double-clicking.



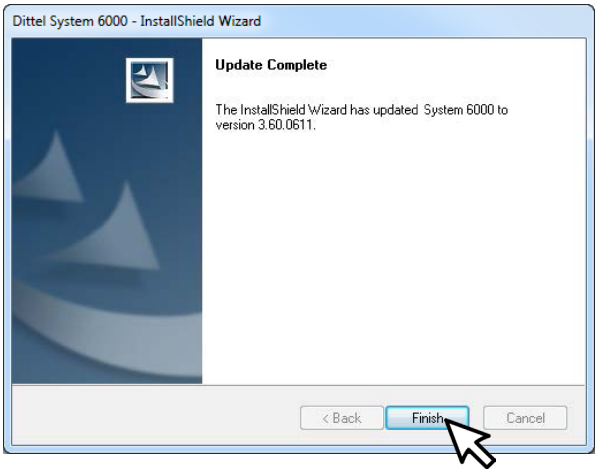
If not all prerequisites for installation have been met yet, the opposite dialog will be displayed.

Click on [Install >] to continue.



The program creates the InstallShield.

Click on [Next >] to update the DSCC.



The new version of the DSCC Software will overwrite the present version. All settings like Sets, Limits, Offset, etc. remain unchanged.

To complete the Update click on [Finish].

Start the program as usual.

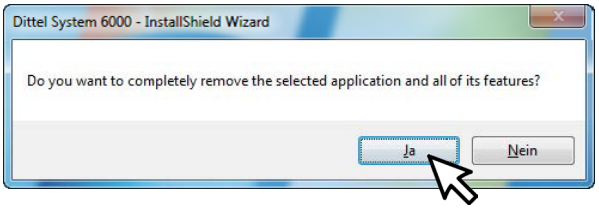
7.4 *Delete the DSCC Software*

The DSCC Software can be deleted completely from your computer or Automation System using the Windows® Control Panel.

Proceed as follows:

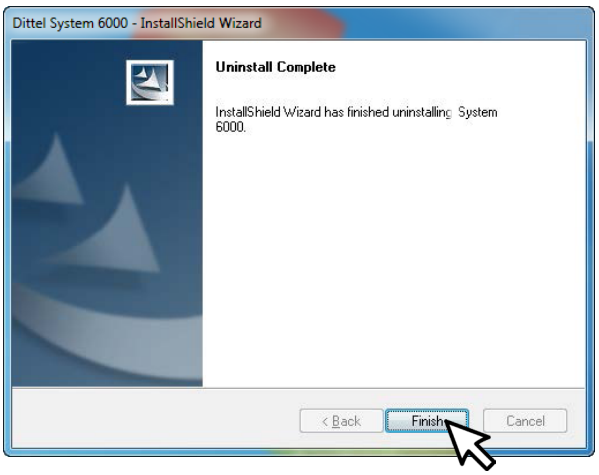
If applicable, close the current DSCC Program.

Windows® 7: Open the folder Programs and Functions via Start / (Settings) / Control Panel.
Windows® 10: Open the folder Programs and Features via Start / (Settings) / Control Panel.
In the list, highlight the line Marposs System 6000 and click on Change (Add) / Remove.



A dialog box opens and asks “Do you want to completely remove the selected application and all of its features?”.

Confirm the uninstallation by clicking on [Yes].



The DSCC Software will be deleted.

Also a system reboot may be necessary. Choose if you want to reboot your computer now or later.

Complete the uninstallation by clicking on [Finish].

If the uninstallation program gives the message that files could not be removed completely, delete the remaining files in the folder Marposs System 6000 with the help of the Windows® Explorer.

7.5 *Further information*

7.5.1 *Default installation path*

The default installation path for the DSCC software is %ALLUSERSPROFILE%\Marposs.

N.B.
%ALLUSERSPROFILE% is a system environment variable and depends on the operating system and user settings. To determine the precise location of the directory, enter the path %ALLUSERSPROFILE%\Marposs in the Windows® Explorer address line and press [Enter] to confirm. Windows® then automatically replaces the placeholder with the full path, which you can read in the Explorer address line.

Example Under Windows® 7 / 10 the full default path is C:\ProgramData\Marposs.

7.5.2 *Command line options*

You can run the SCC.exe and sccviewer.exe programs using command line options. The text file command-line.txt in the <Install_path>\ctrl\help\ directory contains an overview of the available command line options.

7.5.3 *Keyboard shortcuts*

You can control the SCC.exe and sccviewer.exe programs using keyboard shortcuts. The text file keyboard-shortcuts.txt in the <Install_path>\ctrl\help\ directory contains an overview of the the available keyboard shortcuts.

8 DSCC GENERAL SETTINGS

8.1 Starting the Program

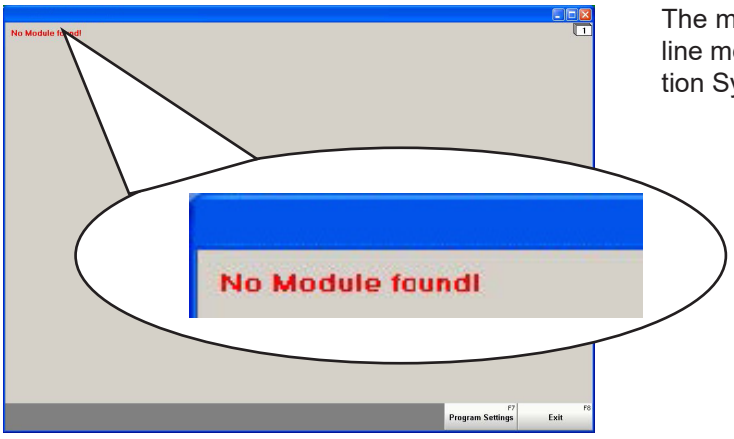
Start the Program on your Automation System or computer by clicking on button Start and then on symbol “Dittel System Control Center”.

Or start the Program by clicking on buttons Start / Programs / Dittel System 6000 and finally on the symbol “Dittel System Control Center”.

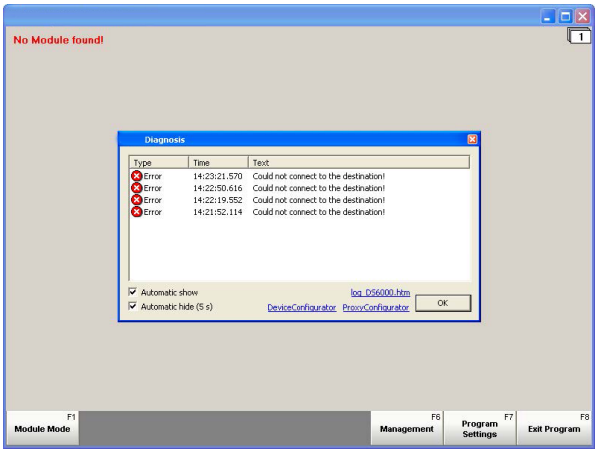
In the SINUMERIK® HMI-Environment you can start the “DSCC Program” by pressing the appropriate softkey.

N.B.
A new installed DSCC Software always starts in the English language!
These ‚General Settings’, particularly the RS-232 interface communication to the Automation System, can only be carried out with operational DS6000 UP Module(s)!

When starting the DSCC Software the very first time the following start screen should open:

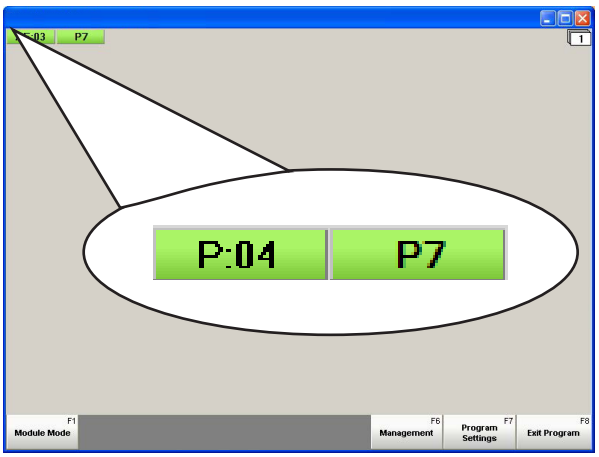


The message “No Module found!” appears since the P6002 UP line module cannot communicate with the Computer or Automation System yet.



After some seconds, the notice ‘Error Could not connect to the destination’ is displayed repeatedly.

Ignore this notice by clicking on [OK] key or pressing the [Enter] key on the PC keyboard or [Input] on the SINUMERIK® keypad to continue.



With an interface already configured once the following start screen of the module should open:

In this example a Pre-Balancing P6002 UP line module with the address P:04 and a Marposs Module P7, are connected to the Automation System or Computer.

To set a different language of the screen, the access levels and the communication between your PC or Automation System and Module the following General Settings have to be carried out.

N.B.
For integration of MARPOSS MHIS software and operation of the MARPOSS module P7, see Appendix A and documentation regarding MHIS software and P7 hardware.

8.1.1 *Requirements to configure the RS-232 interface*

The DSCC Software with Software Version V 3.00 or later is installed on your Windows®-based Automation System or on your Standard Windows® computer with appropriate hardware equipment.

One Module is connected via a serial interface cable to an available RS-232 Port of your Automation System or computer.

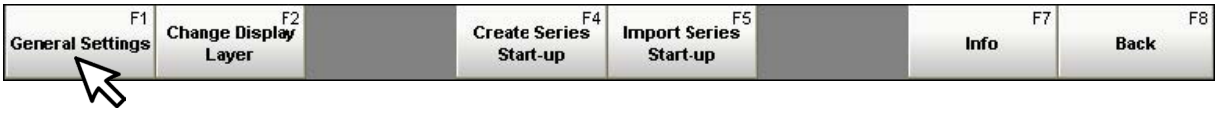
All DS6000 UP Modules are connected to a suitable 24 Vdc power source (all green LEDs # 4 light).

Several DS6000 UP Modules are connected with each other by special patch cords A/N O67L0020018, formerly A/N K0020018 (connectors # 9 or # 10), the first and last Module is terminated (DIP-switch # 6, switch SW2 to „ON“).

8.2 *General Settings*

To configure the DSCC Program press or click on the [Program Settings] key or the function key [F7).

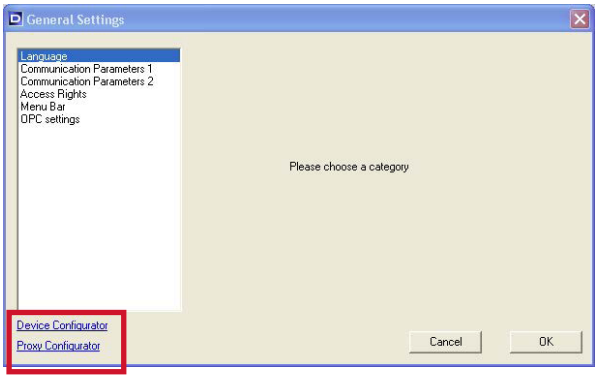
Then click or press on the [General Settings] key or function key [F1].



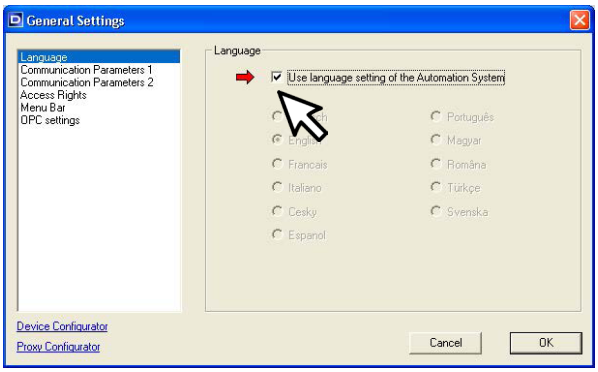
N.B.
The Proxy Configurator is installed since DSCC-version 3.60 in automatic way, but has to be configured and started manually or by windows system.
The Device Configurator is installed automatically when installing or updating the DSCC Software to version V 2.30 or later.

The following screen should open.

8.2.1 *General Settings: Language*

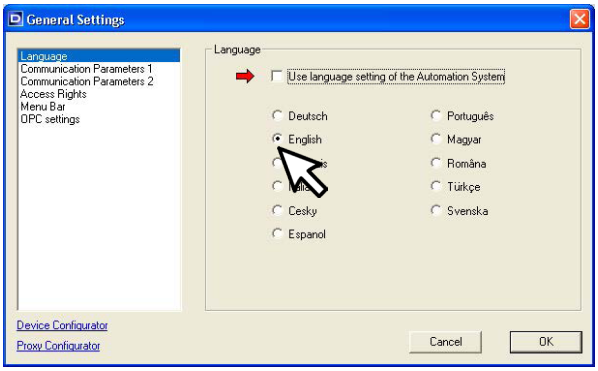


Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] or Down- [▼] softkey or the function key [F1] or [F2] highlight the wanted Category. To open the options display press the softkey [Select] or function key [F6].	Click on the wanted Category.



Use language setting of the Automation System
Only in combination with an Automation System and installed OPC Server!
Notice the OPC settings!
If this function is activated (check box active), the DSCC Software takes over the language setting of the Automation System.

Operation using softkeys/ function keys:	Operation using computer mouse:
With the [+] / [-] softkeys or the function keys [F3] / [F4] activate or deactivate the function.	Click into the check box to activate or deactivate the function.



Manual Language setting

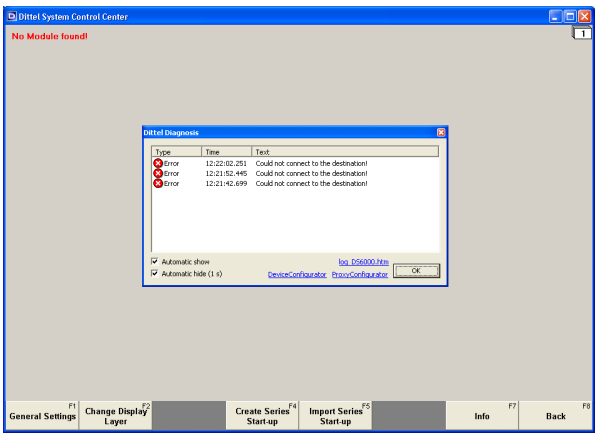
Factory setting: **English**,
can be set to German, English, French, Italian, Czech, Spanish, Portuguese, Hungarian, Romanian, Turkish or Swedish.
Additional languages on request.

With the [+] / [-] softkeys or the function keys [F3] / [F4] highlight the wanted **Language**, in this case English.	Click on the wanted **Language**, in this case English.

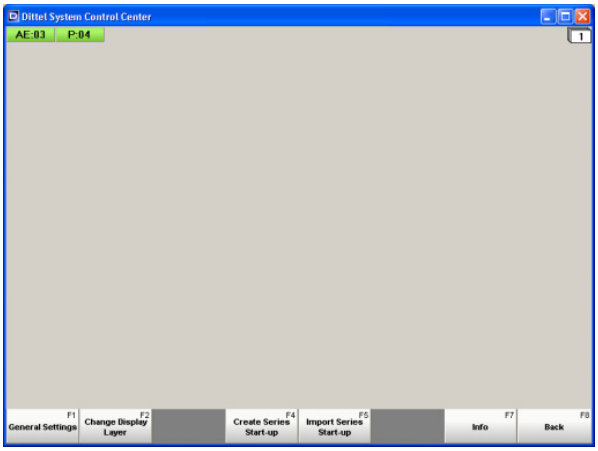
N.B.
Confirm a change in **Language** by clicking on the [OK] key or pressing the [OK] softkey or function key [F8]. The following screen opens in the selected language.

Press or click the [Back to General Settings] / [F5] key and you return without any change to select another **General Setting**.

Press or click the [Cancel] / [F7] key and you return without any change to the English start screen.

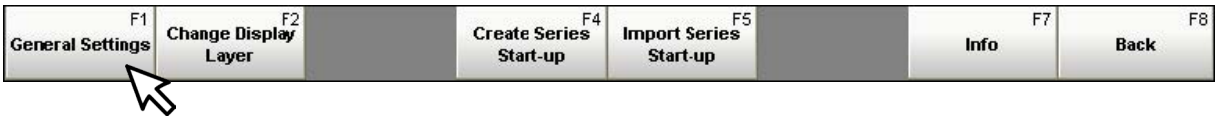


After you have selected and confirmed the language, you return to the opposite screen.
If the RS-232 Interface of the Module is not configured yet the notice **Error Could not connect to the destination** can be displayed repeated.
Ignore this notice by clicking on [OK] key or pressing the [Enter] key on the PC keyboard or [Input] on the SINUMERIK® keypad to continue.
The softkeys and messages have changed into the new language, if applicable.



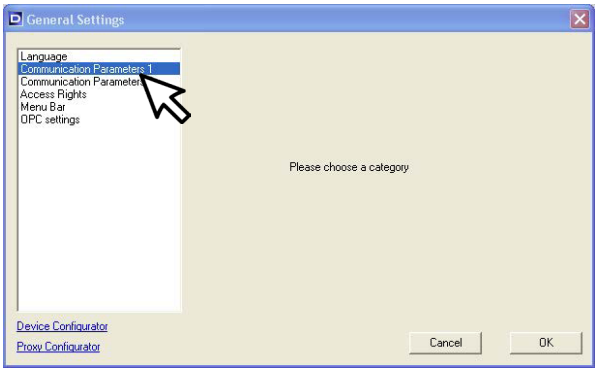
With configured interface and operational DS6000 UP Modules, the screen will show green Module addresses.

To continue click or press on the [General Settings] key or function key [F1].

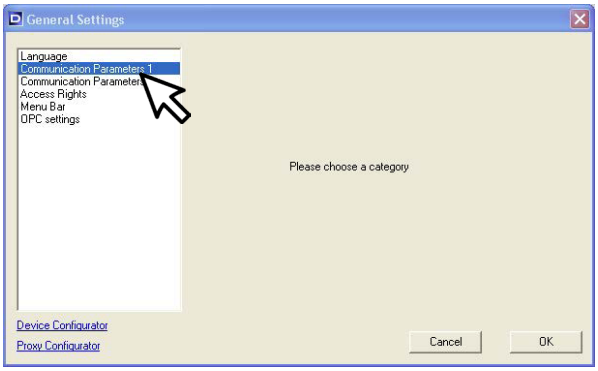


8.2.2 *General Settings: Communication Parameters 1*

N.B.
For Ethernet Interface, see supplementary document «Ethernet Interface, article number ODNDL03EN03».



Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] or Down- [▼] softkey or the function keys [F1] / [F2] highlight the Category **Communication Parameters 1**. To open the options display press the softkey [Select] or function key [F6].	Click on Category **Communication Parameters 1**.

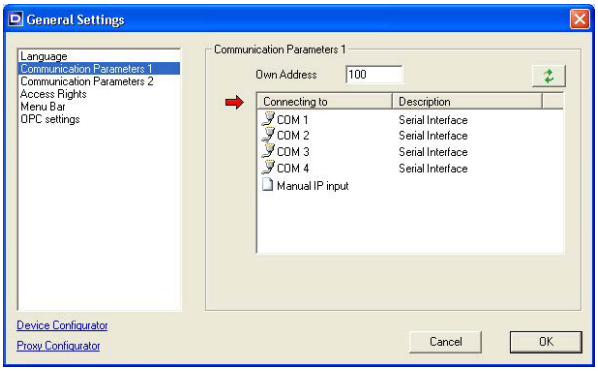


Own Address
Factory setting: **100**,
variable from 100 to 109.

The address setting 100 is intended for the Operator PC or the Automation System. Only with this address, automatic data configuration is possible.

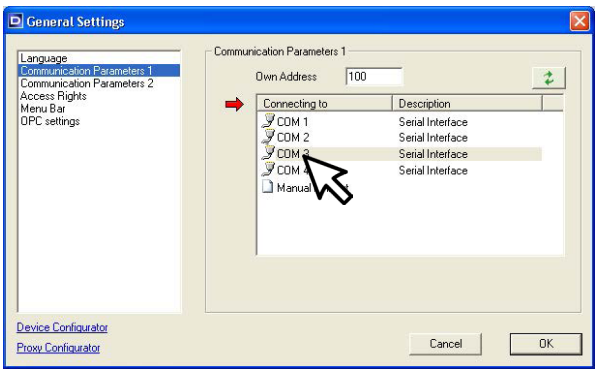
Enter an address higher than 100 when you want to configure the System externally via a Notebook etc. Then the functionality is restricted.

With the [+] or [-] softkey or function keys [F3] / [F4] enter the wanted address.	Click into the address screen, highlight numbers, and enter the wanted address. Or click on [+] or [-] keys to increase or decrease the address.



As soon as Category **Communication Parameters 1** is opened, the DSCC Software is searching for available interfaces of your Computer or Automation System.

With the Up- [▲] / [F1] or Down-softkey [▼] / [F2] set the red arrow to «Connecting to».



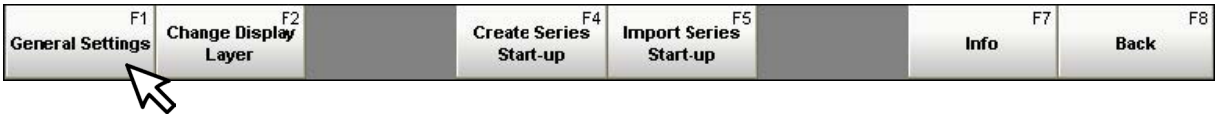
With the mouse cursor or with the [+] / [F3] or [-] / [F4] softkey highlight the Serial Interface of your Computer or Automation System which is connected via a RS-232 Interface cable to a DS6000 UP Module.

When using an Automation System SINUMERIK®, COM1 is always internally occupied, that means, you have to set the Serial Interface to COM2 or higher.

N.B.
Confirm the setting in **Communication Parameters 1** by clicking on the key [OK] or pressing the softkey [OK] or function key [F8]. Communication is done with a Standard Baud Rate of **57600**. After successful connection to the module, the screen with green Module addresses will appear.

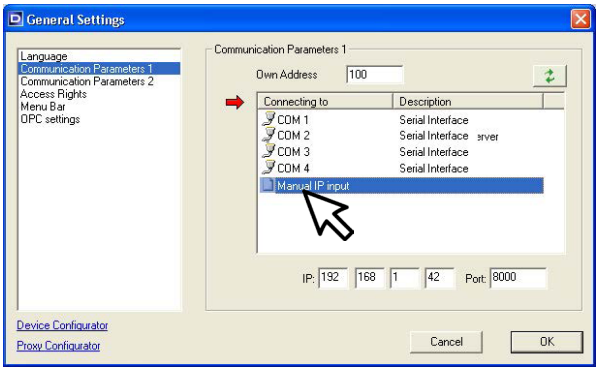
Press or click the key [Back to General Settings] / [F5] and you return without any change to select a new **General Setting**.

To continue click or press on the [General Settings] key or function key [F1].



Setting the IP Address of an Ethernet Interface Converter

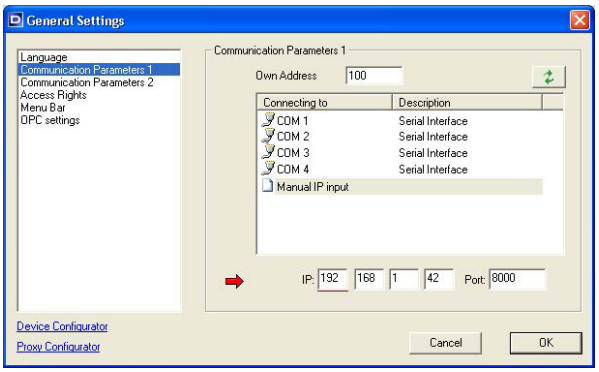
This settings are required when the DS6000 UP Module(s) should be operated via an external interface converter (serial / Ethernet) with an Ethernet interface of your computer or Automation System. IP-address and TCP-Port must be set corresponding to your interface converter:



Manual IP input

Operation using softkeys/function keys:	Operation using computer mouse:
With the Down-softkey [▼] set the red arrow to Connecting to. With the [+] or [-] softkey highlight **Manual IP input**.	With the mouse cursor click on '**Manual IP input**'.

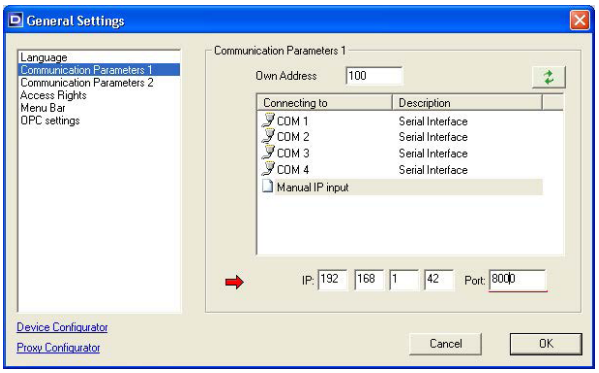
Additional screens open:



IP Address

Factory setting: **192 168 1 42**

With the Down-softkey [▼] set the red arrow to IP. The first screen is underscored red. With the [+] or [-] softkey set the wanted IP-Address. With the Down-softkey [▼] underscore the second screen, set the next numbers using the [+] or [-] softkeys and so on.	Click or highlight each screen and type the wanted IP Address or use the [+] or [-] keys.



Port

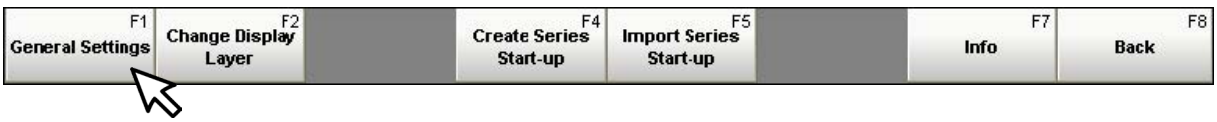
Factory setting: 8000

Operation using softkeys/function keys:	Operation using computer mouse:
With the Down-softkey [▼] highlight the window Port. With the [+] or [-] softkey set the wanted TCP Port number.	Click or highlight the window and type the wanted TCP Port or use the [+] or [-] keys.

N.B.
Confirm a change in **Communication Parameters 1** by clicking on the [OK] key or pressing the [OK] softkey / function key [F8]. After successful connection to the module the screen with green Module addresses will appear.

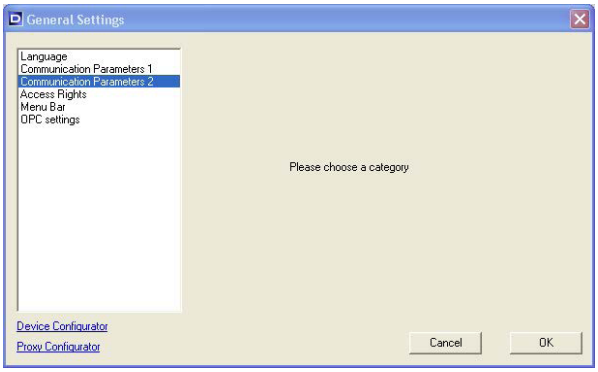
Press or click the key [Back to General Settings] / [F5] and you return without any change to select a new **General Setting**.
Clicking or pressing the [Cancel] / [F7] key returns you without any change to the screen that will show green Module addresses.

To continue click or press on the [General Settings] key or function key [F1].



8.2.3 *General Settings: Communication Parameters 2*

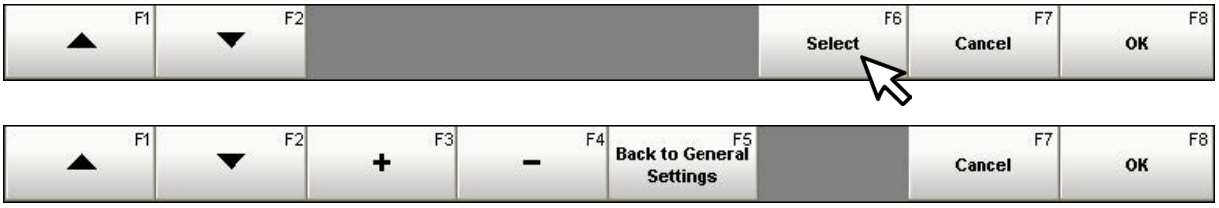
N.B.
This setting is intended for future use, please DO NOT activate!
An activation of this function may cause an error message and no connection to the module can be made!



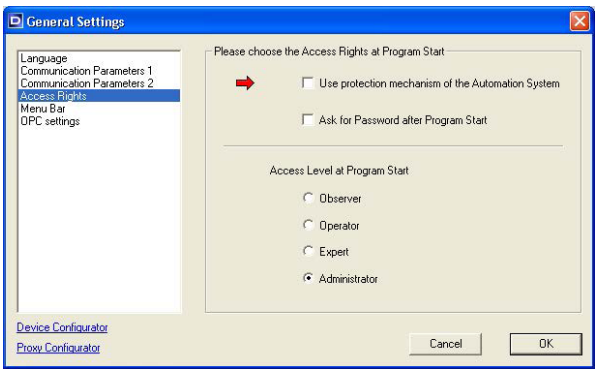
8.2.4 *General Settings: Access Rights*

N.B.
Ex-factory the DSCC Software is shipped with Access Level 'Administrator' and without password.
We recommend not restricting the Access Rights as long as the DS6000 UP Modules are not running properly on the machine tool!

Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] or Down- [▼] softkey highlight the category **Access Rights**. To open the options display press the softkey [Select] / [F6].	Click on the category **Access Rights**.



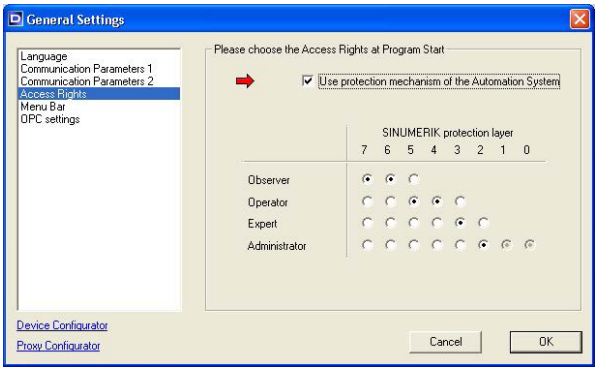
N.B.
The following setting applies only in combination with an Automation System and installed OPC Server!
Notice the OPC settings!



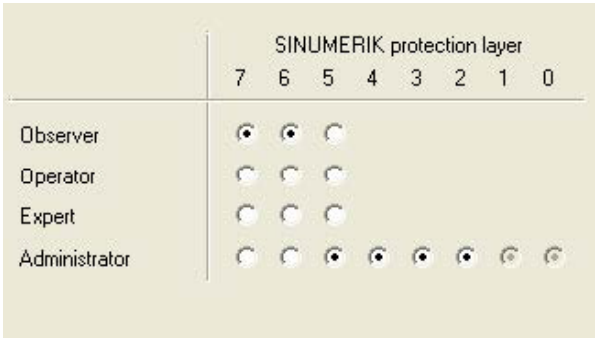
Use protection mechanism of the Automation System

Factory setting: ☐ (not active).

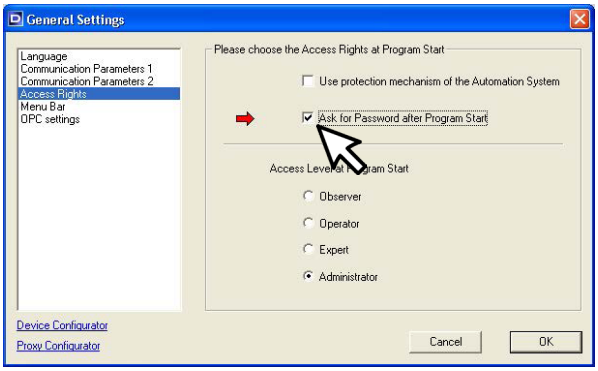
Can be set to ☐ (non-active) or ☑ (active).
With this function, the used protection layers of the Automation System are transferred to the DS6000 UP Modules.



Operation using softkeys/function keys:	Operation using computer mouse:
With the [+] / [F3] or [-] / [F4] key activate or deactivate the function. When activated the following setup screen opens.	Click into the check box and activate or deactivate the function. When activated the following setup screen opens.



For example, the operation and programs of the SINUMERIK® Automation System are protected internally via a 7-stage access mode, in which ‘0’ indicates the highest and ‘7’ the lowest access level.
With the Up- [▲] / [F1] or Down- [▼] / [F2] key and the [+] / [F3] or [-] / [F4] key activate the desired access levels. Or click into the respective check boxes.
When starting the DSCC software the program starts always with the access level predefined by the Automation System. While operating the actual access level of the Automation System determines the access level of the DS6000 UP Modules according the opposite setting.

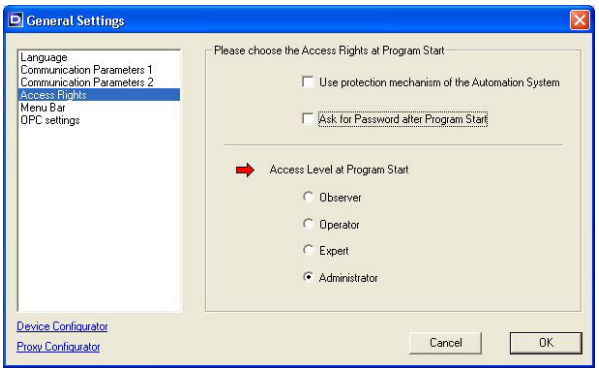


Ask for Password after Program Start

Factory setting: ☐ (not active), no password stored.

Can be set to ☐ (non-active) or ☑ (active).
If this function is active, a password for the selected access level must be entered when starting the program (see next setting).
If this function is not active then the program starts immediately without password in the selected access level.

Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the setting **Ask for Password after Program Start**. With the [+] / [F3] or [-] / [F4] key activate or deactivate the password prompt.	Click into the check box and activate or deactivate the password prompt.



Access Level at Program Start

Factory setting: **Administrator**.
With this setting adjustments or operation can be limited, depending on the access level. Nevertheless, if the Administrator wants to access the program, it is possible any time after entering the valid password.

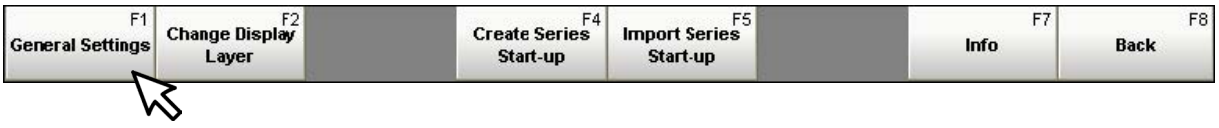
Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the setting **Access Level at Program Start**. With the [+] / [F3] or [-] / [F4] key set the wanted Access Level at Program Start	Click into the check box to set the wanted **Access Level at Program Start**.

P6002 UP line module:

Observer: Only observation of the unbalance and speed possible.
Operator: Like Observer, additionally authorized to select Pre-Balancing Method, RPM Tolerance, Rotation Direction, Target Level and Mass Table. Functions: Setup, Pre-Balancing and Re-Balancing.
Expert: Like Operator, additionally authorized to set or change the memory sets of the Pre-Balancing Module.
Administrator: No restriction, full range of operation and setting.

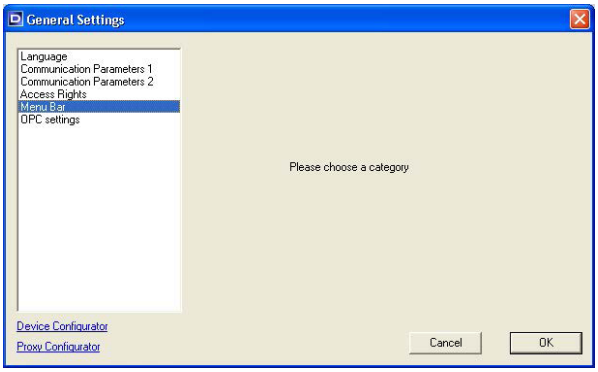
N.B.
Confirm a change in Access Rights by clicking on the [OK] key or pressing the [OK] softkey or function key [F8]. You return to the green screen.
Press or click the [Back to General Settings] / [F5] key and you return without any change to select a new General Setting.
Pressing or clicking the [Cancel] / [F7] key returns you without any change to the green screen.

To continue click or press on the [General Settings] key or function key [F1].

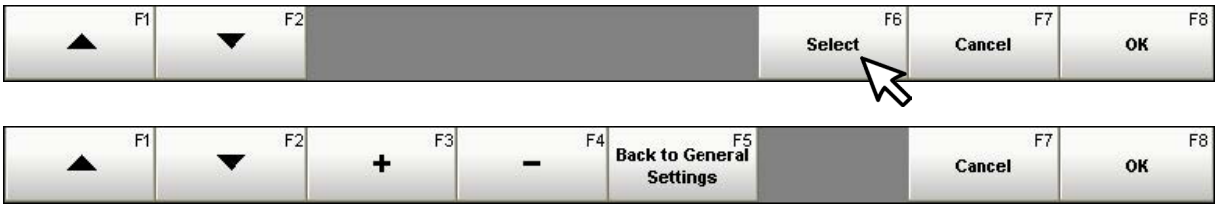


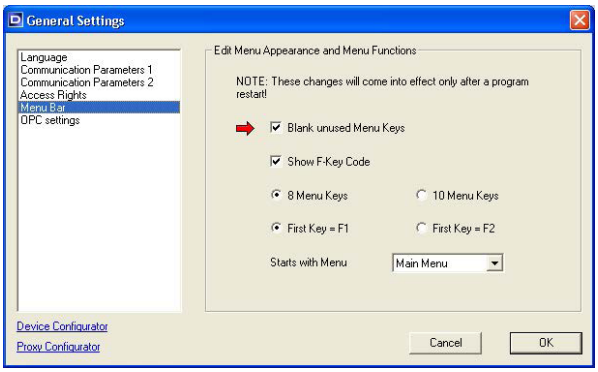
8.2.5 *General Settings: Menu Bar*

N.B.
The following settings get effective only after a restart of the DSCC software!



Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the category Menu Bar. To open the options display press the softkey [Select] or [F6].	Click on the category **Menu Bar**.





Blank unused Menu Keys

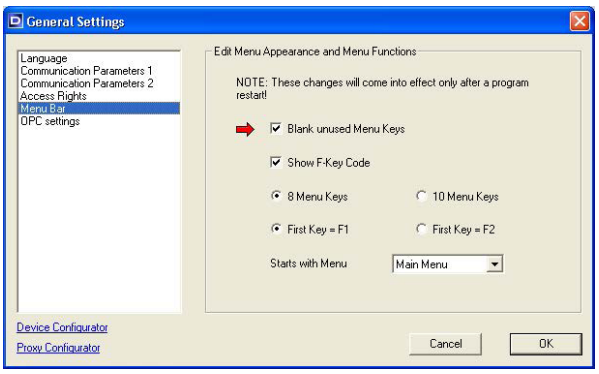
Factory setting: ☑ (active).

Can be set to ☐ (non-active) or ☑ (active).
With this setting, unused menu keys are either blanked or visible.

With the [+] / [F3] or [-] / [F4] key activate or deactivate the function.	Click into the check box and activate or deactivate the function.

Setting: ☑ **Blank unused Menu Keys**

Setting: ☐ **Blank unused Menu Keys**



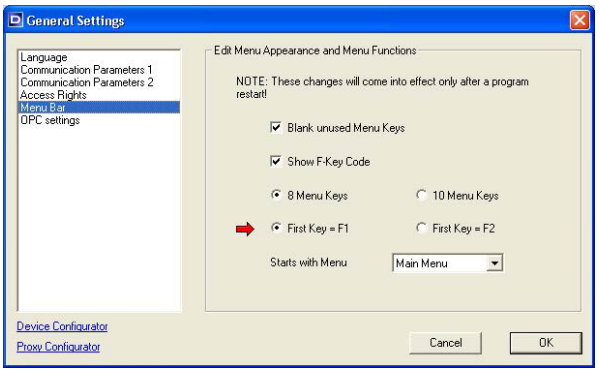
8 Menu Keys - 10 Menu Keys

Factory setting: **8 Menu Keys**.
Can be set to **8 Menu Keys or 10 Menu Keys**.
With this setting, you can adapt the number of menu keys (softkeys) to the number of keys at the Automation System.

With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the line **8 Menu Keys - 10 Menu Keys**. With the [+] / [F3] or [-] / [F4] key determine the number of menu keys.	Determine the number of menu keys by clicking into the appropriate check box.

Setting: **8 Menu Keys**

Setting: **10 Menu Keys**

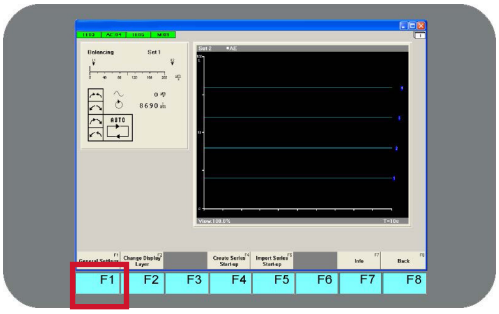


First Key = F1 – First Key = F2

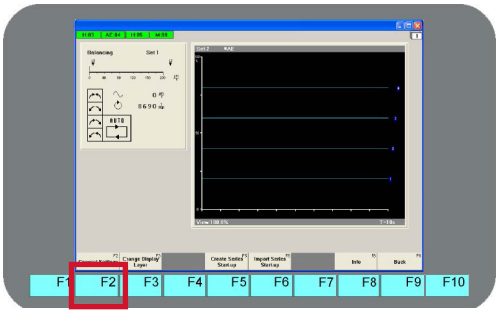
Factory setting: **First Key = F1**.
Can be set to **First Key = F1** or **First Key = F2**.
If the **F1-Key** is occupied yet, e.g. for the HELP function, the first softkey can be set as **F2-Key**.
All function keys described in this operator's manual apply to the setting **First Key = F1**!

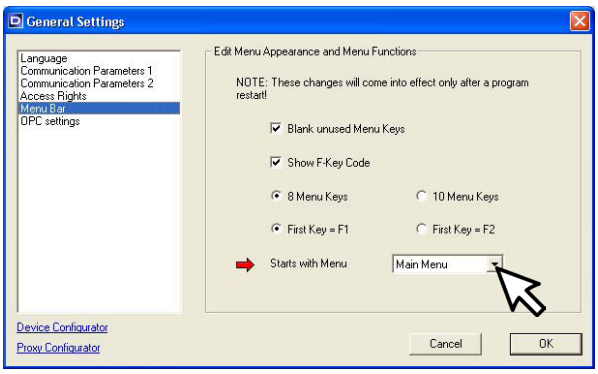
Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the line **First Key = F1 – First Key = F2**. With the [+] / [F3] or [-] / [F4] key determine the appropriate setting.	Determine the setting by clicking into the appropriate check box.

Setting: **First Key = F1**



Setting: **First Key = F2**

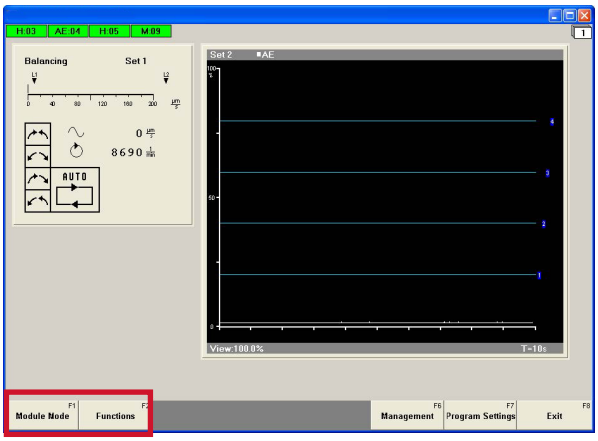




Starts with Menu

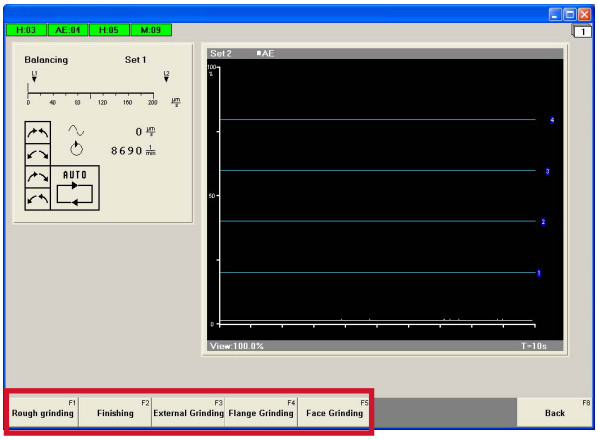
Factory setting: **Main Menu**.
Can be set to **Main Menu** or Functions.
With this setting, you can determine with which menu the DSCC software starts.

Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the line Starts with Menu. With the [+] / [F3] or [-] / [F4] key determine the Starts with Menu.	Click on the wanted Starts with Menu.



Program starts with setting **Main Menu**

The additional key [Functions] is only available when new menu keys were defined in the menu **Management - Setup Functions**.

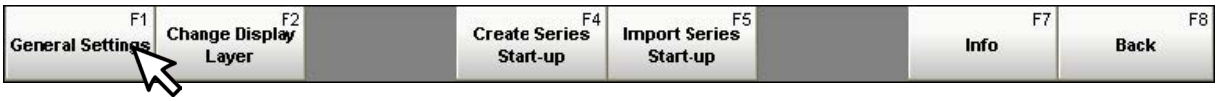


Program starts with setting **Functions**

The program starts with the keys defined in the menu **Management - Setup Functions**.
In this example the keys are defined as ‘Rough grinding’, ‘Finishing’, ‘External Grinding’, etc.

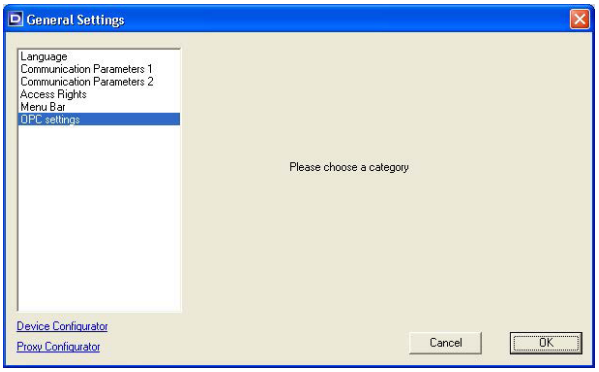
N.B.
Confirm a change in **Menu Bar** by clicking on the [OK] key or pressing the [OK] softkey or function key [F8]. You return to the green screen.
Exit the DSCC software and restart it, only then the changes get effective!
Press or click the [Back to General Settings] / [F5] key and you return without any change to select a new **General Setting**.
Pressing or clicking the [Cancel] / [F7] key returns you without any change to the green screen.

e click or press on the [General Settings] key or function key [F1].

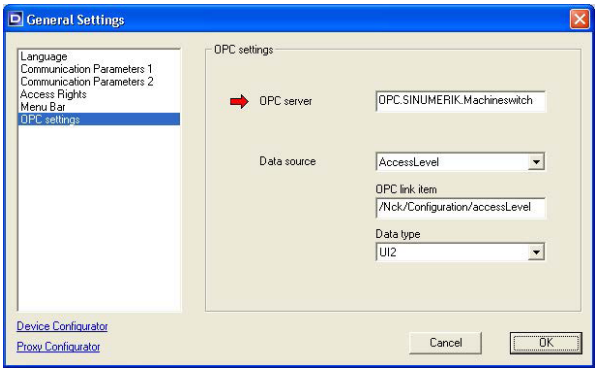


8.2.6 *General Settings: OPC Settings*

N.B.
An OPC Server software must be installed on your Automation System!



Operation using softkeys/function keys:	Operation using computer mouse:
With the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight the category **OPC Settings**. To open the options display press the soft-key [Select] or [F6].	Click on the category **OPC Settings**.



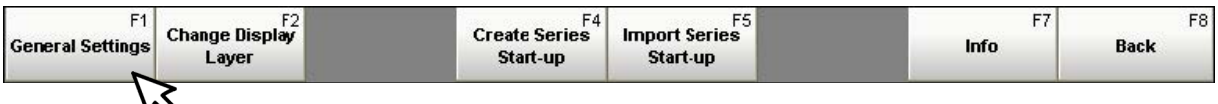
OPC Server

Factory setting: OPC.SINUMERIK.Machineswitch

For more information, please contact our Sales Department.

N.B.
Confirm a change in **OPC Settings** by clicking on the [OK] key or pressing the [OK] softkey or function key [F8]. You return to the green screen.
Press or click the [Back to General Settings] / [F5] key and you return without any change to select a new **General Setting**.
Pressing or clicking the [Cancel] / [F7] key returns you without any change to the green screen.

To continue click or press on the [General Settings] key or function key [F1].



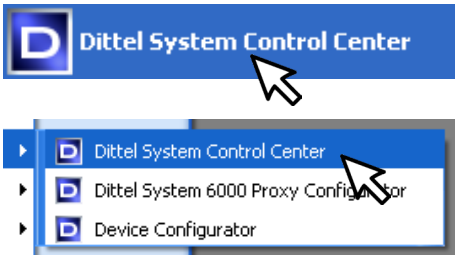
9 MODULE SPECIFIC SETTINGS

9.1 Precondition

a) One pre-set Pre-Balancing P6002 UP line module is
- connected to a 24 Vdc power source (green LED # 4 lights),
- connected to an Automation System (e.g. SINUMERIK®) or Standard-Windows® Computer with appropriate hardware equipment via the Serial Interface (RS-232), connector # 5, or via Ethernet.
- The DSCC Program is properly installed (refer to paragraph “7 DSCC Software” on page 47) and the interface configured (see paragraph “8.2.2 General Settings: Communication Parameters 1” on page 62). For Ethernet interface, see Supplementary Document “Ethernet Interface” A/N ODNDL03EN03.

b) Several pre-set Pre-Balancing P6002 UP line modules and/or Process Monitoring Modules AE6000 UP are:
- connected to a 24 Vdc power source (all green LEDs # 4 light),
- connected with each other by special Patch Cords (A/N O67L0020018, formerly A/N K0020018), the first and last Module is terminated (DIP-switch # 6 is ON).
- ONE Module must be connected to an Automation System (e.g. SINUMERIK®) or Standard-Windows® Computer with appropriate hardware equipment via the serial interface (RS-232) or via Ethernet. The interface of THIS Module is appropriately configured (see paragraph “8.2.2 General Settings: Communication Parameters 1” on page 62 for RS-232, for Ethernet see Supplementary Document A/N ODNDL03EN03).
- The DSCC Software is properly installed and the interface configured (refer to paragraph “7 DSCC Software” on page 47).

9.2 Starting the Program



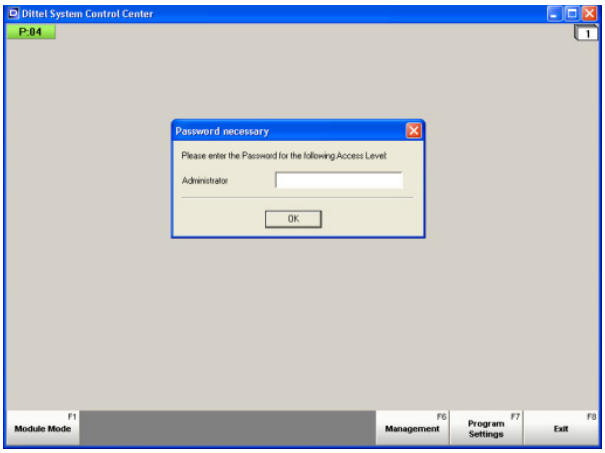
Start the Program on your Automation System or computer by clicking on button Start and then on symbol “Dittel System Control Center”.

or start the Program by clicking on buttons Start / Programs / Dittel System 6000 and finally on the symbol “Dittel System Control Center”.

In the SINUMERIK® HMI-Environment, you can start the DSCC Program by pressing the appropriate softkey.

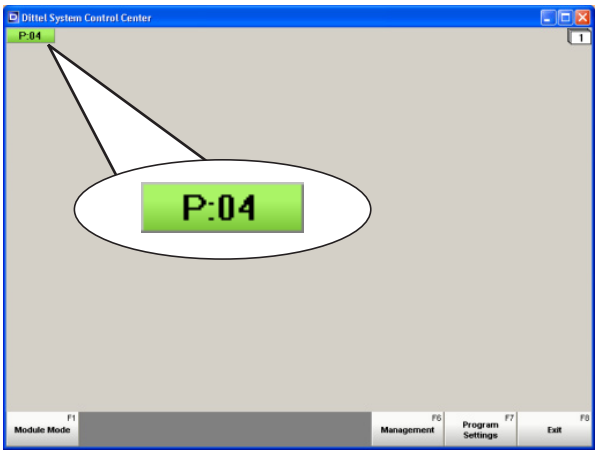
The following Start Screen should open:

9.2.1 Start Screen

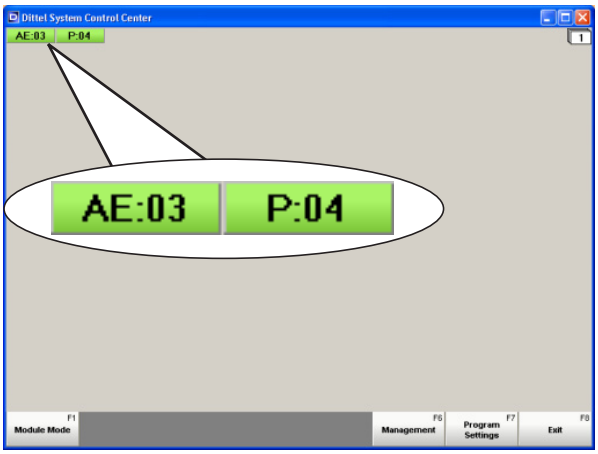


When the password prompt is activated (see paragraph “8.2.4 General Settings: Access Rights” on page 65) the opposite screen is displayed.
If no password has been entered till now, click on [OK] or press [Enter] on your computer keyboard or [Input] on the SINUMERIK® keypad.
Otherwise enter your password and click on [OK] or press [Enter] on your computer keyboard or [Input] on the SINUMERIK® keypad.

When the password prompt is not activated or you have confirmed by clicking on [OK] or pressing [Enter] / [Input] the following start screen is displayed depending on number of connected Modules:



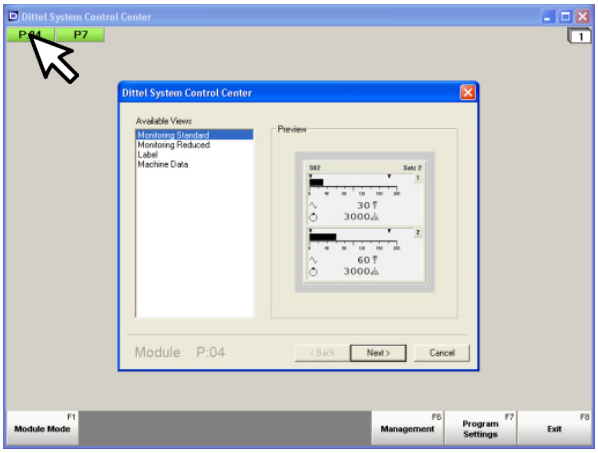
A green Module Address **P:04** shows a ready to operate P6002 UP Pre-Balancing line module with the address 04.



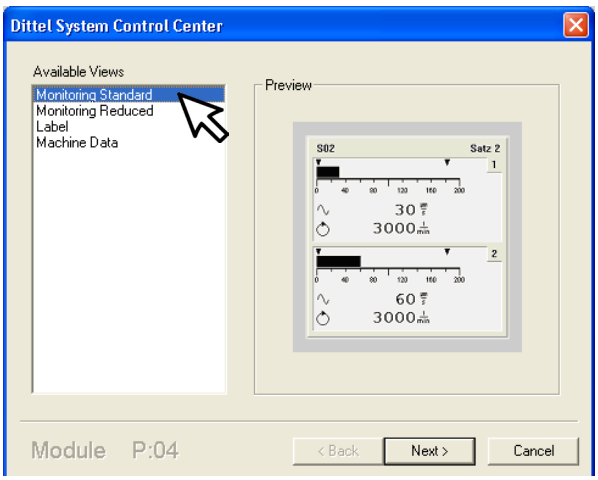
Green Module Addresses **AE:03 P:04** show two ready to operate Modules; one Acoustic
Emission Process Monitoring Module AE6000 UP or
AE6001 with the address 03 and one Pre-Balancing P6002 UP line module with the address 04.

9.2.2 *Activating the Module(s)*

N.B.
Without the following settings, an P6002 UP Pre-Balancing line module is not operable via an Automation System or PC! Each Module must be 'visible' at least on one of the Display Layers!



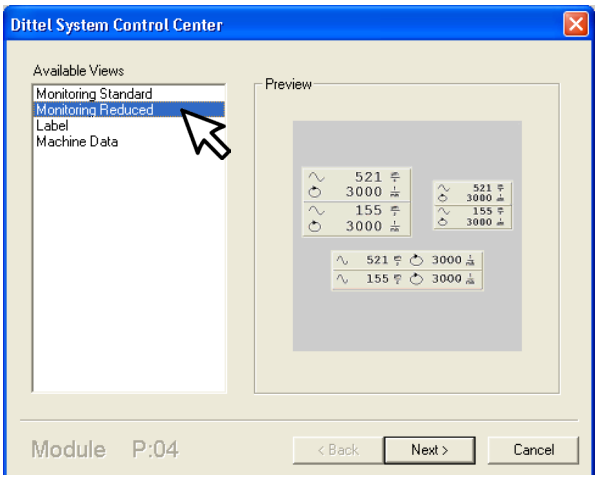
Activate a Pre-Balancing Module by double-clicking, for example on Module Address **P:04**. The opposite options display opens. There are three different Module Views available to represent the Pre-Balancing P6002 UP line module on the screen. The preview shows you examples.



Monitoring Standard

The Module View »Monitoring Standard« shows all important information in a scalable window.
It shows

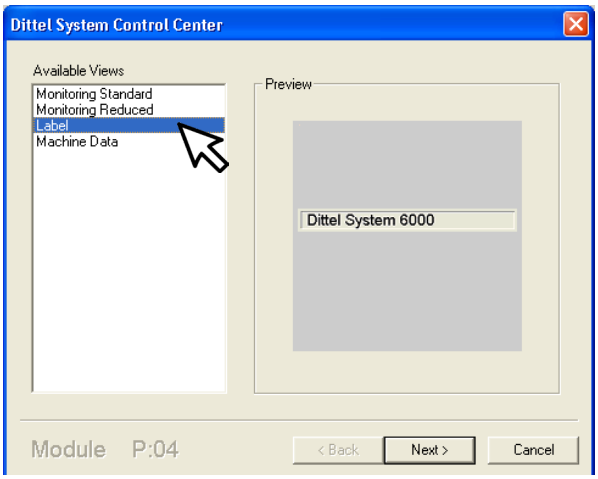
- the Set number,
- the Set name,
- the actual unbalance, optionally displayed in units of µm/s or nm,
- optionally an internal measurement angle,
- two limits of unbalance,
- the actual speed,
- the Operating Mode and possible Error Messages.



Monitoring Reduced

The Module View »Monitoring Reduced« shows in a scalable window

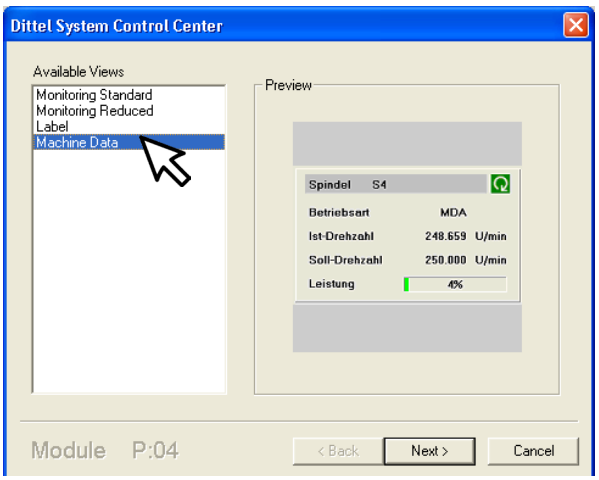
- the actual unbalance, optionally displayed in units of µm/s or nm,
- optional an internal measurement angle,
- the actual speed, and possible Error Messages.



Label

The View “Label” is further reduced to a lettering space which is scalable.

Also in this Module View, the Pre-Balancing P6002 UP line module monitors fully but no error messages or values are displayed on the screen!

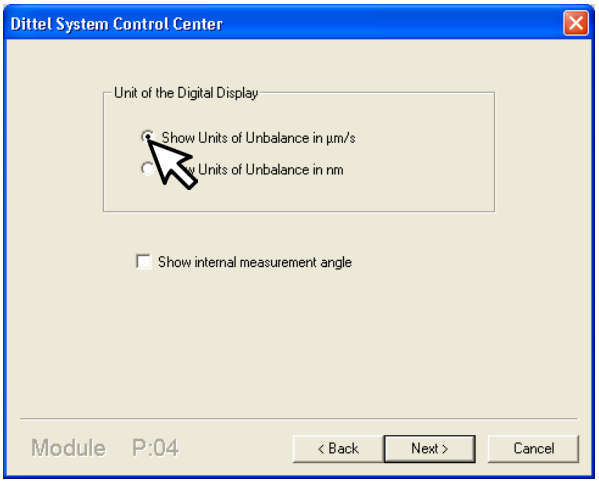


Machine Data
THIS IS NOT A PRE-BALANCING FUNCTION!

This screen representation “Machine Data” only makes sense in connection with a SINUMERIK® Automation System and OPC server software.

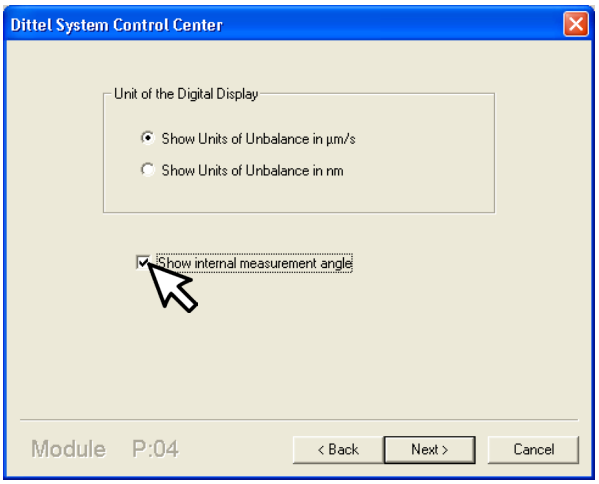
In this view, the machine data of the actual operated spindle are displayed.

With a computer mouse click or the arrow keys [↑] [↓] of your keyboard select the wanted Module view and click on [Next >] or press the [Enter] key.



If you have chosen the Module View **Monitoring Standard**, **Monitoring Reduced** the following screen opens.

In this options window you determine the Unit of the Digital Display and/or an Internal Measurement Angle:
Show Units of Unbalance in µm/s: the digital display and the analog bar graph show the unbalance velocity in µm per second.
Show Units of Unbalance in nm: the digital display shows the displacement in nano-meter whereas the analog bar graph shows the unbalance velocity in µm per second.

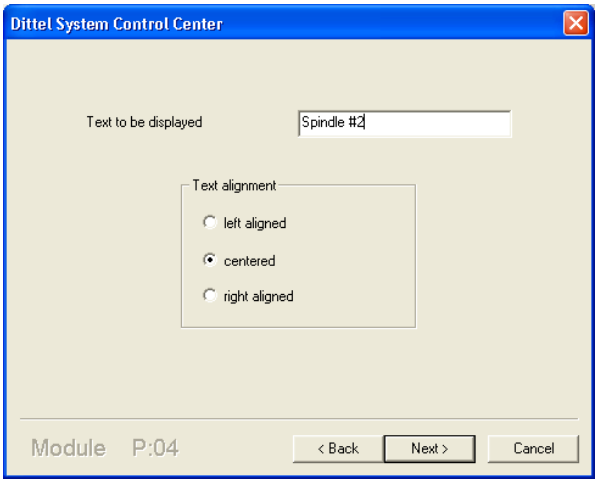


Checkbox **Show internal measurement angle**:

☑ (ticked): In the Module View **Monitoring Standard** and **Monitoring Reduced**, an internal measurement angle is displayed. This is the angle between position of the unbalance and trigger point of the speed sensor (prox switch).

The internal measurement angle is only displayed at a constant speed. So when starting or switching off the machine drive, the internal measurement angle is blanked.

With a computer mouse click or using the cursor keys [↑] / [↓] select the wanted unit of unbalance, tick or untick the checkbox regarding the angle, and then click on [Next >] or press the [Enter] key.

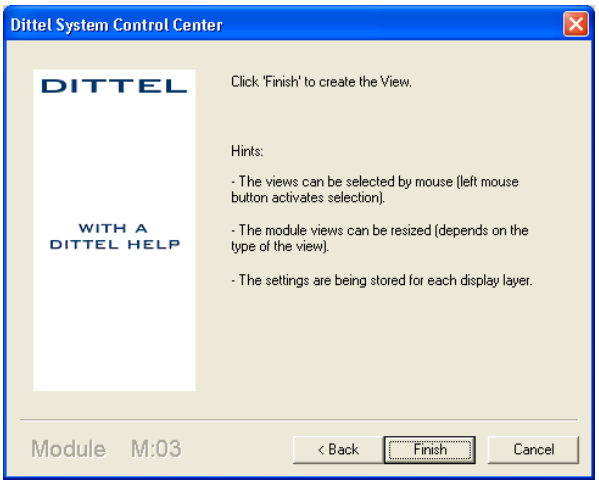


If you have chosen the Module View **Label** the following screen opens.

Highlight and overwrite the example text with your application, e.g. **Spindle 02**.

With a mouse click, select the Text Alignment of the displayed Label.

Click on [Next >] or press [Enter].

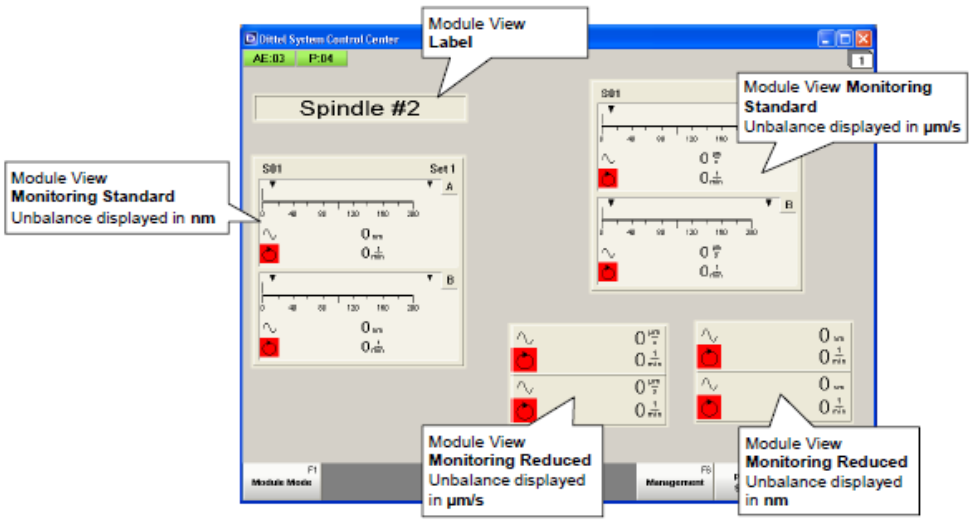


In all cases the following screen opens.

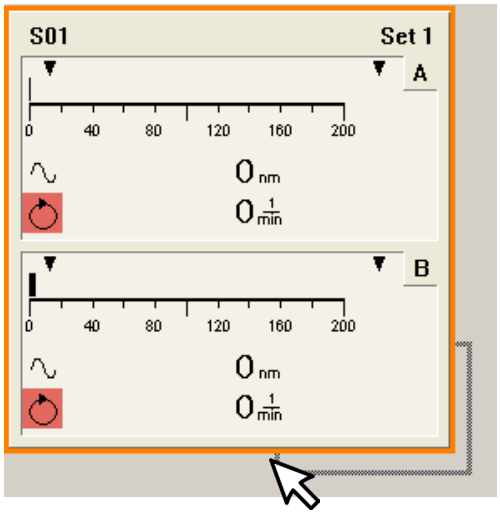
Click on [Finish] or press [Enter] to create the wanted Module View.

N.B.
Make every Pre-Balancing Module operable as described above! You can open every Module View on the screen as many as you like. Simply repeat the steps as described above.

The example shows the Pre-Balancing Module **P:04** which is opened in all three available Views.



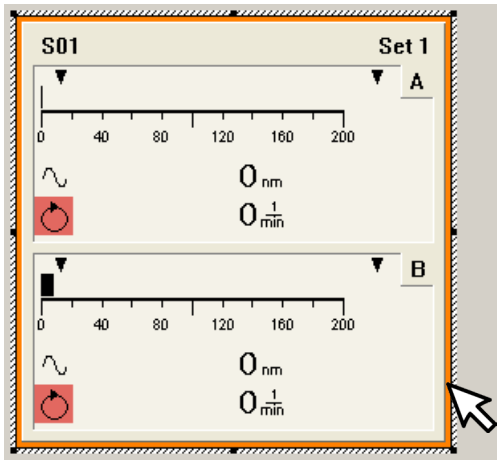
9.2.3 *Module View – highlighting, positioning and scaling*



To position and/or scale the Module View, highlight the Module View first.

To highlight the Module View(s) move the cursor arrow outside the Module View(s), press and hold the LEFT PC mouse button.

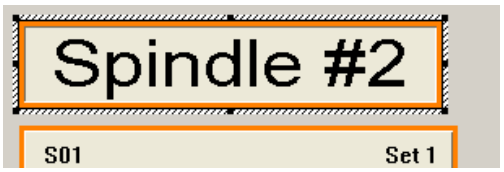
Drag a frame into the Module View(s) and release the mouse button. The Module View(s) will be highlighted (marked).



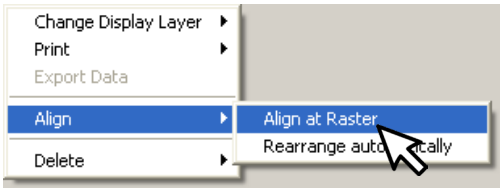
To position the Module View(s) move the cursor arrow to touch the marking of the Module View(s). An additional ‘move’ symbol appears.

Press and hold the LEFT mouse button and move the Module View(s) to a convenient position on the screen.

Release the mouse button.



After highlighting, the width and height of all three Module Views can be scaled.
To do this, move the cursor arrow to a “handle” of the marking. The cursor arrow changes to make horizontal, vertical, or diagonal changes in size.
Press and hold the LEFT mouse button and pull the Module View to a convenient size. The font size and symbols adapt to the label size automatically.
Release the mouse button.



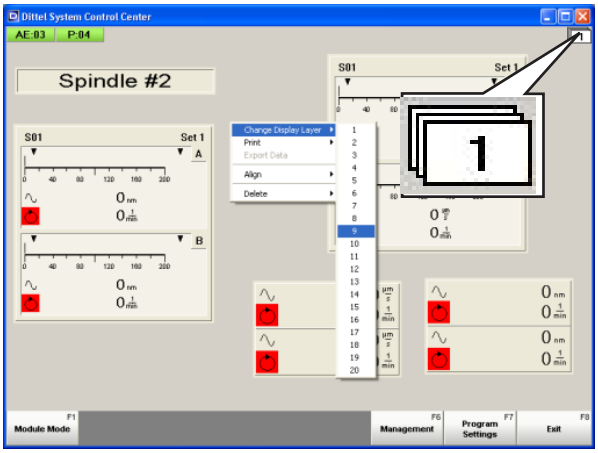
To align different Module Views move the cursor arrow outside a Module View, then press the RIGHT mouse button. Move the cursor to ‘Align’, a context menu opens where you can select how to align the Module Views:

Align at Raster: The Module Views are aligned within a 10 x 10 pixel raster.
Rearrange automatically: The Module Views are arranged automatically from left to right in the order of their module addresses.

With the cursor highlight the wanted alignment and click with the left mouse button.

9.2.4 *Create different Display Layers*

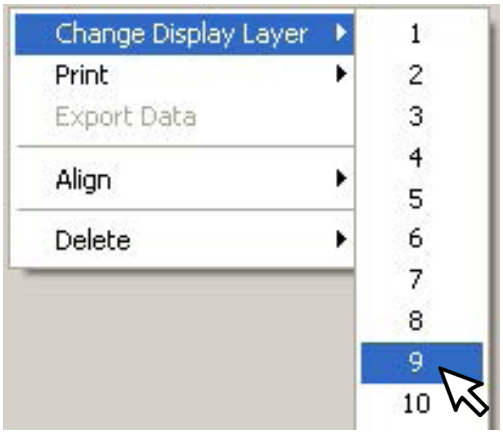
The DSCC Software offers you to create up to twenty different display layers.



To position and/or scale the Module View, highlight the Module View first.

To highlight the Module View(s) move the cursor arrow outside the Module View(s), press and hold the LEFT mouse button.

Drag a frame into the Module View(s) and release the mouse button. The Module View(s) will be highlighted (marked).



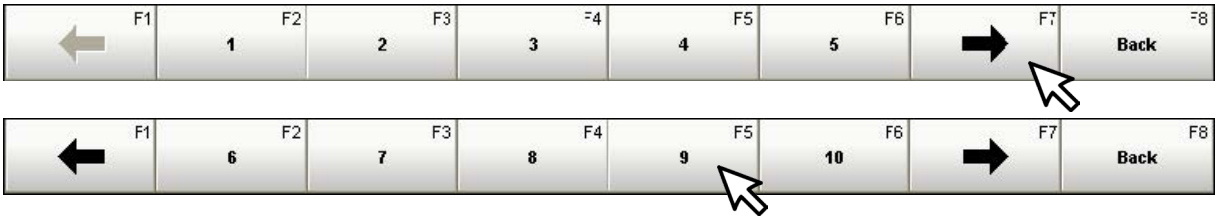
With the mouse button, click on the wanted Display Layer number. The screen changes immediately to the new Display Layer.

Or you press the softkey [Program Settings] / [F7]

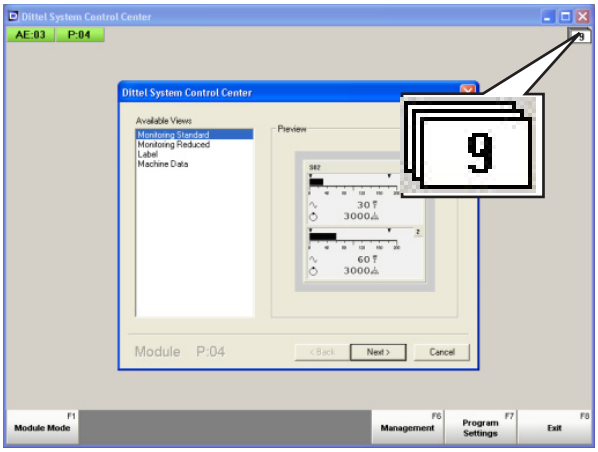
and then [Change Display Layer] / [F2]

With the arrow keys or function keys [F1] / [F7] the keys 1 to 20 are displayed.

Press the key with the wanted Display Layer number. The screen changes immediately to the new Display Layer.



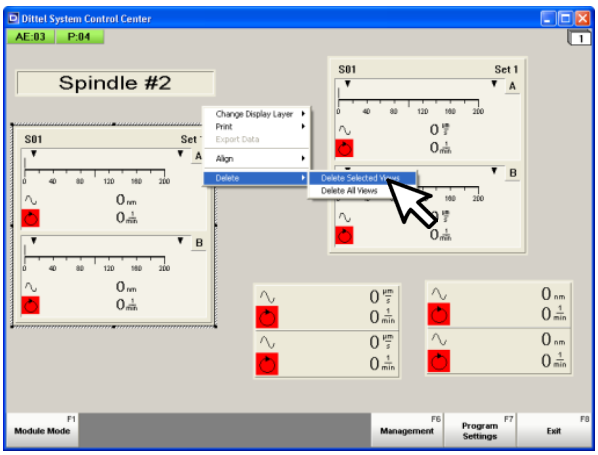
Create a new Display Layer, e.g. Display Layer 9, as described in paragraph“9.2.2 Activating the Module(s)” on page 73:



With the key shortcut [Ctrl] + [1] … [Ctrl] + [9] a direct and fast selection of the first nine Display Layers is possible as well.

9.2.5 *Delete Module View(s)*

N.B.
Never delete all Module Views.
If all Module Views are deleted on all Display Layers, the Pre-Balancing Module is no longer operational via the Automation System or computer!

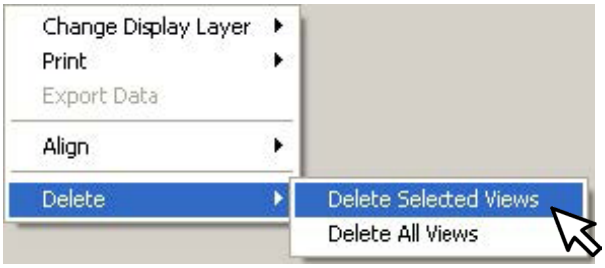


Change to the Display Layer in which you would like to delete Module Views.

If you would like to delete only certain Module Views, highlight the Module View to be deleted. After holding down the RIGHT mouse button, a context menu opens.

Click on **Delete Selected Views**.

The selected Module Views are immediately deleted.



If you would like to delete all Module Views on that Display Layer, hold down the RIGHT mouse button and a context menu opens.

Click on **Delete All Views**.

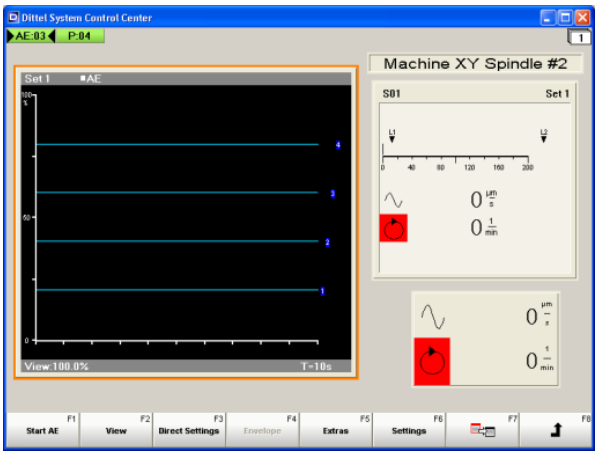
All Module Views are deleted immediately.

9.3 *Module Settings*

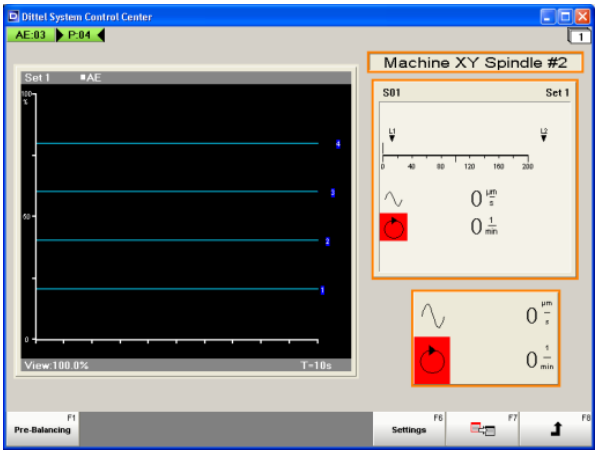
N.B.
The Pre-Balancing P6002 UP line module is factory pre-set for check and testing purposes. To achieve perfect balancing results it is therefore necessary to adapt the P6002 UP line module to your conditions. Please carry out the following adjustments carefully.
The following adjustments are only possible with Access Rights **Expert** or **Administrator**.
All quantities like unbalance (µm/s), Limit 1, Limit 2, speed (1/min), shown in the following illustrations, are examples or default settings!

When restarting the system always the Display Layer 1 is shown (if not changed). With [Ctrl] + [1] … [9] or the softkeys [Program Settings] - [Change Display Layer] select the Display Layer where the Module to be set is shown.

To carry out the Module Setting of a P6002 UP line module press or click on [Module Mode] or [F1].



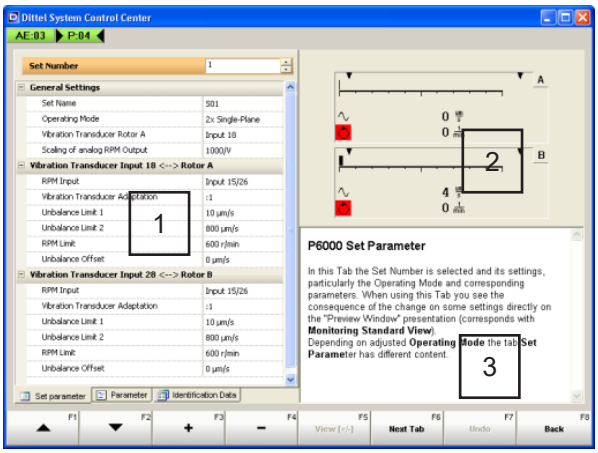
When restarting the program, on the selected Display Layer always the first “visible” Module is highlighted, e.g. **AE:03**, as well as the corresponding Module View (marked orange). The softkeys to operate the Module are displayed.



With several modules “visible” select the module to be set by using the key corresponding to the F7 function or [F7] = next Module, in this example **P:04**. The Module will be highlighted as well as the corresponding Module View (marked orange).

Press or click on the key [Settings] / [F6].

An options display with Preview Window opens – independent of the Module View - to set the selected Pre-Balancing P6002 UP line module:



The options display of the P6002 UP line module is split into three sections:

1

The left section of the display is for setting. Practically the settings are carried out with computer mouse and keyboard. But the wanted setting can also be highlighted using the Up- [▲] or Down-key [▼] / [F1] or [F2] of the automation system's keyboard. The highlighted setting can be changed using the keys [+] or [-] / [F3] or [F4].

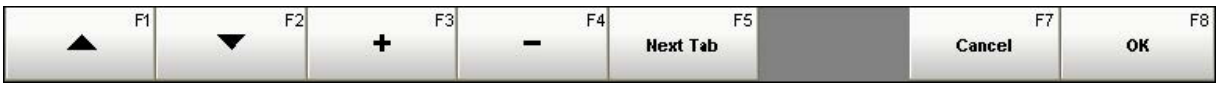
- Click on the button or press the key [View [+/-]] / [F5] to open or close a dropdown list.
  Click on the button or press the [Next Tab] / [F6] key to open the next tab.
  The following tabs can be chosen:
  - Set Parameter,
  - Parameter,
  - Identification Data.
- Click on the button or press the [Undo] / [F7] key to cancel already made settings.
- Click on the button or press the [Back] / [F8] key to enter the settings and return to the Module View.

2

The right upper section shows a preview of the Module View Monitoring Standard of the P6002 UP line module.

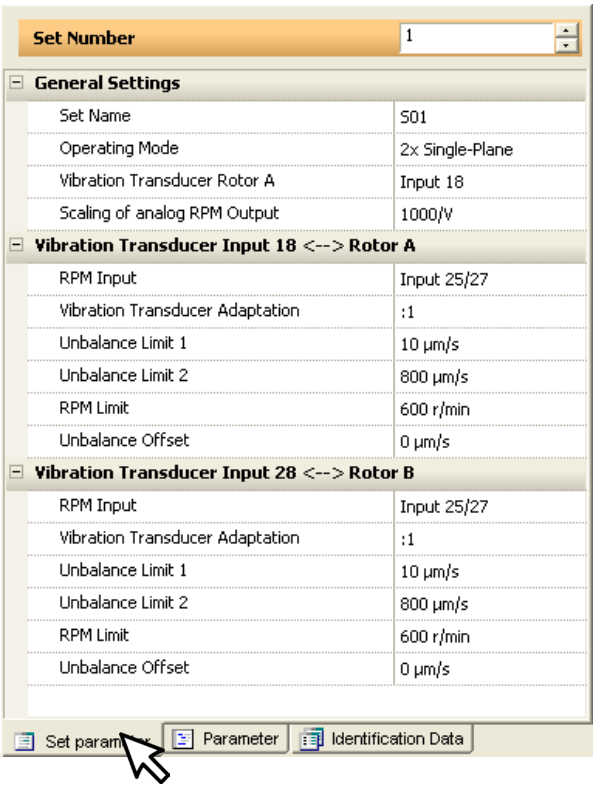
3

The right lower section is a Help-window. It explains the highlighted setting.



9.3.1 *Tab: Set Parameter*

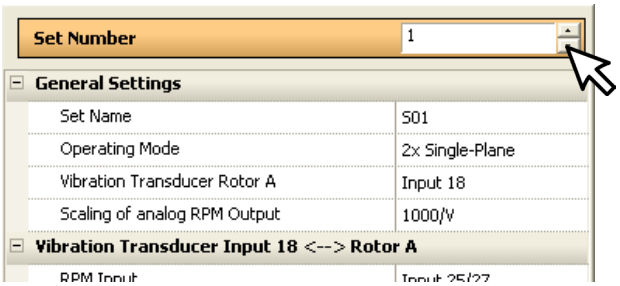
N.B.
The following settings determine essentially the pre-balancing quality, as well as the monitoring function of P6002 UP line module. Only trained staff should therefore perform all settings.



Choose the Tab **Set Parameter**.

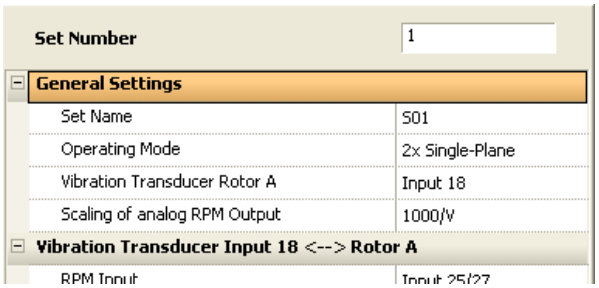
In this Tab the Set Number is selected and its settings, particularly the Operating Mode and corresponding parameters.
When using this Tab you see the consequence of the change on some settings directly on the “Preview Window” presentation (corresponds with Module View **Monitoring Standard**).

Depending on adjusted **Operating Mode** the tab **Set Parameter** has different content.

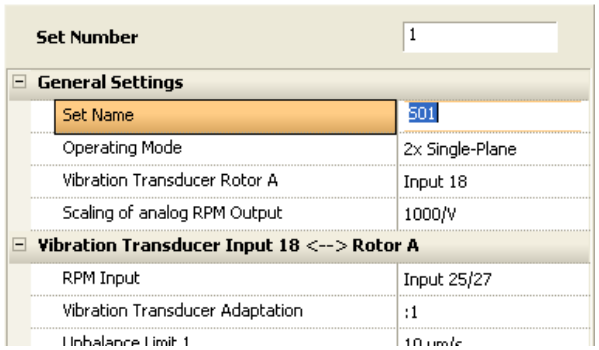


Set Number

Default setting: **1**,
can be changed from **1** to **15** using the keys [+] or [-] / [F3] or [F4] or the computer mouse.
All parameters, which are necessary to pre-balance a rotor or spindle in one or two planes, are saved under a user-defined Set Number (1 to 15). By switching over the Set Number (manually or by the automation system) it is therefore possible to pre-balance either one or two rotor(s) in one plane or to pre-balance a rotor in two planes with their specific parameters.
All information saved under a Set Number is permanently stored. Interruption of the power supply does not result in loss of information.
Changing the Set Number is immediately visible on the preview window.



General Settings (only heading, no function)
Under the heading **General Settings** the
- Set Name,
- Operating Mode,
- Acceleration Sensor Rotor A, and
- Scaling of analog RPM Output
can be entered.



Set Name

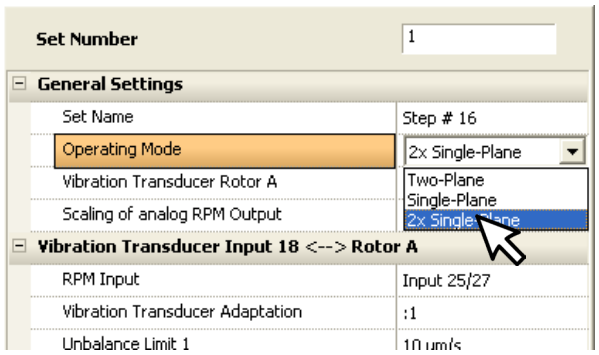
Default setting: e.g. Set Number 1: **S01**

- Highlight the line **Set Name** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.

An input box is shown.

- The default Set Name, e.g. **S01** of Set Number 1, can be overwritten if desired and is shown on the Module View **Monitoring Standard** above left and on the pre-balancing screen together with the Set Number.

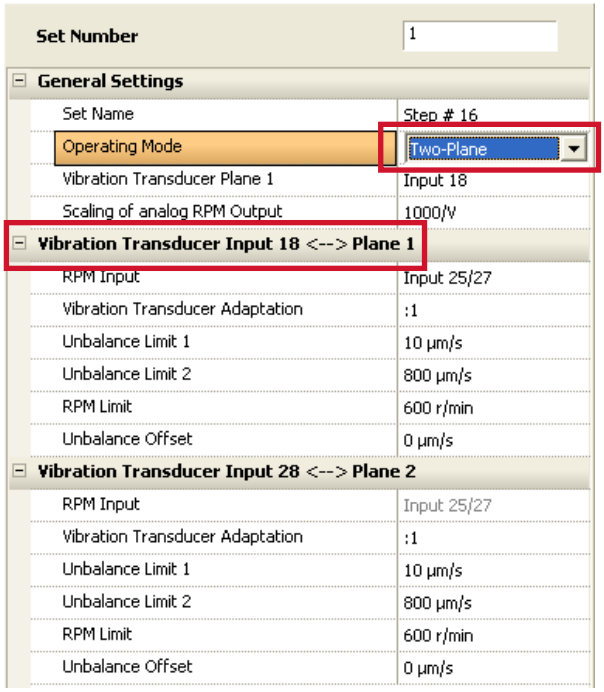
Up to sixteen (16) characters are permitted!



Operating Mode

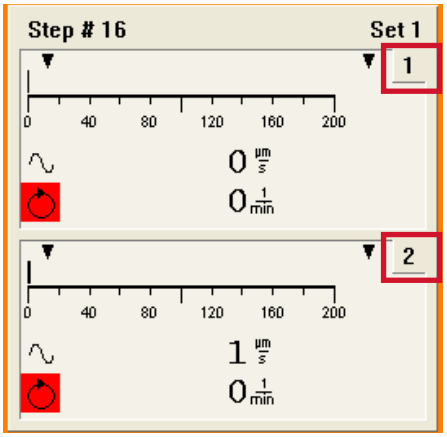
Default setting: **2x Single-Plane**

- Highlight the line **Operating Mode** with a com-puter mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key. A list of options is displayed.

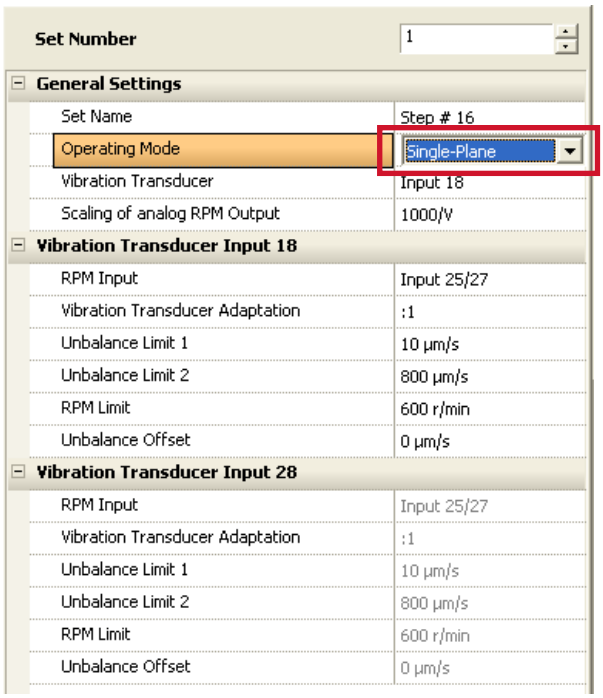


Two-Plane

Setting when a rotor (e.g. a spindle) should be pre-balanced dynamically (in two planes).
The settings for the Set are changing accordingly.
In this example the plane, whose Acceleration Sensor is connected to Vibration Transducer Input 18, is Plane 1.

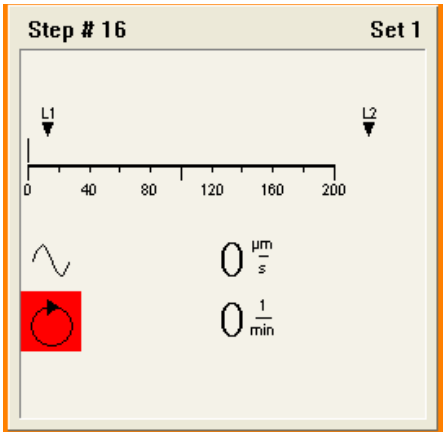


In the Module View **Monitoring Standard**, **Plane 1** and **Plane 2** are monitored and displayed simultaneously.

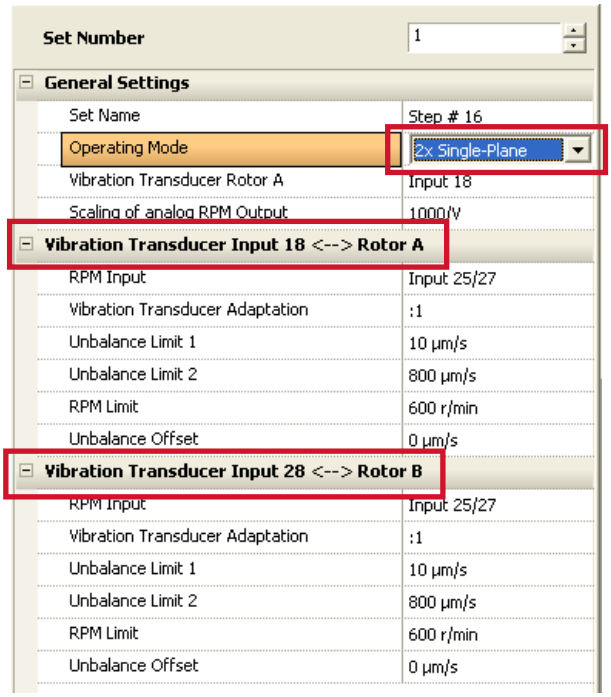


Single-Plane

Setting when a rotor (e.g. a spindle) should be pre-balanced statically (in one plane).
The settings for the Set are changing accordingly.
In this example the Acceleration Sensor of the rotor has to be connected to input 18.

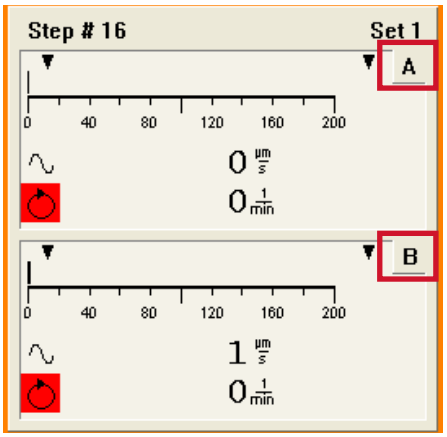


In the Module View **Monitoring Standard**, only the rotor is monitored and displayed.



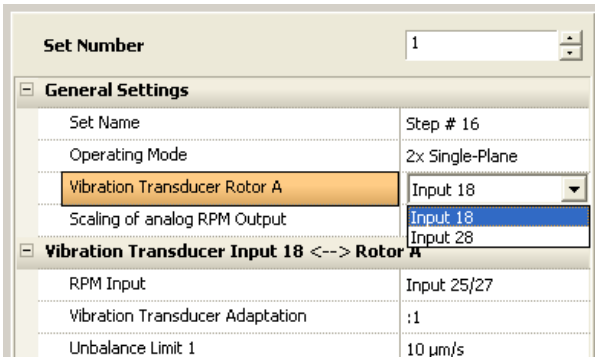
2x Single-Plane

Setting when two rotors should be pre-balanced statically (in one plane) in turn.
The settings for the Set are changing accordingly.
In this example the Acceleration Sensor of Rotor A has to be connected to input 18 and the Acceleration Sensor of Rotor B has to be connected to input 28.



In the Module View **Monitoring Standard**, Rotor A and Rotor B are monitored and displayed simultaneously.

N.B.
The following line to set the Input of the Acceleration Sensor changes depends on the **Operating Mode**!

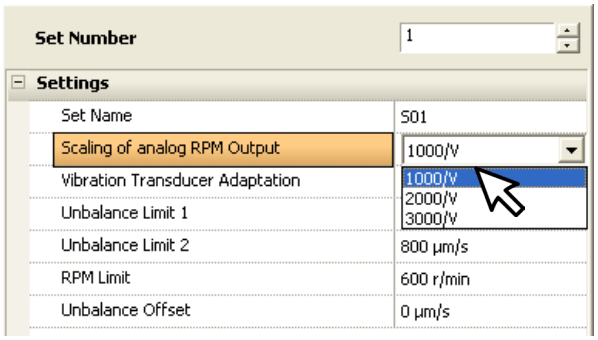


Vibration Transducer
Operation Mode: **Single-Plane**
Vibration Transducer Rotor A
Operation Mode: **2x Single-Plane**
Vibration Transducer Plane 1
Operation Mode: **Two-Plane**

Default setting: **Input 18**

- Highlight the line **Vibration Transducer** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

With this adjustment it is defined via which Acceleration Sensor Input the Module P6002 UP receives the Acceleration Sensor signal from either the Rotor, the Rotor A or from Plane 1.
The following bold **headings** of the settings change correspondingly.



Scaling of analog RPM Output

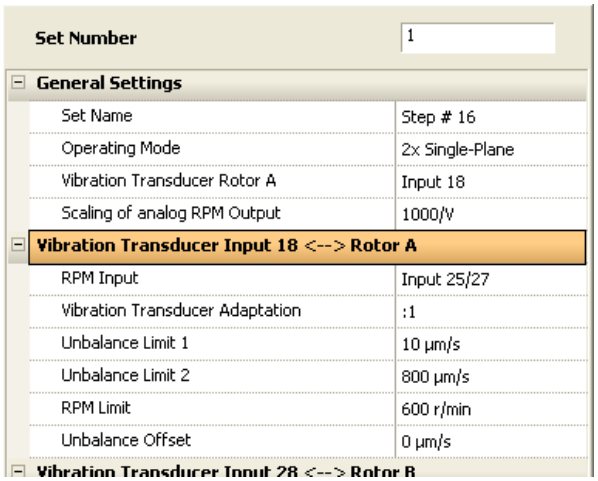
Default setting: **1000/V**

- Highlight the line **Scaling of analog RPM Output** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

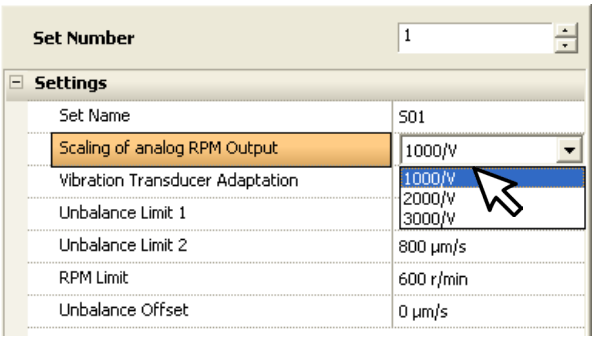
The options are **1000/V, 2000/V, or 3000/V**.
The speed of either the Rotor, Rotor A or Two-Plane rotor which is selected with **Operating Mode** is presented as a proportional DC voltage at pin 24 of connector # 2.

N.B.
A wrong scaling factor can lead to a misinterpreted output voltage of the rotor speed.
Perform the setting of the “Scaling of analog RPM Output” carefully.
The output voltage is limited to 10 Vdc.
At a setting of, e.g. 2000/V, a maximum speed of 20,000 RPM can
be measured (corresponds to the limit of 10 Vdc). The output voltage will not increase any further at a speed of more than 20,000 RPM.

N.B.
The following settings always refer to the respective bold **heading**:
- Vibration Transducer Input 18
- Vibration Transducer Input 28
- Vibration Transducer Input 18 <--> Rotor A
- Vibration Transducer Input 28 <--> Rotor B
- Vibration Transducer Input 18 <--> Rotor B
- Vibration Transducer Input 28 <--> Rotor A
- Vibration Transducer Input 18 <--> Plane 1
- Vibration Transducer Input 28 <--> Plane 2
- Vibration Transducer Input 18 <--> Plane 2
- Vibration Transducer Input 28 <--> Plane 1



Example: Operating Mode: **2x Single-Plane Vibration Transducer Input 18 <--> Rotor A**
Under the respective heading
- RPM Input,
- Vibration Transducer Adaptation,
- Unbalance Limit 1,
- Unbalance Limit 2,
- RPM Limit, and
- Unbalance Offset,
true for Rotor A, defined by the Acceleration Sensor connected to Input 18, can be set.



RPM Input

Default setting: **Input 15/26**

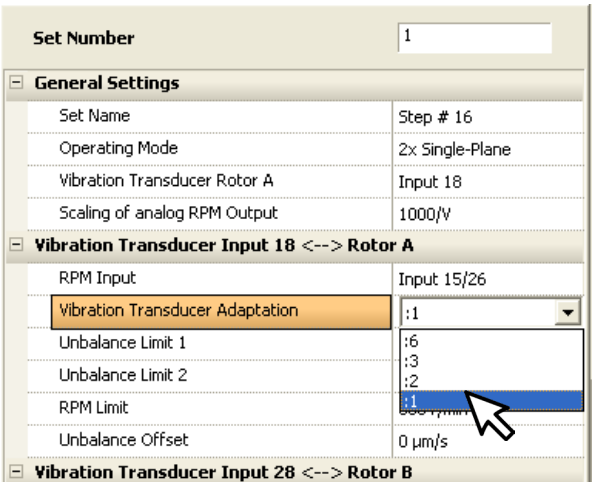
- Highlight the line **RPM Input** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

The options are:

Input 15/26 The Speed Sensor (proximity switch), belonging to the Acceleration Sensor stated in the heading, is connected to Connector # 15, or the corresponding Rotary Encoder (RS-422) is connected to Connector # 26.

Input 25/27 The Speed Sensor (proximity switch), belonging to the Acceleration Sensor stated in the heading, is connected to Connector # 25, or the corresponding Rotary Encoder (RS-422) is connected to Connector # 27.

N.B.
While in the Operating Mode **Two-Plane** the RPM Input of **Acceleration Sensor Input 28** ... is disabled since only one speed is necessary for Two-Plane Balancing.
While in the Operating Mode **2x Single-Plane** both RPM Inputs for Rotor A and Rotor B can be set equally when two rotors are on the same shaft and only one speed sensor is used.



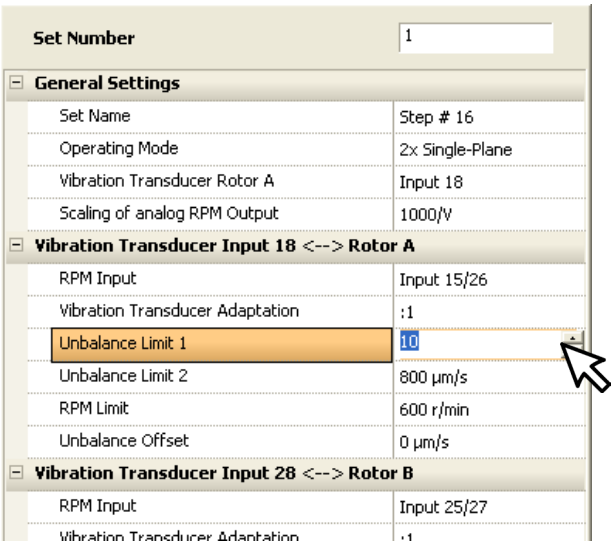
Vibration Transducer Adaptation

Default setting: **1**

- Highlight the line Vibration Transducer Adaptation with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

The options are: :**1, :2, :3 or :6**.
With this operator defined setting, the signal of the Acceleration Sensor, stated in the heading, will be attenuated by a ratio as stated.
E.g., at high unbalance signals coming from the Acceleration Sensor overdriving the amplifier can be prevented or when using a high sensitive Acceleration Sensor, the input signal can be attenuated.

N.B.
The setting of the “Vibration Transducer Adaptation” affects the analog and digital display of the unbalance in µm/s or nm, the display of the Unbalance Limits 1 and 2 and the Unbalance Offset.
In addition, it affects the status of the Unbalance Limits 1 and 2 and the Filtered Unbalance Signals at the static interface connector # 2 and the PROFIBUS.
For P6002 UP module:
When using an Acceleration Sensor BA 320D or BA 320M the setting should be :**1**.
The measurement **indication** of the unbalance (µm/s) is only true with an Acceleration Sensor having a charge sensitivity of 1000 pC/g (BA 1020X) and an Acceleration Sensor Adaptation setting of :**1**.
For P6002A UP module:
The measurement **indication** of the unbalance (µm/s) is only true with an Active Acceleration Sensor having a sensitivity of 300 mV/g and an Acceleration Sensor Adaptation setting of :**1**.
When using an Acceleration Sensor BA 1020X and an Acceleration Sensor Adaptation ratio of :**3**, the unbalance display has to be multiplied by 3.



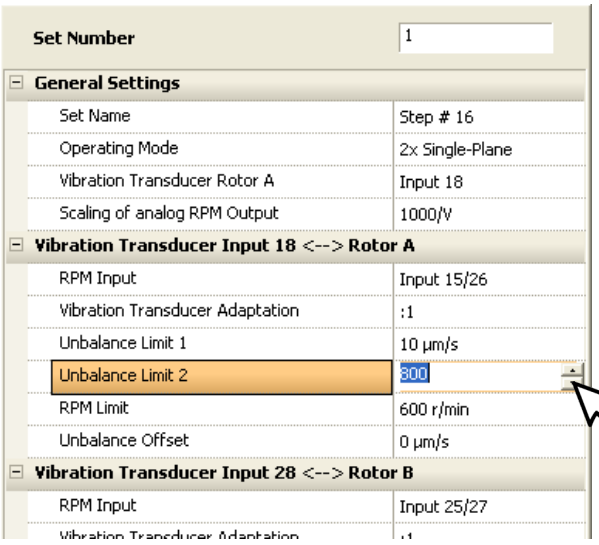
Unbalance Limit 1

Default setting: **10 µm/s**,

- Highlight the line **Unbalance Limit 1** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the Unbalance Limit 1 from 10 µm/s to **200 µm/s**, incremented in units of 1 µm/s or enter the value directly with the keyboard.

On the Preview Window or Module View **Monitoring Standard**, the quantity of the Unbalance Limit 1 is indicated as a triangle.
This operator defined setting establishes the vibration level coming from the Acceleration Sensor stated in the heading,, which acts as an “upper limit 1” for the process. When reached, this setting will indicate the need to perform a re-balancing operation. This indication (HIGH signal turns to LOW) is given via
- ìpin 4 of connector # 2 for **Acceleration Sensor Input 18**, or via pin 8 of connector # 2 for **Acceleration Sensor Input 28**,
- or equivalent via PROFIBUS interface, connector # 13, to the machine CNC control.

N.B.
An incorrect setting of the Unbalance Limit 1 leads to a premature or delayed message “Unbalance 1 Limit exceeded”.
Carry out the setting of the Unbalance Limit 1 carefully!
Additionally note the setting of “Acceleration Sensor Adaptation” and “Unbalance Offset”.



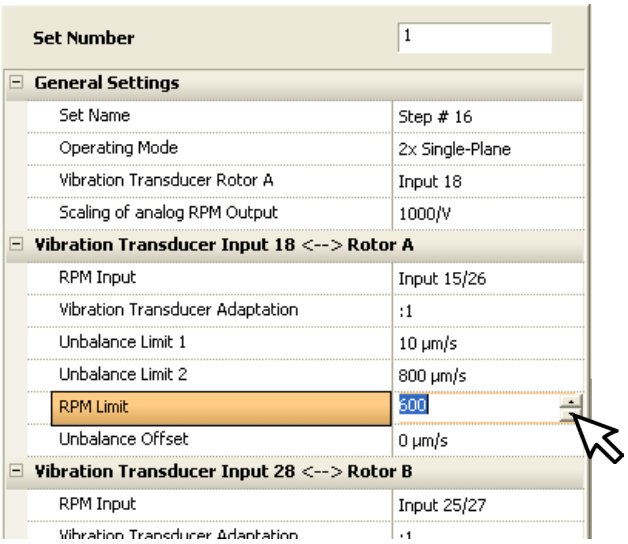
Unbalance Limit 2

Default setting: **800 µm/s**,

- Highlight the line Unbalance Limit 2 with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the Unbalance Limit 2 from **200 µm/s** to **1,000 µm/s**, incremented in units of 1 µm/s or enter the value directly with the keyboard.

On the Preview Window or Module View **Monitoring Standard**, the quantity of the Unbalance Limit 2 is indicated as a triangle.
This operator defined setting establishes the vibration level coming from the Acceleration Sensor stated in the heading, which acts as an indicator of the operational upper safety limit for the machine tool.
When reached, this setting will indicate an inadmissible unbalance, e.g. caused by collision or wheel damage. This indication (HIGH signal turns to LOW) is given via
- pin 5 of connector # 2 for **Acceleration Sensor Input 18**, or via pin 8 of connector # 2 for **Acceleration Sensor Input 28**,
- or equivalent via PROFIBUS interface, connector # 13,
to the machine CNC control; this may be used to emergency shutdown the machine tool.

N.B.
An incorrect setting of the Unbalance Limit 2 leads to a premature or delayed message “Unbalance 2 Limit exceeded”. This may cause an emergency shutdown signal before time or an unacceptably high unbalance arises.
Carry out the setting of the Unbalance Limit 2 carefully!
Please note, that the sum of Unbalance Offset and Unbalance Limit 2 must be less than 1020. Otherwise, the Unbalance Limit 2 is no longer monitored.
Additionally note the setting of “Acceleration Sensor Adaptation” and “Unbalance Offset”.



RPM Limit

Default setting: **600 r/min**,

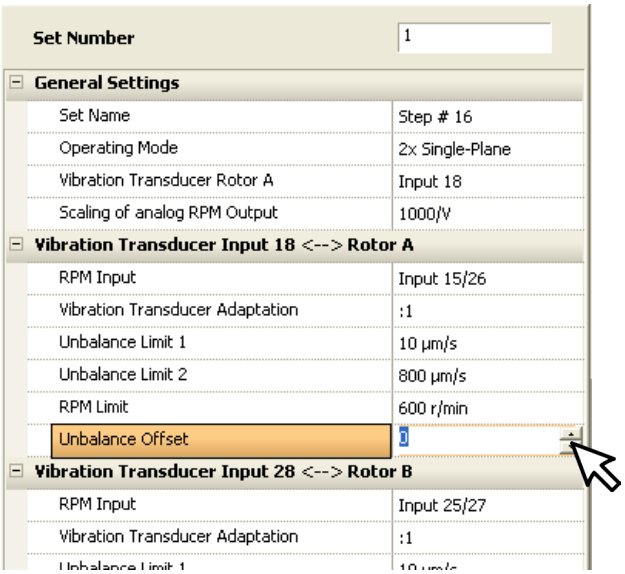
- Highlight the line RPM Limit with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the RPM Limit from 450 r/min to 30,000 r/min or enter the value directly with the keyboard.

With the operator defined setting the speed of the rotor or plane is monitored. The related Speed Sensor is connected to the adjusted RPM Input - as described above (see figure of RPM Input).
Examples for setting the RPM Limit:

- If the actual spindle speed (rotor speed for P6002A UP line modules) does not reach the RPM Limit, the motor drive may be faulty. Indication (static HIGH-signal) is given via
  - pin 6 of connector # 2 for **Acceleration Sensor Input 18** and **RPM Input** selected, or
  - pin 7 of connector # 2 for **Acceleration Sensor Input 28** and **RPM Input** selected, or
  - equivalent at PROFIBUS interface, connector # 13 to the machine CNC control.
- When the actual spindle speed exceeds the RPM Limit (inadmissible speed) the spindle may be damaged. Indication (HIGH signal turns to LOW) is given via
  - pin 6 of connector # 2 for **Acceleration Sensor Input 18** and **RPM Input** selected, or
  - pin 7 of connector # 2 for **Acceleration Sensor Input 28** and **RPM Input** selected, or
  - equivalent at PROFIBUS interface, connector # 13 to the machine CNC control.

ATTENTION
The P6002 UP line is allowed to receive only one switching pulse from the speed sensor of the rotor per revolution. Several switching pulses per revolution lead to a wrong speed indication and thus to wrong monitoring of the RPM Limit.

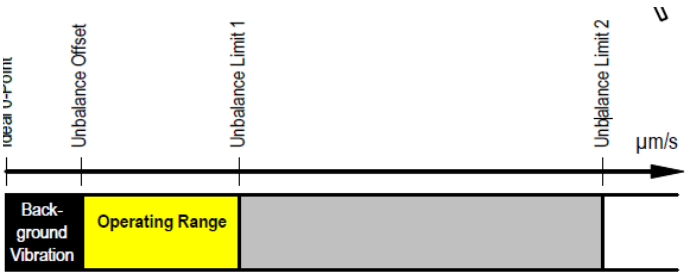
N.B.
If the setting of the RPM LIMIT is not possible, this setting is inhibited by an »Administrator« for safety reasons (see Tab **Parameter**)!



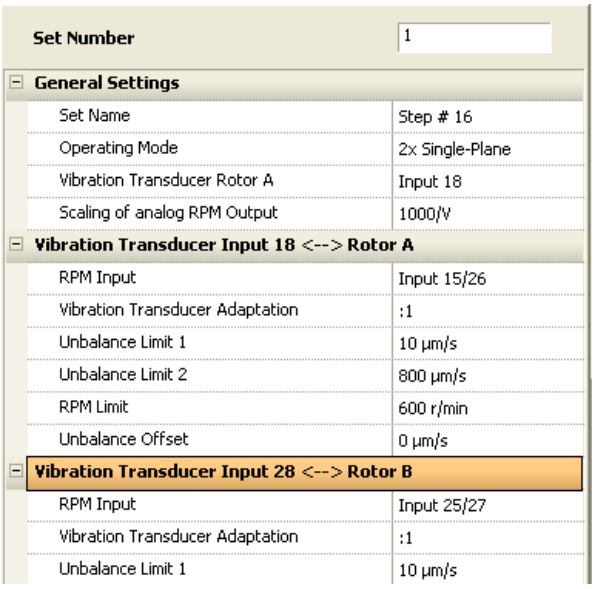
Unbalance Offset
Default setting: **0 µm/s**

- Highlight the line **Unbalance Offset** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the Unbalance Offset from **0 µm/s to 100 µm/s** or enter the value directly with the keyboard.

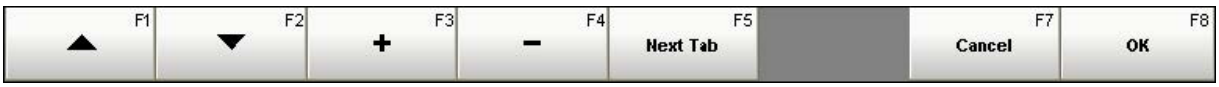
Since no balancing system is capable to balance a spindle to a value below the environmental vibration level, this operator defined setting “suppresses” vibration coming from adjacent machinery, etc.



N.B.
Set the Unbalance Offset only if there is a high proportion of external vibration. An Unbalance Offset value of more than 0 µm/s leads to a reduced unbalance signal. It follows that the unbalance signal either reaches the Unbalance Limit 1 delayed or never reaches the Unbalance Limit 2.
Please note, that the sum of Unbalance Offset and Unbalance Limit 2 must be less than 1020. Otherwise, the Unbalance Limit 2 is no longer monitored.



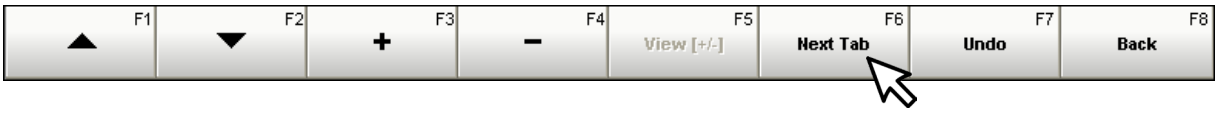
Depending on Operating Mode repeat the settings e.g. for Vibration **Transducer Input 28...,** as shown in the **heading**.

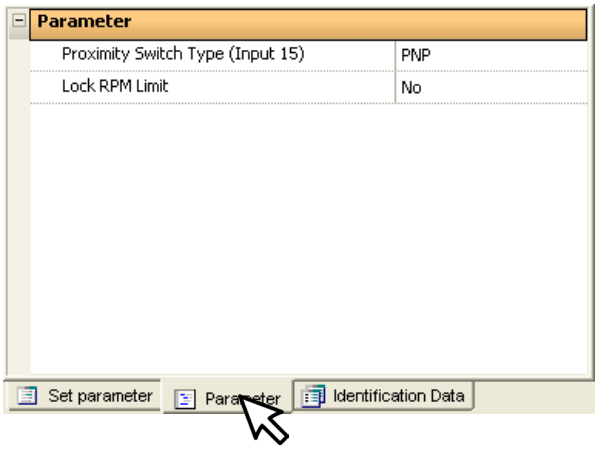


N.B.
Save all settings of the **Set parameter** tab by clicking or pressing on key [Next Tab] / [F6] or [Back] / [F8].
Bypass any changes by pressing or clicking on key [Undo] / [F7] and then [Next Tab] / [F6] or [Back] / [F8].
You are leaving the options display. When you have chosen [Next Tab] the next tab is shown.
When you have chosen [Back] you return to the Module View **Monitoring Standard**.

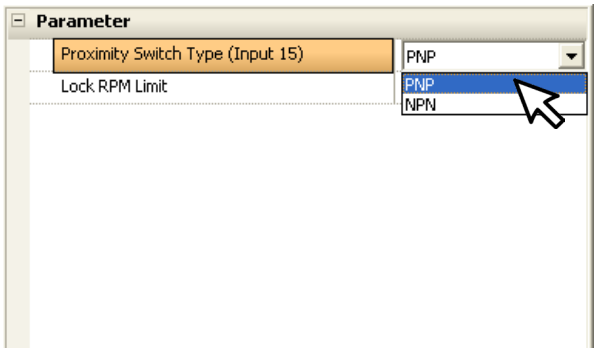
9.3.2 *Tab: Parameter*

N.B.
The following settings are true for all 15 Sets of the P6002 UP line!
If applicable, press the key [Settings] again and open the Tab Parameter by pressing or clicking on the key [Next Tab] or [F6] twice.





Under the heading Parameter, the equipment specific, set independent Parameters, are adjusted and stored.

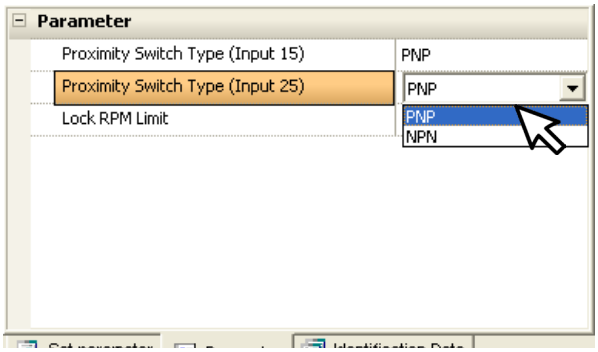


Proximity Switch (Speed sensor) Type (Input 15)

Default setting: **PNP**

- Highlight the line **Proximity Switch Type (Input 15)** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key. A list of options is displayed.
- Depending on type of the speed sensor / proximity switch plugged into connector # 15 enter **PNP** or **NPN**. The type should be printed on the type label of the switch.

N.B.
The assignment of the speed signal input, connector # 15, to the Input of the Acceleration Sensor is done in the tab **Set Parameter**.

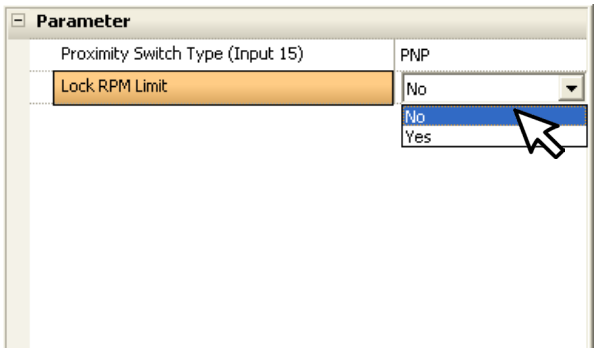


Proximity Switch (Speed sensor) Type (Input 25)

Default setting: **PNP**

- Highlight the line **Proximity Switch Type (Input 25)** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key. A list of options is displayed.
- Depending on type of the speed sensor / proximity switch plugged into connector # 25 enter **PNP** or **NPN**. The type should be printed on the type label of the switch.

N.B.
The assignment of the speed signal input, connector # 25, to the Input of the Acceleration Sensor is done in the tab **Set Parameter**.



ONLY ACCESSIBLE WITH ADMINISTRATOR RIGHTS!

Lock RPM Limit
Default setting: **No**

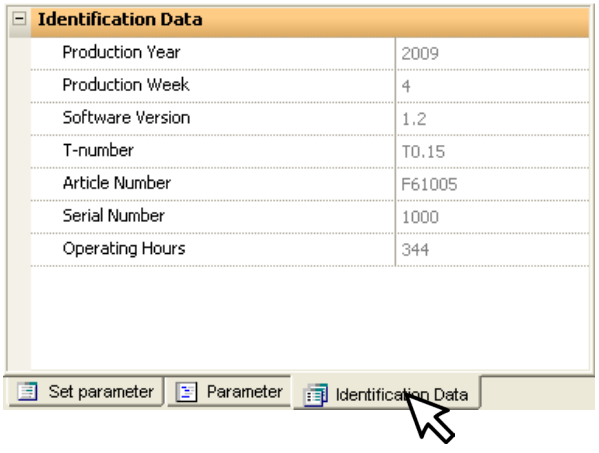
- Highlight the line **Lock RPM Limit** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

The options are:

- **YES** i.e. the RPM Limit(s) of the rotor(s) or plane(s) are locked. They cannot be altered (see **Set Parameter** → RPM Limit Figure).
- **NO** i.e. the RPM Limit of the rotor(s) or plane(s) are changeable anytime by an **Administrator** or **Expert**.

N.B.
Save all settings of the **Parameter** tab by clicking or pressing on key [Next Tab] / [F6] or [Back] / [F8].
Bypass any changes by pressing or clicking on key [Undo] / [F7] and then[Back] / [F8].
You are leaving the options display. When you have chosen [Next Tab] the next tab is shown.
When you have chosen [Back] you return to the Module View **Monitoring Standard**.

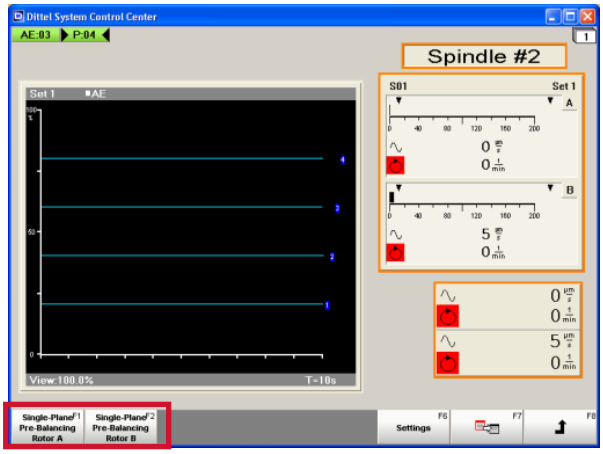
9.3.3 *Tab: Identification Data*



In this tab, you find information about the P6002 UP line.
This information is important at possible guarantee cases, necessary update of the module software, substitute orders, etc.
The data are not editable!

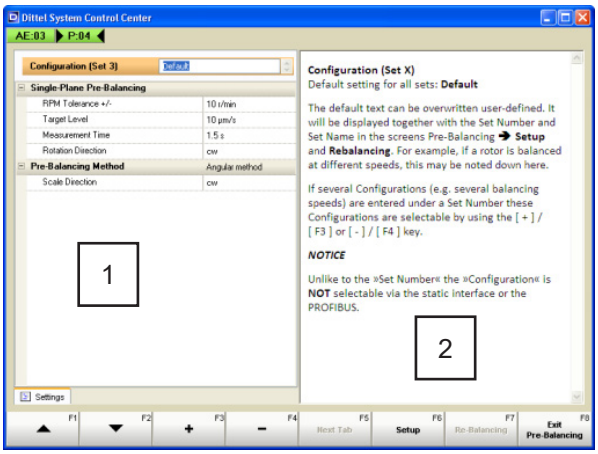
N.B.
Leave the tab **Identification Data** by pressing or clicking on key [Back] or [F8]. You return to the **Monitoring Standard** screen.

9.4 *Settings: Single-Plane Pre-Balancing*



The following settings are true for the Operating Modes
- Single-Plane
- 2x Single-Plane
Open the respective options display by clicking or using the softkey [Pre-Balancing] (Operating Mode **Single-Plane**) or [Pre-Balancing Rotor A] or [Pre-Balancing Rotor B] (Operating Mode **2x Single-Plane**).
The following settings are only true for the rotor selected!

N.B.
Rotor A is determined by its local Acceleration Sensor and the selected Acceleration Sensor Input 18 or 28

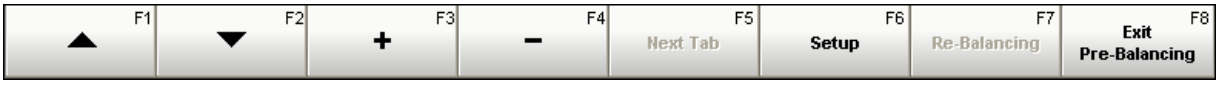


The options display of »Pre-Balancing« is split into two sections:

1
The left section of the display is for setting. Practically the settings are carried out with computer mouse and keyboard.
But the wanted setting can also be highlighted using the Up- [▲] or Down-key [▼] / [F1] or [F2] of the automation system's keyboard.
The highlighted setting can be changed using the keys [+] or [-] / [F3] or [F4].
The settings are entered when leaving the tab **Settings**

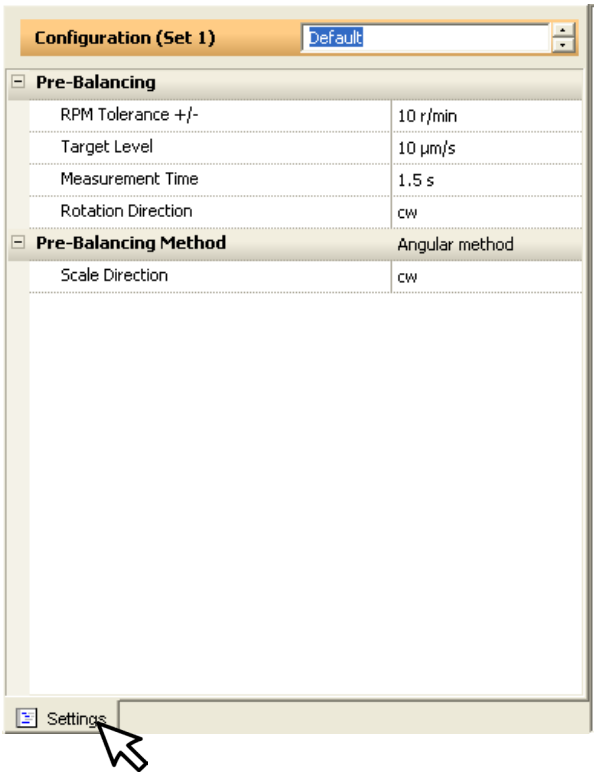
- by clicking or pressing the key [Next Tab] / [F5], if available, or
- by clicking or pressing the key [Setup] / [F6], or
- by clicking or pressing the key [Exit Pre-Balancing] / [F8]..

2
The right section is a Help-window. It explains the highlighted setting.



9.4.1 *Tab: Settings*

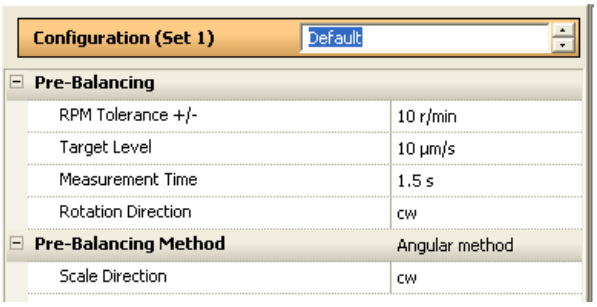
N.B.
These settings of P6002 UP line determine the balancing quality significantly.
All settings should therefore be performed only by trained staff.



Choose the Tab **Settings.**.

In this Tab the rotor parameters and particularly the Pre-Balancing Method can be set for a certain Set number and its configuration. By different configurations, different Pre-Balancing Methods or Rotation Directions can be set under one Set.

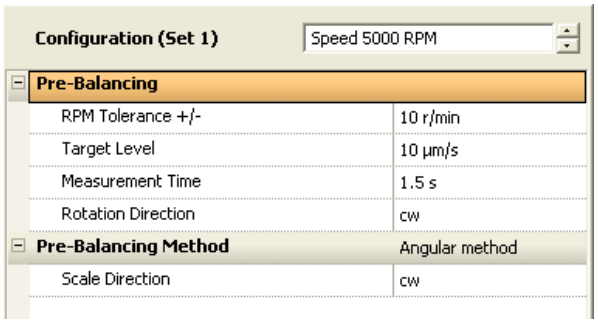
N.B.
As specified under the actual Set (e.g. **Set 1**) **RPM Tolerance** and **Target Level** correspond to the signals coming from the speed sensor and the acceleration sensor.



Configuration (Set X)

Default setting or all sets: **Default**
Highlight the line Configuration (**Set X**) with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
An input box is displayed.
The default text can be overwritten user-defined. It will be displayed together with the Set Number and Set Name in the screens Pre-Balancing → **Setup** and **Rebalancing**. For example, if a rotor is balanced at different speeds, this may be noted down here.
If several Configurations (e.g. several balancing speeds) are entered under a Set Number these Configurations are selectable by using the [+] / [F3] or [-] / [F4] key.

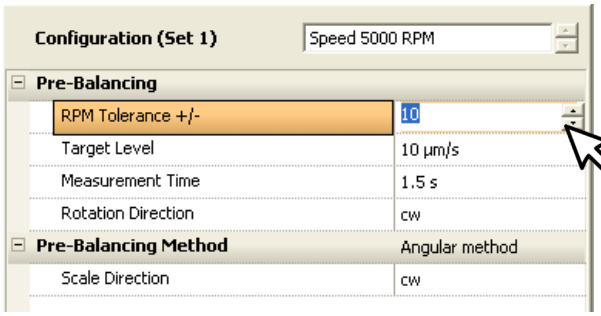
N.B.
Unlike to the Set Number the Configuration is **NOT** selectable via the static interface or the PROFIBUS.



Pre-Balancing (header only, no function)

Under the heading **Pre-Balancing** the following parameters are set and stored:

- RPM Tolerance +/-
- Target Level
- Measurement Time
- Rotation Direction

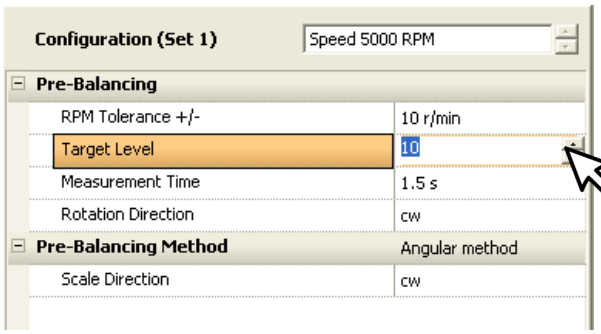


RPM Tolerance +/-

Default setting: **10 r/min**

- Highlight the line RPM Tolerance +/- with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **RPM Tolerance** +/- from **1 r/min to 100 r/min**, incremented in units of 1 r/min or enter the value directly with the keyboard.

Depending on drive or control of the rotor it can happen, that after repeated switching on/off, the speed is above or below the **Balancing RPM**.
To pre-balance properly, the speed must be within the adjusted tolerance of the **Balancing RPM**, otherwise automatic continuing to the next test run fails.

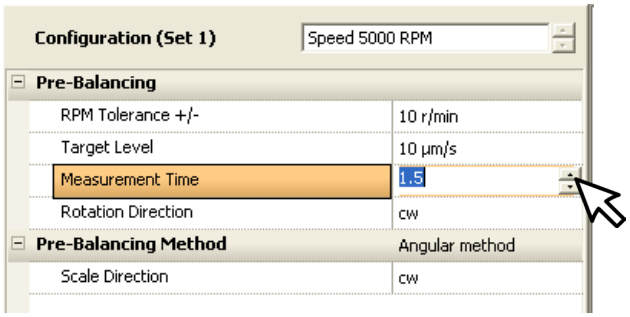


Target Level:

Default setting: **10 µm/s**

- Highlight the line **Target Level** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Target Level** from **1µm/s to 100µm/s**, incremented in units of 1µm/s or enter the value directly with the keyboard.

This amount of unbalance of the spindle or rotor, which is specified as the maximum below which the unbalance is considered to be acceptable.
When this target level is not achieved during the last test run, the unit will display a WARNING message:

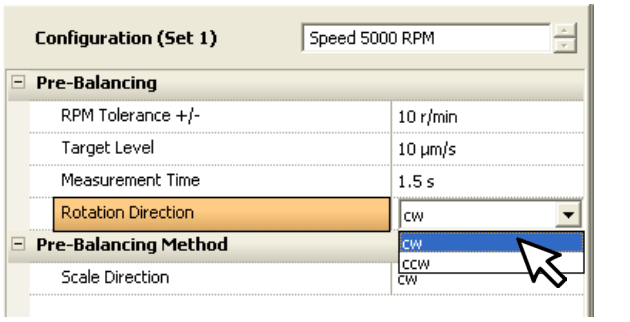


Measurement Time

Default setting: **1.5 s**

- Highlight the line Measurement Time with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Measurement Time** from **1.5 s to 15 s**, incremented in units of 0.1 s or enter the value directly with the keyboard.

If a beat frequency occurs at a certain operating speed on the unbalance signal the signal has to be averaged. For it the Measurement Time has to be extended such, that a complete beat period or its multiple corresponds as accurate as possible to the Measurement Time.
A beat frequency is visible by a rising and falling bar graph of the unbalance, in particular on a balanced system.
The duration of a beat frequency period can be determined by observation.



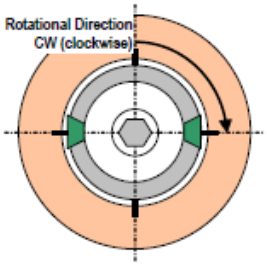
Rotation Direction

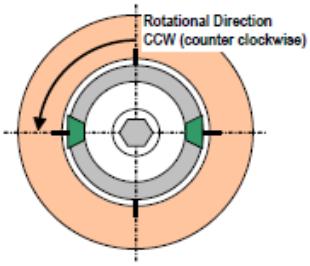
Default setting: **cw** (clockwise)

- Highlight the line Rotation Direction with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

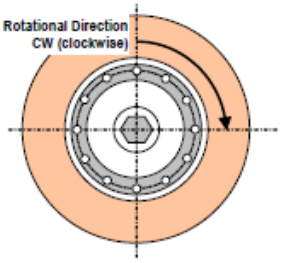
The options are cw (clockwise) or ccw (counter clockwise).
This setting is determined by the rotational direction of the rotor to be pre-balanced while facing the circular groove and angle scale or the tapped holes on the wheel holder.

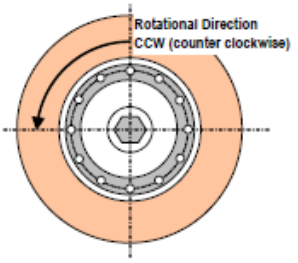
Pre-Balancing with Angular Method

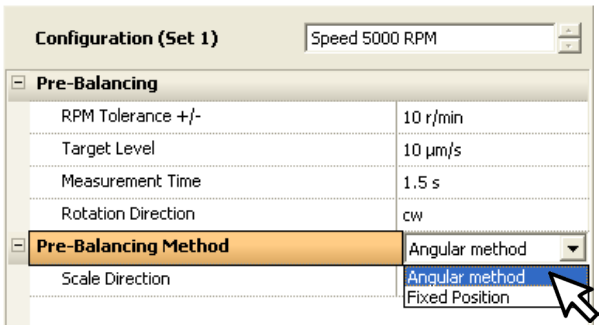




Pre-Balancing with Fixed Position Method







Pre-Balancing Method

Default setting: **Angular method**

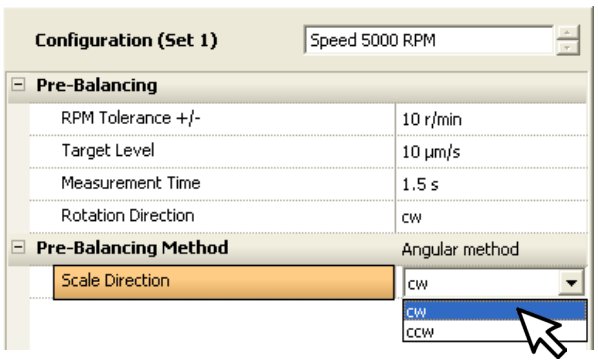
- Highlight the line **Pre-Balancing Method** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

The options are:

Angular method This method uses two balancing-weights, which are progressively adjustable in a circular groove of the fixing flange.

Fixed Position This method uses two or three correction masses (e.g. different heavy screws) which are placed on three (3) to twenty four (24) fixed locations (e.g. equidistant tapped holes at the rotor).

Only when selected Pre-Balancing Method: Angular Method

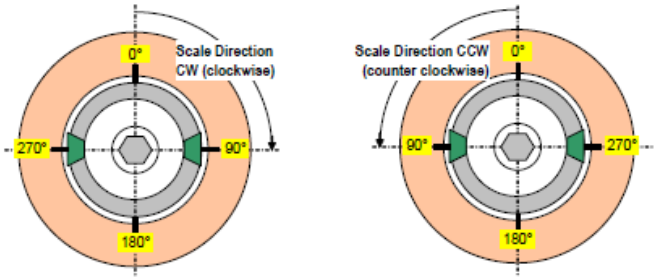


Scale Direction

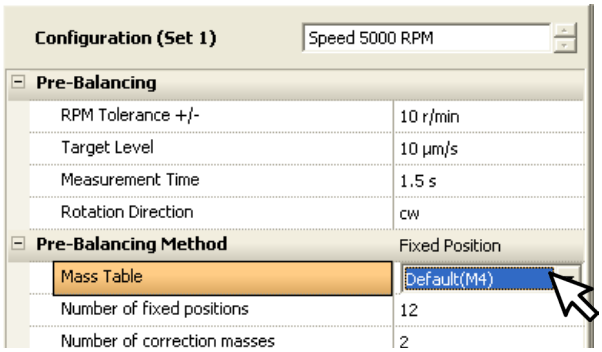
Default setting: **cw** (clockwise)

- Highlight the line **Scale Direction** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

The options are cw (clockwise) or ccw (counter clockwise):
This setting is determined by the direction of the angle scale on the wheel holder or of the protractor, used to position the balancing weights. The angle scale direction is the direction (clockwise or counter clockwise while facing the scale) in which the angle references **increase** (0°, 90°, 180°, etc.).



Only when selected Pre-Balancing Method: Fixed Position

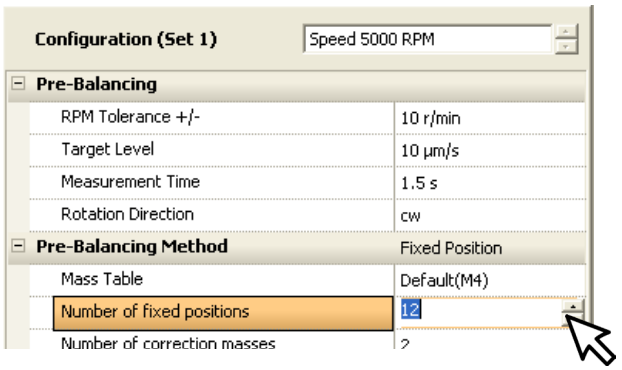


Mass Table

Default setting: **Default (M4)**

- Highlight the line **Mass Table** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

This setting determines the mass table (e.g. your set of balancing screws), used to balance with the **Fixed Position** method. Only the names of the Mass Tables generated in tab Mass Table, are displayed.
See Tab: **Mass Table** how to enter availableweights or cor rection masses (e.g. screws) and their names.

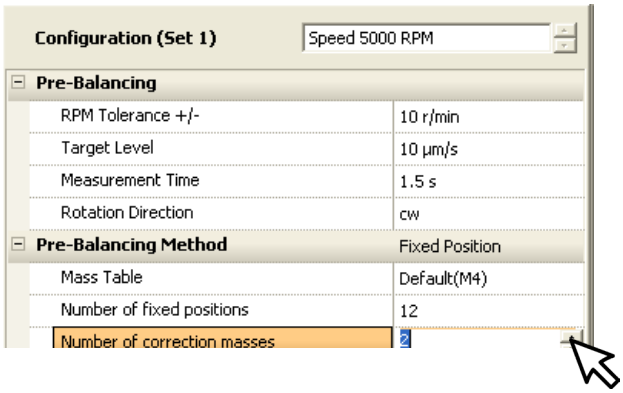


Number of fixed positions

Default setting: **12**

- Highlight the line **Number of fixed positions** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Number of fixed positions from 3 to 24** or enter the value directly with the keyboard.

This setting determines the number of available fixed positions, e.g. threaded holes in the wheel or tool holder.

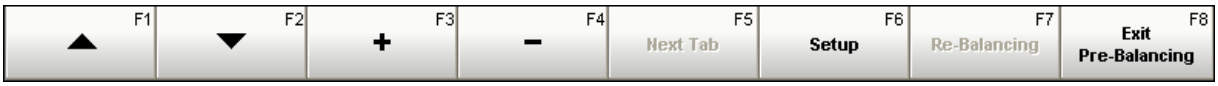


Number of correction masses

Default setting: **2**

- Highlight the line **Number of correction masses** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Number of correction masses**, either **2** or **3**, or enter the value directly with the keyboard.

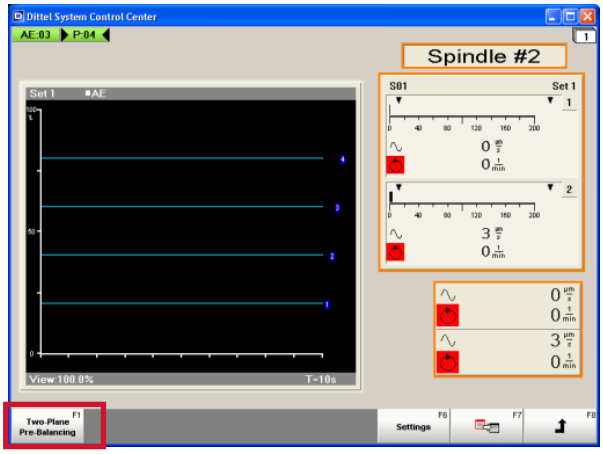
The Pre-Balancing Method **Fixed Position** can be carried out with two or three correction masses (e.g. screws).
Two correction masses, due to inevitable increments in weight, do not provide principally the optimal balancing result. With three correction masses, balancing will be more precisely.



N.B.
All settings are stored when leaving the tab **Settings**.

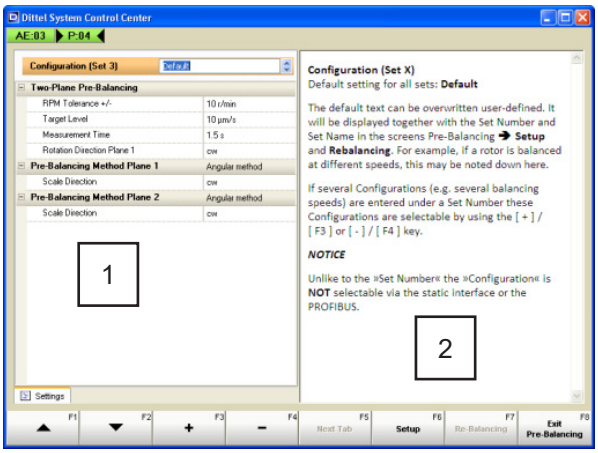
- Only for Pre-Balancing Method **Fixed Position**: when clicking or pressing the key [Next Tab] / [F5] the tab **Mass Table** opens to generate a new mass table or to edit an existing table.
- When clicking or pressing the key [Setup] / [F6] the screen changes to setup the function **Pre-Balancing**,
- When clicking or pressing the key [Exit Pre-Balancing] / [F8] you return to the Monitoring screen.

9.5 *Settings: Two-Plane Pre-Balancing*



The following settings are true for the Operating Mode - Two-Plane
Open the respective options display by clicking or using the key **Two-Plane Pre-Balancing.**

N.B.
Plane 1 is determined by its local Acceleration sensor and the selected Acceleration sensor Input 18 or 28.

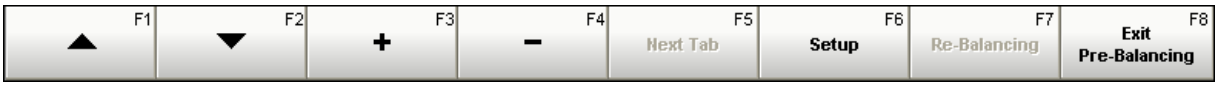


The options display of »Two-Plane Pre-Balancing« is split into two sections:

1
The left section of the display is for setting. Practically the settings are carried out with computer mouse and keyboard.
But the wanted setting can also be highlighted using the Up- [▲] or Down-key [▼] / [F1] or [F2] of the automation system's keyboard.
The highlighted setting can be changed using the keys [+] or [-] / [F3] or [F4].
The settings are entered when leaving the tab **Settings**

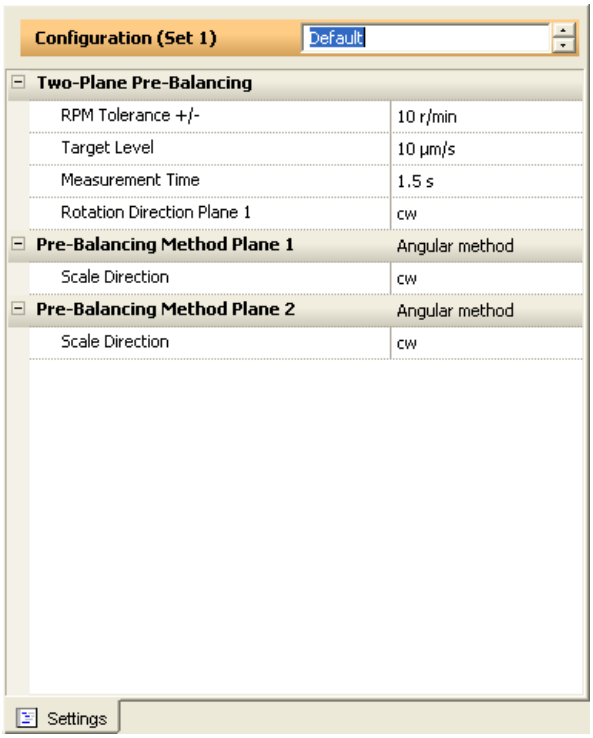
- by clicking or pressing the key [Next Tab] / [F5], if available, or
- by clicking or pressing the key [Setup] / [F6], or
- by clicking or pressing the key [Exit Pre-Balancing] / [F8]..

2
The right section is a Help-window. It explains the highlighted setting.



9.5.1 *Tab: Settings*

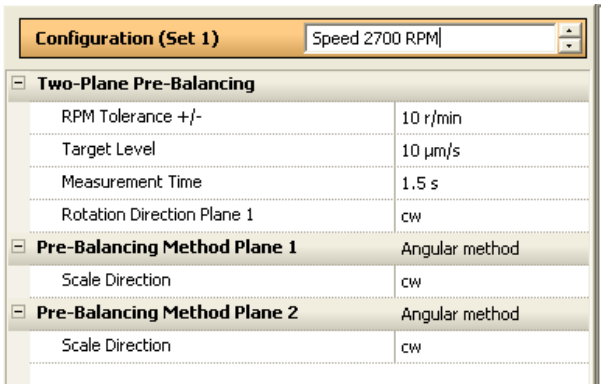
N.B.
These settings of P6002 UP determine the balancing quality significantly.
All settings should therefore be performed only by trained staff.



Choose the Tab **Settings.**.

In this Tab the plane parameters and particularly the Pre-Balancing Method for each plane can be set for a certain Set number and its configuration. In a Set different Pre-Balancing Methods or RPM tolerances can be stored when creating different **Configurations.**

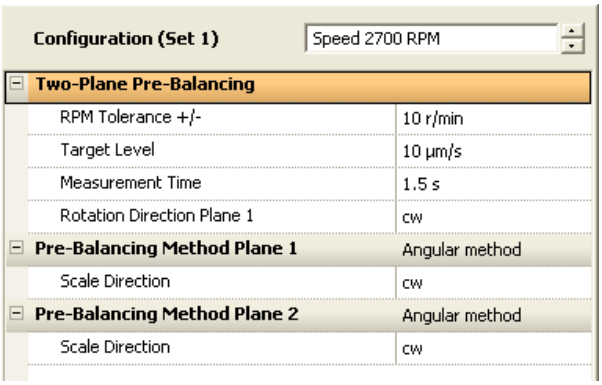
N.B.
As specified under the actual Set (e.g. **Set 1**) **RPM Tolerance** and **Target Level** correspond to the signals coming from the speed sensor and the acceleration sensors.



Configuration (Set X)

Default setting or all sets: **Default**
Highlight the line Configuration (**Set X**) with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
An input box is displayed.
The default text can be overwritten user-defined. It will be displayed together with the Set Number and Set Name in the screens Pre-Balancing → **Setup** and **Rebalancing**. For example, if a rotor is pre- balanced at different speeds, this may be noted down here.
If several Configurations (e.g. several balancing speeds) are entered under a Set Number these Configurations are selectable by using the [+] / [F3] or [-] / [F4] key.

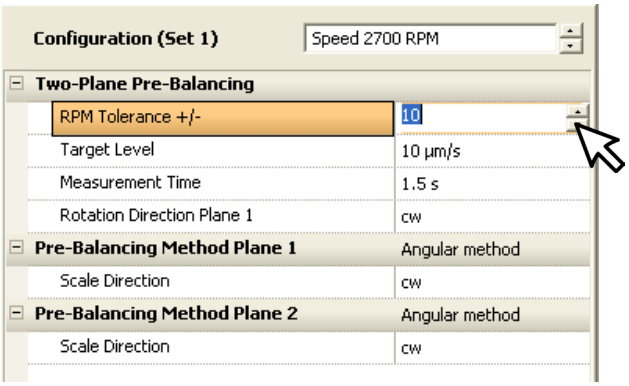
N.B.
Unlike to the Set Number the Configuration is **NOT** selectable via the static interface or the PROFIBUS.



Two-Plane Pre-Balancing (header only, no function)

Under the heading **Two-Plane Pre-Balancing** the following parameters are set and stored:

- RPM Tolerance +/-
- Target Level
- Measurement Time
- Rotation Direction Plane 1

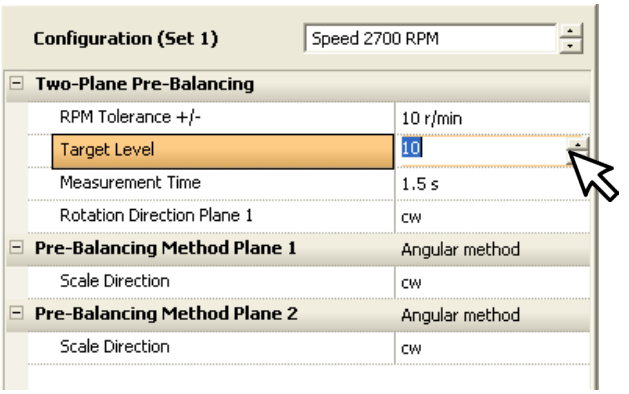


RPM Tolerance +/-

Default setting: **10 r/min**

- Highlight the line **RPM Tolerance +/-** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **RPM Tolerance** +/- from **1 r/min to 100 r/min**, incremented in units of 1 r/min or enter the value directly with the keyboard.

Depending on drive or control of the spindle or rotor it can happen, that after repeated switching on/off, the speed is above or below the **Balancing RPM**.
To pre-balance properly, the speed must be within the adjusted tolerance of the **Balancing RPM**, otherwise automatic continuing to the next test run fails.

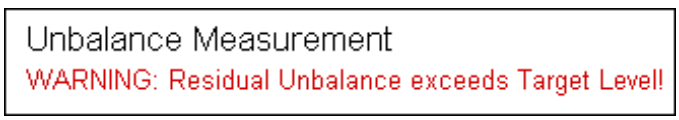


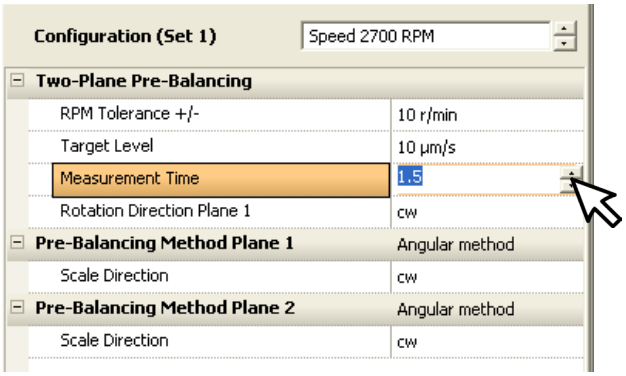
Target Level:

Default setting: **10 µm/s**

- Highlight the line **Target Level** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Target Level** from **1µm/s to 100µm/s**, incremented in units of 1µm/s or enter the value directly with the keyboard.

Enter the permissible residual unbalance you want to achieve after pre-balancing the two-plane rotor.
When this target level for at least one plane is not achieved during the last test run, the unit will display a WARNING message:



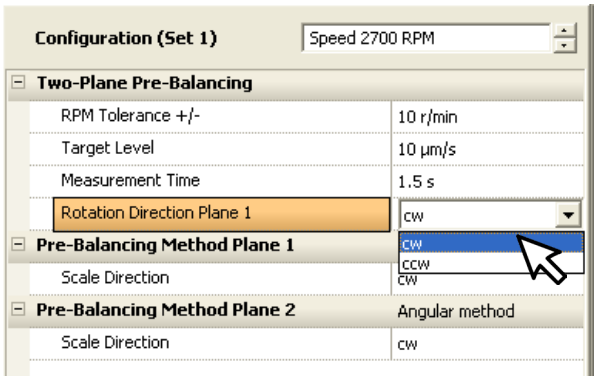


Measurement Time

Default setting: **1.5 s**

- Highlight the line **Measurement Time** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Measurement Time** from **1.5 s to 15 s**, incremented in units of 0.1 s or enter the value directly with the keyboard.

If a beat frequency occurs at a certain operating speed on the unbalance signal the signal has to be averaged. For it the **Measurement Time** has to be extended such, that a complete beat period or its multiple corresponds as accurate as possible to the Measurement Time.
A beat frequency is visible by a rising and falling bar graph of the unbalance, in particular on a balanced system.
The duration of a beat frequency period can be determined by observation.



Rotation Direction Plane 1

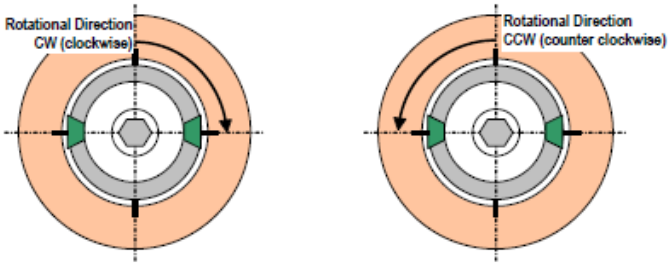
Default setting: **cw** (clockwise)

- Highlight the line **Rotation Direction Plane 1** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

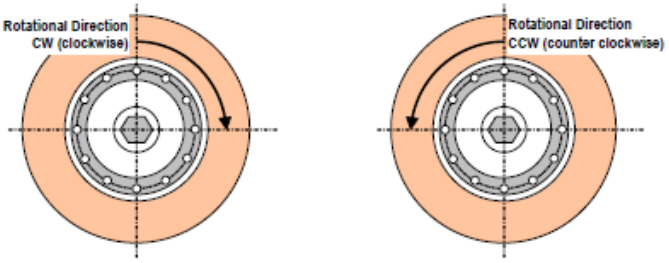
The options are **cw** (clockwise) or **ccw** (counter clockwise).
This setting is determined by the rotational direction of the rotor while facing **Balancing Plane 1** (e.g. circular groove and angle scale or tapped holes on the wheel holder).

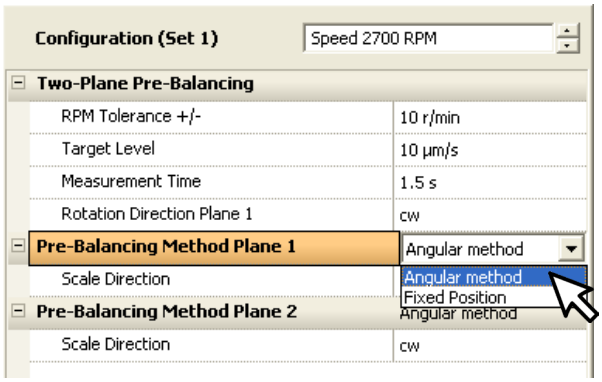
N.B.
Plane 1 is determined by its local Acceleration sensor and the allocation to Acceleration sensor Input 18 or 28.

Balancing Plane 1:
Pre-Balancing with Angular Method



Balancing Plane 1:
Pre-Balancing with Fixed Position Method





Pre-Balancing Method Plane 1:

Default setting: **Angular method**

- Highlight the line **Pre-Balancing Method Plane 1** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

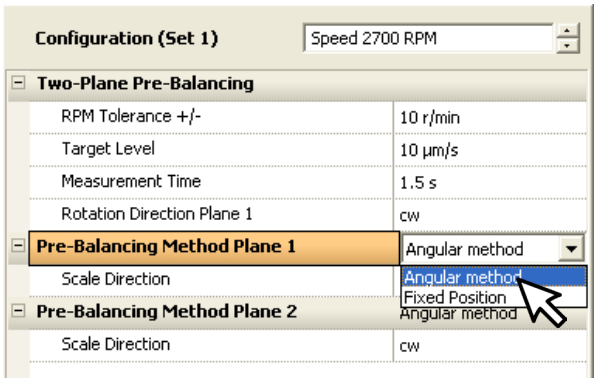
The options are:

Angular method This method uses two balancing-weights, which are progressively adjustable in a circular groove of the fixing flange or wheel holder.

Fixed Position This method uses two or three correction masses (e.g. different heavy screws) which are placed on three (3) to twenty four (24) fixed locations (e.g. equidistant tapped holes at the rotor).

N.B.
The following descriptions apply to **Plane 1** and to **Plane 2** (following described as **Plane X**).

Only when selected Pre-Balancing Method Plane X Angular Method

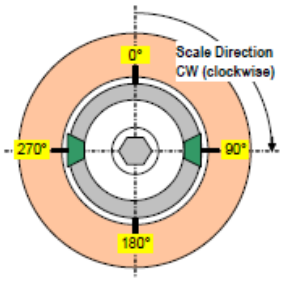


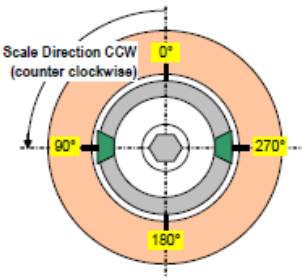
Scale Direction

Default setting: **cw** (clockwise)

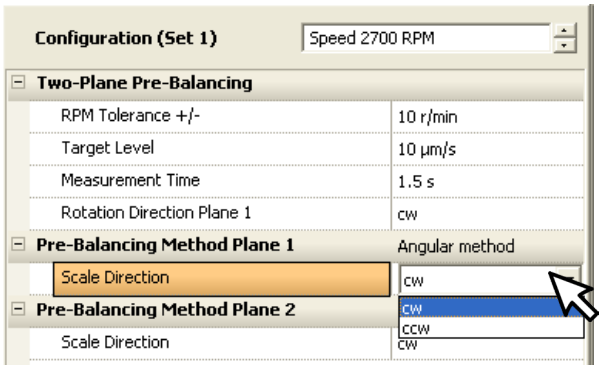
- Highlight the line **Scale Direction** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

The options are **cw** (clockwise) or **ccw** (counter clockwise):
This setting is determined by the direction of the angle scale on the wheel holder or of the protractor, used to position the balancing weights. The angle scale direction of plane 1 or plane 2 is the direction (clockwise or counter clockwise while facing the scale) in which the angle references **increase** (0°, 90°, 180°, etc.).





Only when selected Pre-Balancing Method Plane X Fixed Position

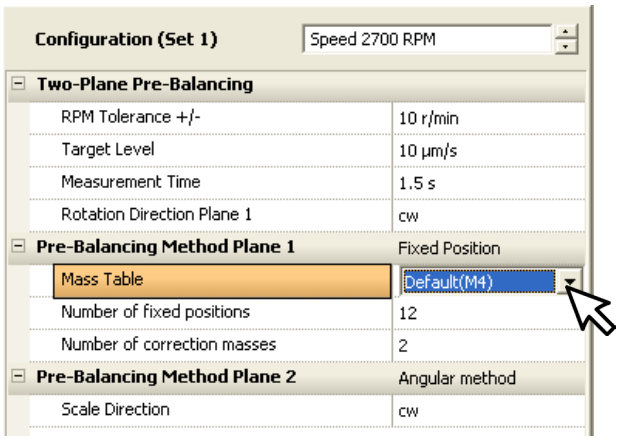


Mass Table

Default setting: **Default (M4)**

- Highlight the line **Mass Table** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- Open the drop-down list with a mouse click or the [+] / [F3] or [-] / [F4] key.

This setting determines the mass table (e.g. your set of balancing screws), used to balance with the **Fixed Position** method. Only the names of the Mass Tables available in tab Mass Table, are displayed.
See Tab: **Mass Table** how to enter available weights or correction masses (e.g. screws) and its names.

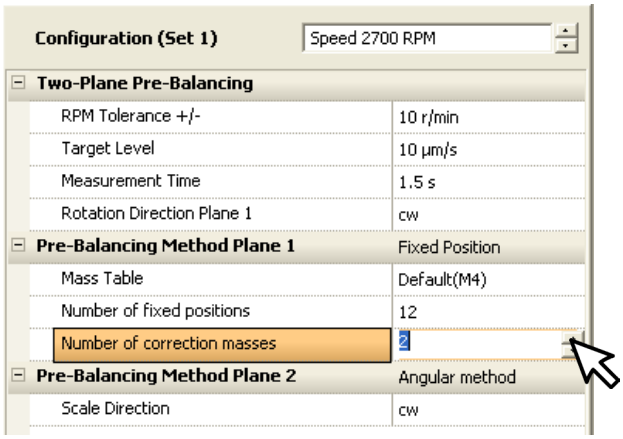


Number of fixed positions

Default setting: **12**

- Highlight the line **Number of fixed positions** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Number of fixed positions from 3 to 24** or enter the value directly with the keyboard.

This setting determines the number of available threaded holes in the Balancing Plane concerned.

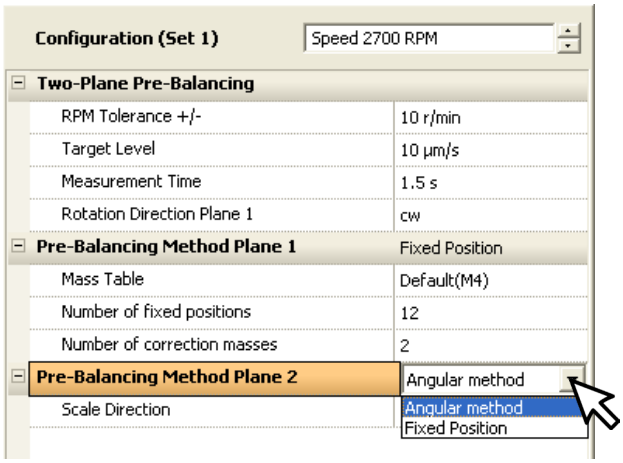


Number of correction masses

Default setting: **2**

- Highlight the line **Number of correction masses** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- With a mouse click or the [+] / [F3] or [-] / [F4] keys select the **Number of correction masses**, either **2** or **3**, or enter the value directly with the keyboard.

The Balancing Method **Fixed Position** can be carried out with two or three correction masses (e.g. screws) per plane.
Two correction masses, due to inevitable increments in weight, do not provide principally the optimal pre-balancing result. With three correction masses, balancing will be more precisely.



Pre-Balancing Method Plane 2

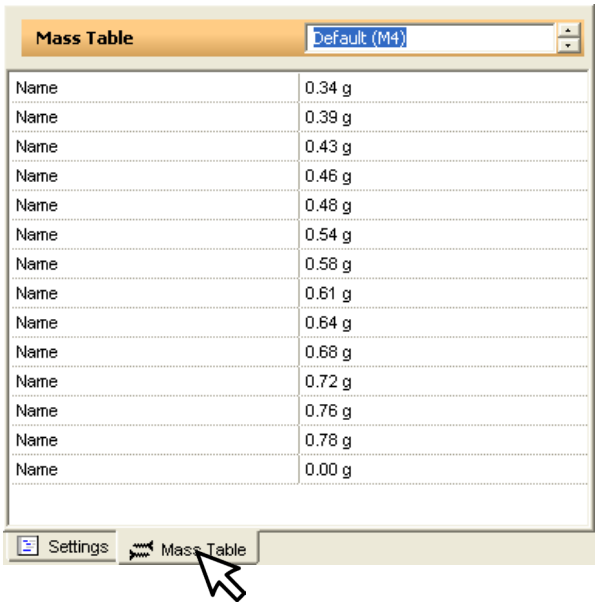
Default setting: **Angular method**
Determine the Pre-Balancing Method Angular method or Fixed Position for Plane 2.
The settings for **Scale Direction** or **Mass Table**, **Number of fixed positions** etc. refer to Plane 1.

N.B.
All settings are stored when leaving the tab **Settings**.

- Only for Pre-Balancing Method **Fixed Position**: when clicking or pressing the key [Next Tab] / [F5] the tab **Mass Table** opens to generate a new mass table or to edit an existing table.
- When clicking or pressing the key [Setup] / [F6] the screen changes to setup the function **Pre-Balancing**,
- When clicking or pressing the key [Exit Pre-Balancing] / [F8] you return to the Monitoring screen.

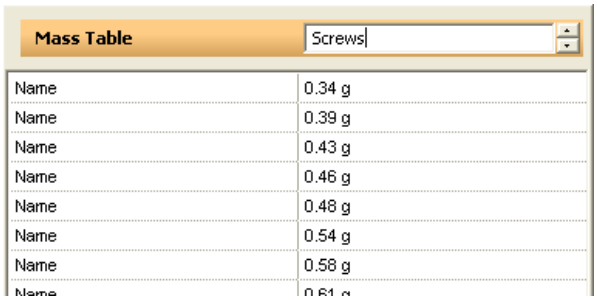
9.6 *Tab: Mass Table*

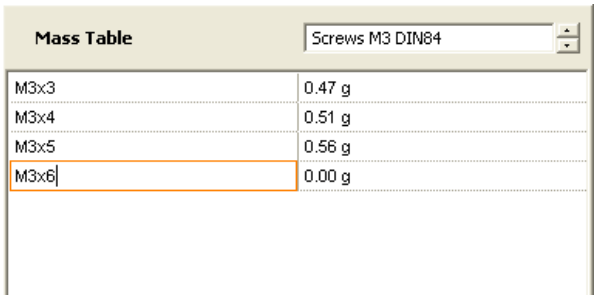
N.B.
The tab **Mass Table** is only available if at least one rotor or plane is pre-balanced with the **Fixed Position** method.
If for each correction mass a Name (e.g. M3x4) is entered in the Mass Table, then during Setup, Pre-Balancing or Re-Balancing the respective **Name** instead of the weight is shown on the screen.



Choose the Tab **Mass Table.**.

In this tab, all available correction masses including name and weight are entered in a table. The name of the mass table is user-defined.



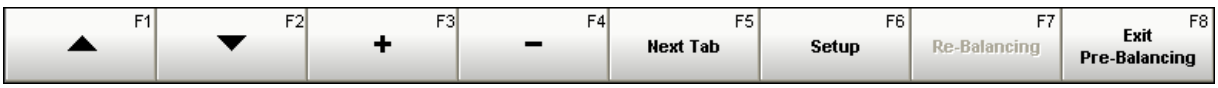


Mass Table.

Default setting: **Default (M4)**, a fictive set of balancing screws, M4.

- Highlight the line **Mass Table** with a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key.
- To generate a new Mass Table overwrite the highlighted text (e.g. “Screws M3 ...”).

- With a computer mouse click or by pressing the Up- [▲] / [F1] or Down- [▼] / [F2] key highlight or create a new line.
- Enter all available weights of your correction masses and if desired, the name. For example, you can weigh screws of different length precisely and enter or you take over the weights of commercially available sets of balancing screws. Entering the weights can be done in any order. Sorting by weight is done automatically when saving.
- To delete a weight enter “0”.



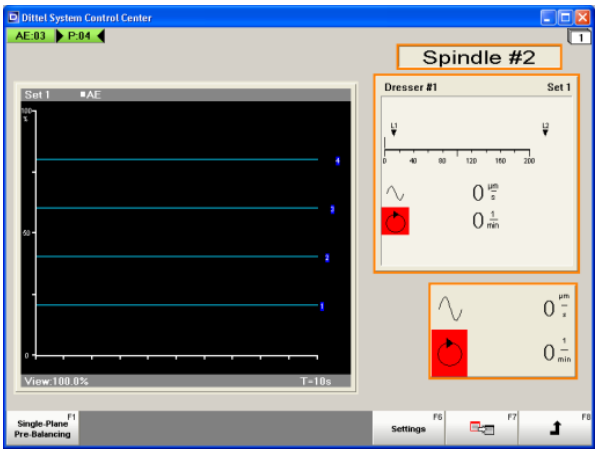
N.B.
Save all your entries by clicking or pressing on key [Next Tab] / [F5] or [Setup] / [F6] or [Exit Pre-Balancing] / [F8].

10 SINGLE PLANE PRE PRE-BALANCING USING ANGULAR METHOD

10.1 Setup and Single-Plane Pre-Balancing

N.B.
From DSCC software version 3.61 on it is possible to start the setup as follows:
- With the balancing (spread) weights in neutral position (spread angle 180°)
- or with pre-adjusted balancing weights if the position and size of the unbalance is approximately known. With this method unpredictably large imbalances can be avoided at high speed when starting balancing at low speed and after each increase in speed, balance again.

The following description of the Pre-Balancing Method **Angular Method** uses two equal fixed mass balancing weights, which can be positioned and clamped at any specific angle on the wheel holder, as compensating masses.
During Setup, Pre-Balancing and Re-Balancing, the Unbalance Limit 1 and 2 and the Speed Limit of the rotor are monitored (see connector # 2 or # 13 of P6002 UP line).

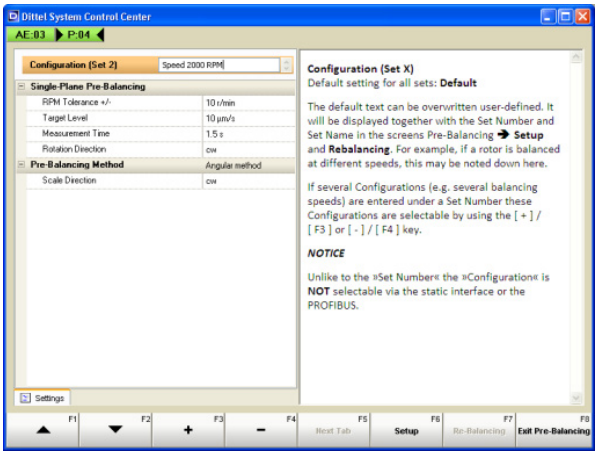


Make the P6002 UP line module available.
Select for the rotor to be pre-balanced the **Set Number** under which the desired operating mode and accompanying parameters were stored.

Manual: To select the Set Number open the tab **Settings**. Adjust the proper Set Number and leave the tab using soft key [Back].

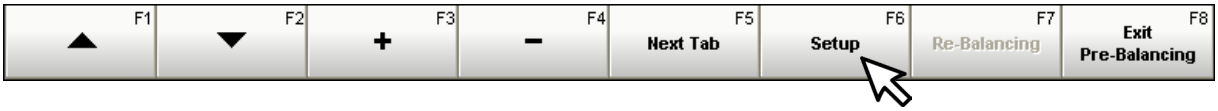
External: Via hardwire interface connector # 2 or PROFIBUS the proper Set Number is set by the Automation System.

Depending on **Operating Mode**, stored under the selected Set Number, individual Module Views with its specific soft keys are displayed.
The opposite screen shows, for example, **Set Number 1** and the Operating Mode **Single-Plane** (recognizable by a single bargraph indication).
To balance the rotor click or press the key [Single-Plane Pre-Balancing].



If available, select the desired **Configuration**.
Particularly check:
- the Pre-Balancing Method = **Angular Method**
- the Rotation Direction and
- the Scale Direction.

Launch the function of the Setup by clicking on soft key [Setup] or pressing the function key [F6].



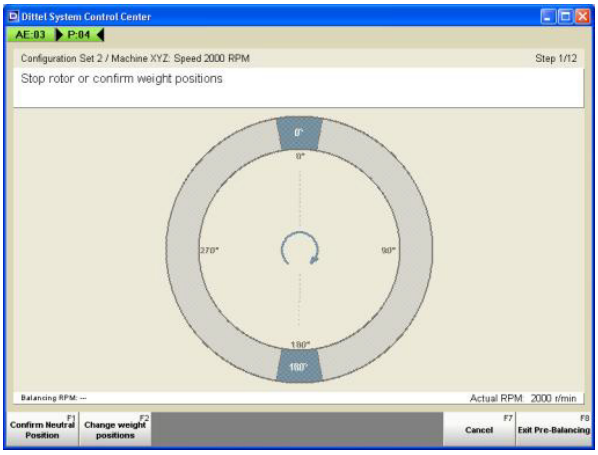
WARNING
Risk of injury from rotating parts!
Switch OFF the machine when installing or adjusting the Balancing Weights!
Ensure that the rotor has stopped, before working on it!
Protect the machine against unauthorized or accidental switching ON!
NEVER operate a machine tool without all proper safety guarding in place.
DO NOT suspend any Safety Facilities!

N.B.
Precise setting of the balancing weights is very essential to successful operation of the pre-balancing process!
Follow the display step by step what to do next.
The [Next] key will not be available until the "**Run rotor at Balancing RPM**" condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the pre-balancing process.
Angles, speed, etc. shown below are **examples**! Follow the instructions as displayed!

10.1.1 *Setup with spread weights in the neutral position*

N.B.
The Setup can be started either with a stopped or with a running rotor.

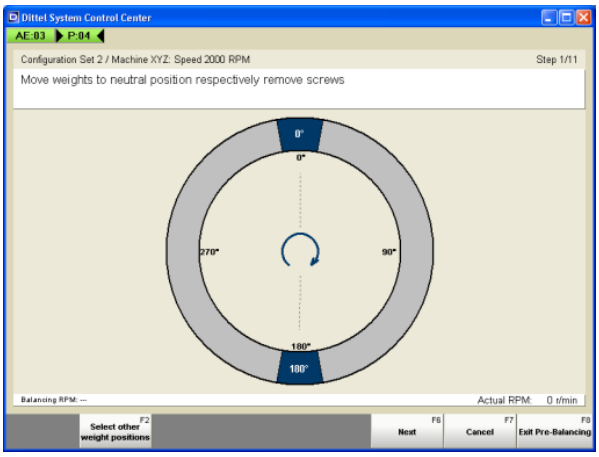
Setup while the rotor is running



When you start setup while the rotor is running the setup is extended by one step, as opposed to setup the rotor, while the rotor is stopped (additional: → Stop rotor or confirm Neutral Position).
Pre-balancing can be shortened by one step
- when the spread weights on the rotor are in the same neutral position as shown on the display
- and without stopping the rotor, confirm the position of the spread weights by pressing the key [Confirm Neutral Position]

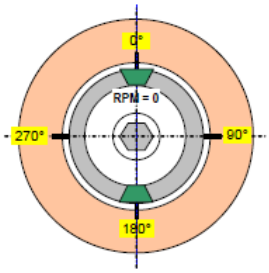
N.B.
The key [Change weight positions] is used to set individual position of the balancing weights. This key should be operated by experienced machine fitters only (see section "10.2 The Key "Select other weight positions"" on page 119).

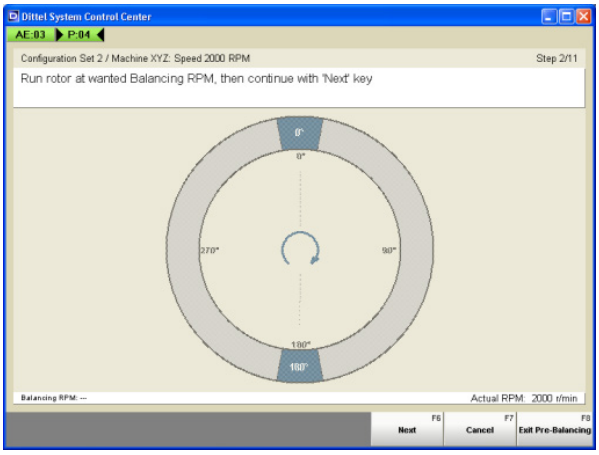
Setup while the rotor is stopped



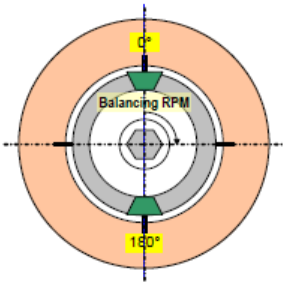
The following example shows the Setup procedure starting with a stopped rotor. (Step 1/11) and the Balancing weights in Neutral Position.

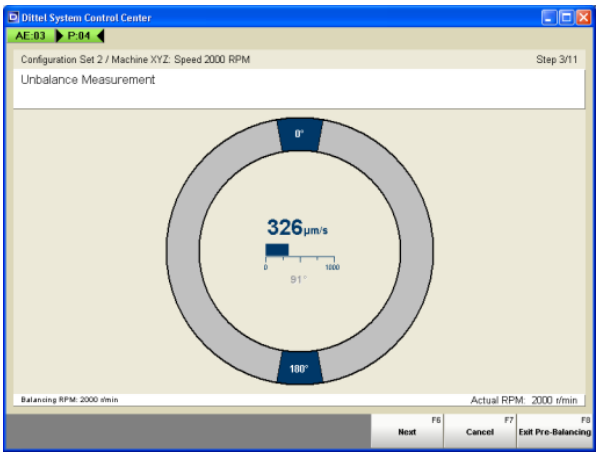
Position the balancing weights precisely to the neutral position as indicated on the screen and clamp.
The example shows Scale Direction: cw.
Continue by pressing or clicking the [Next] key.



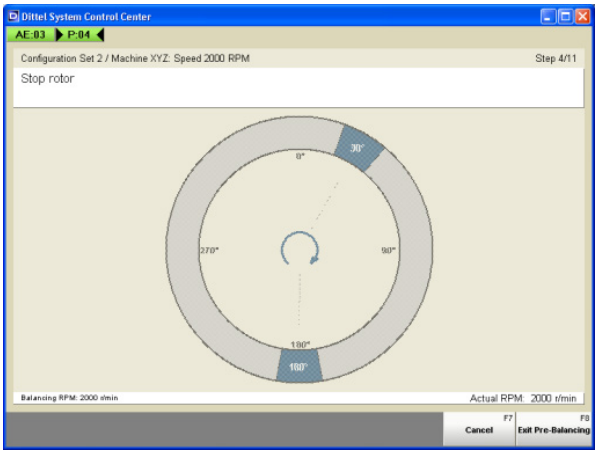


Run rotor at wanted Balancing RPM.
The example shows Rotational Direction: cw.
After reaching the wanted Balancing Speed (indication in this example: Actual RPM: 2000 r/min) continue by pressing or clicking the [Next] key.

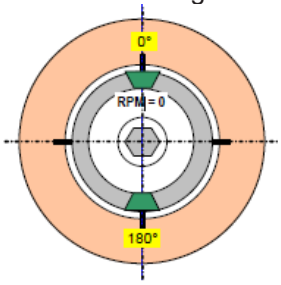


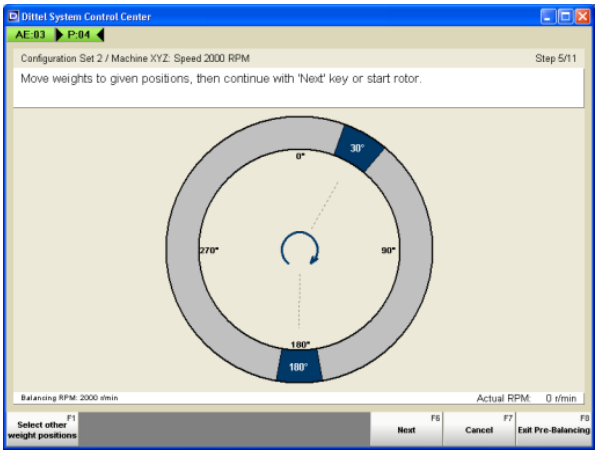


The P6002 UP line module starts its first measurement to determine the initial unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action the angular position and value of the initial unbalance, together with the Balancing Speed of the first trial run are stored (= Display Balancing RPM: 2000 r/min).

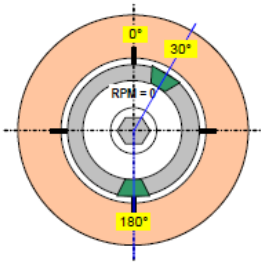


The screen already shows the new balancing weight positions. Stop rotor. After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.

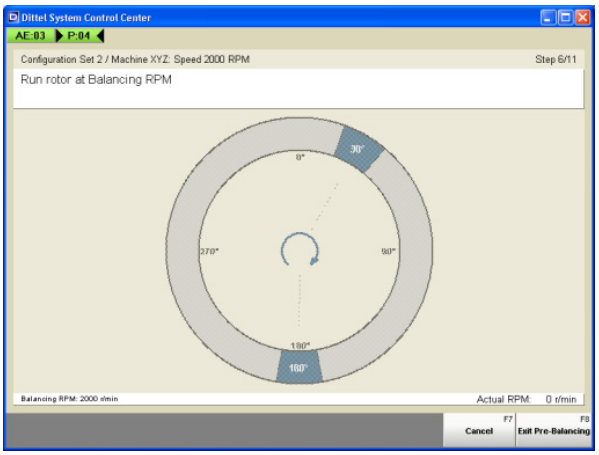




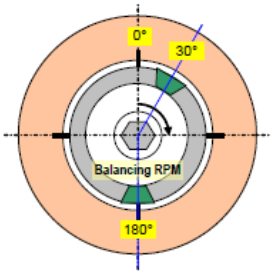
To create a trial unbalance, position the 0° balancing weight to precisely 30° - as shown on the display - and clamp.
To continue press the [Next] key.

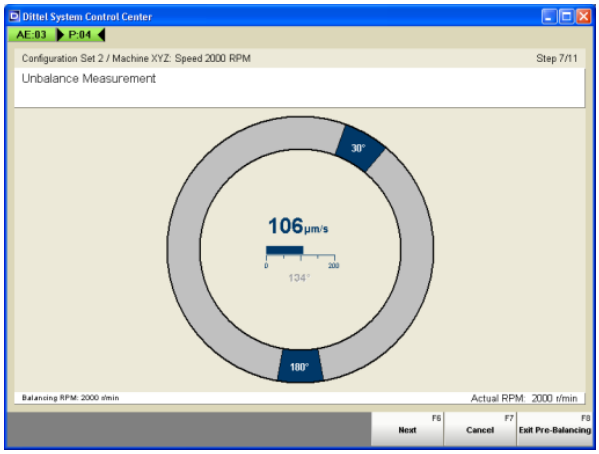


N.B.
If the displayed trial unbalance is not suitable (e.g. too light or too heavy), the spread weights can be adjusted individually. With the key [Select other weight positions] the new positions of the spread weights must be transferred.
This key should be operated by experienced machine fitters only (see section “10.2 The Key “Select other weight positions”” on page 119)!



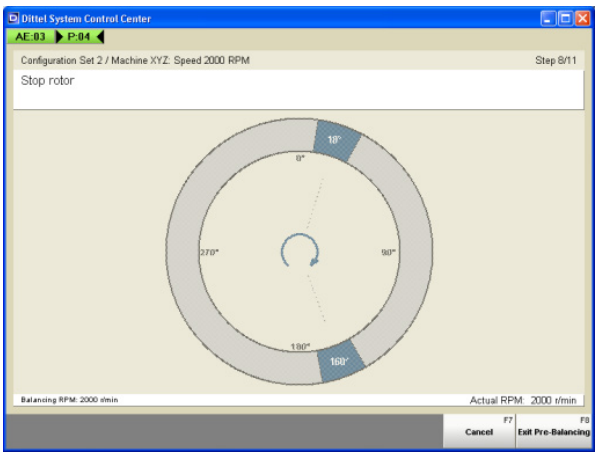
Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2000 r/min) the Module starts automatically the next measurement run.



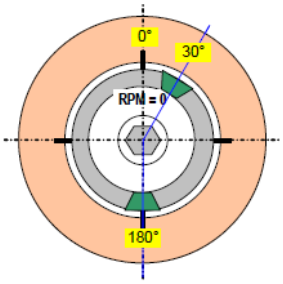


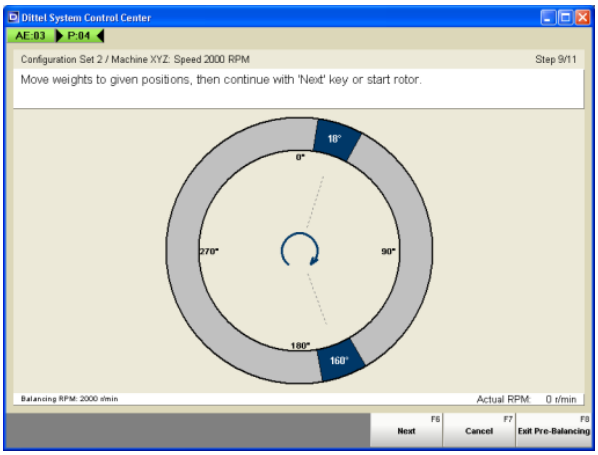
In the second run, the Module repeats its Setup unbalance measurements with the test unbalance.
During the unbalance measurements, the actual unbalance is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action, the angular position and value of the “new” unbalance are stored.

10.1.2 *Pre-Balancing*

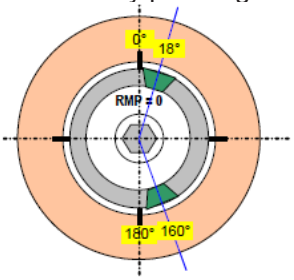


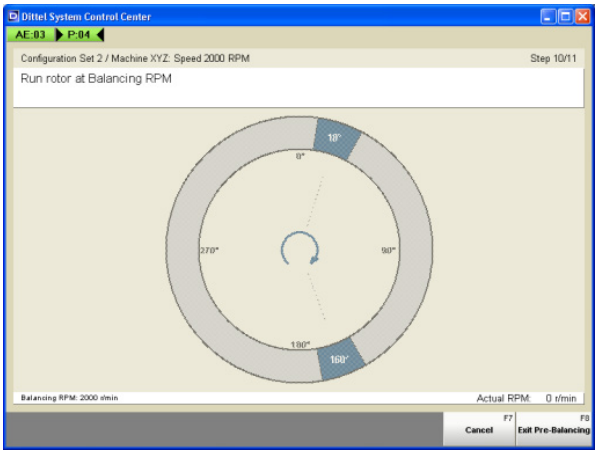
The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



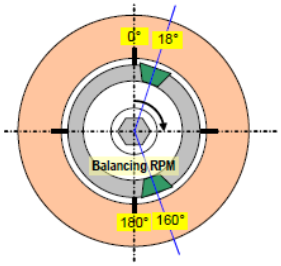


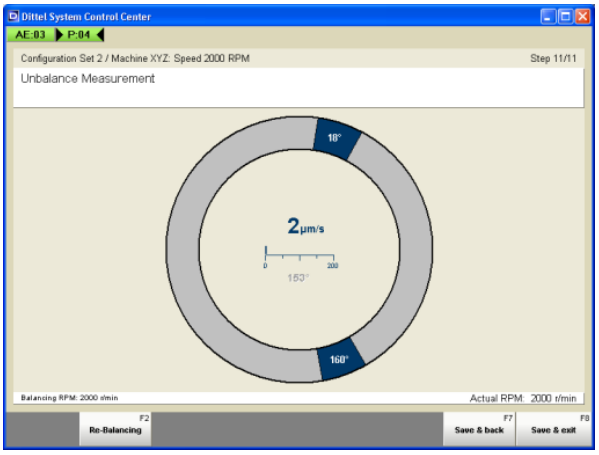
Position the balancing weights as shown in the location detail.
Example: move one balancing weight to 18°, move the other balancing weight to 160°, and clamp both weights.
Continue by pressing the [Next] key.



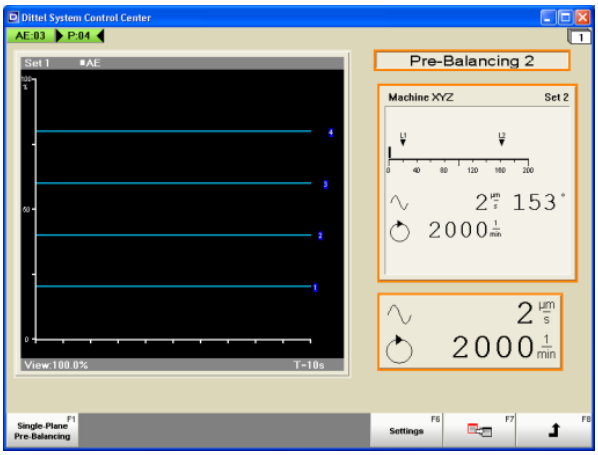


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2000 r/min) the Module starts automatically its last measurement run.





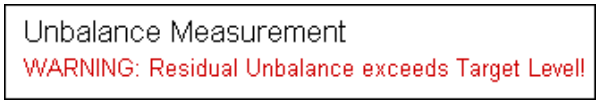
During the last measurement run (check run) the software of the Module checks the position of the balancing weights and shows the residual unbalance in units of µm/s (here 1 µm/s).
If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, press the [Save & Exit] key.



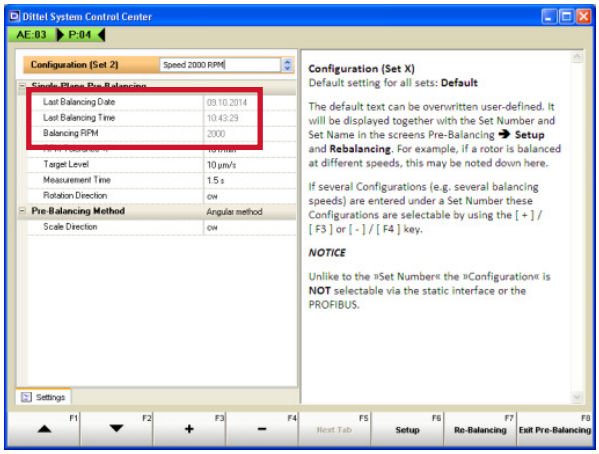
You return to the Monitoring screen.

THUS, THE SETUP AND PRE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

10.1.3 *If the first time Setup and Pre-Balancing process is NOT finished successfully*



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears at the screen.
Continue by pressing the [Save & back] or [Re-Balancing] key and try to improve the result by using this function.



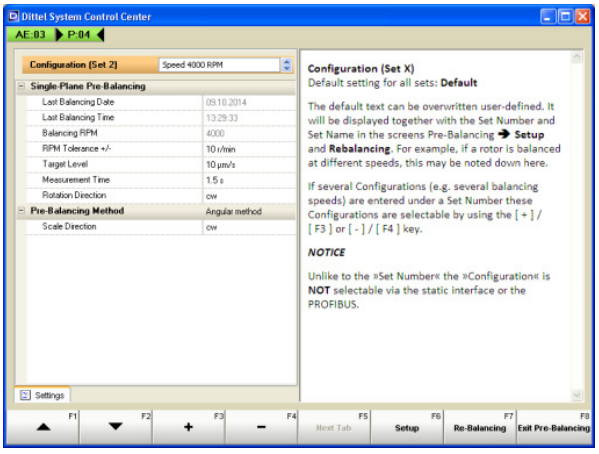
After pressing or clicking the [Save & back] key you return to the tab **Settings**.
Additionally it is indicated:

- the date of the last Pre-Balancing
- the time of the last Pre-Balancing, and
- the Balancing RPM.

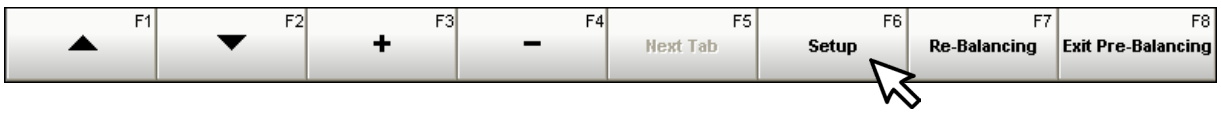
N.B.
A restart of the Setup procedure of the same rotor (optionally under a new Configuration) is required
- when the operational speed has changed,
- when the Rotation Direction has changed.

10.1.4 *Setup with spread weights in any position*

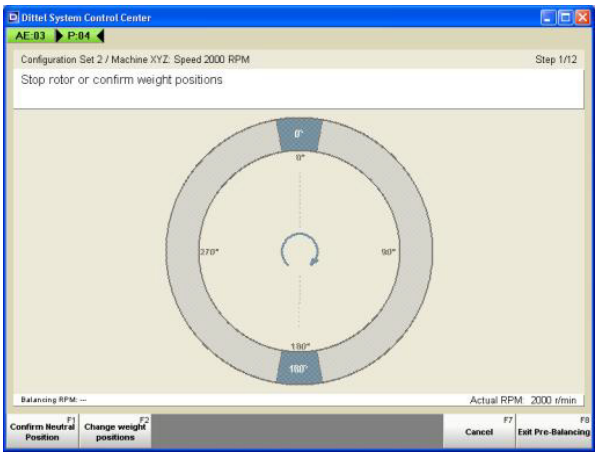
N.B.
If the rotor should be balanced immediately after the previous example with 4,000 rpm instead of 2,000 rpm, for example, proceed as follows:
The Setup can be started either with a stopped or with a running rotor.



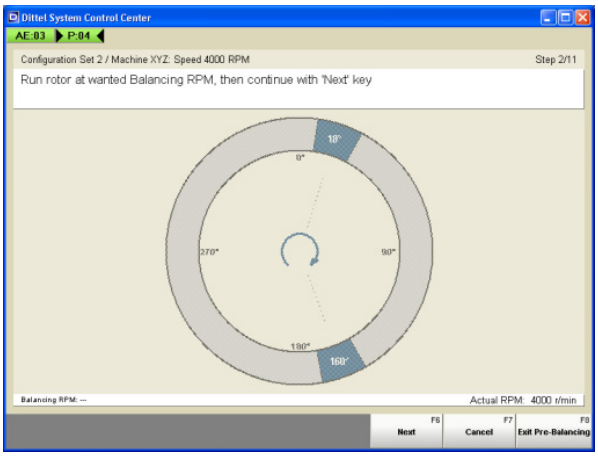
Launch the function of the Setup by clicking on soft key [Setup] or pressing the function key [F6].



Setup while the rotor is running



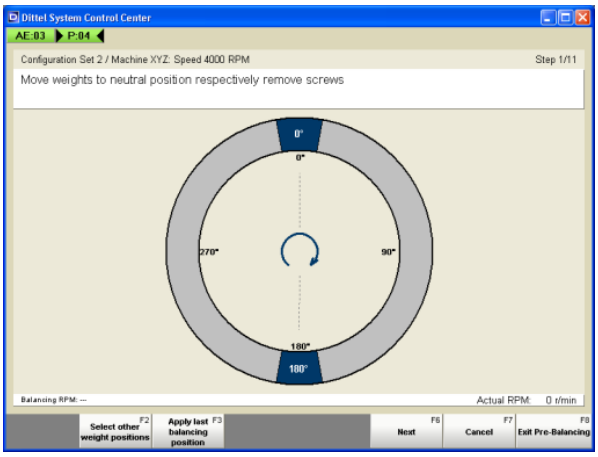
If the setup function is started when the rotor is running, the display shows the balancing weights at the beginning always in neutral position.



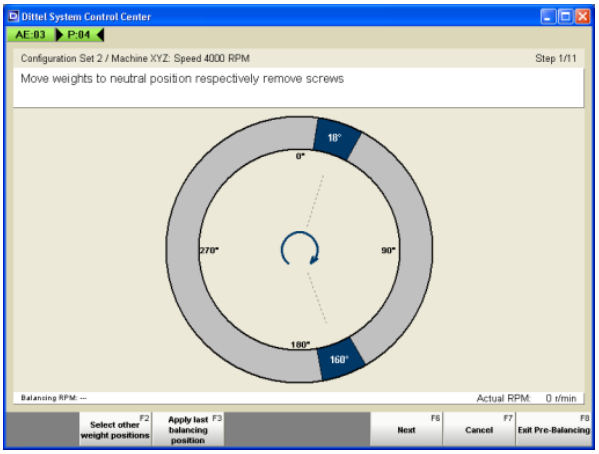
When the positions of the balancing weights on the rotor have not been changed since the last balancing, balancing can be shortened by one step by pressing or clicking on the key “Apply last balancing position” without stopping the rotor.

Continue with step 3/11, next figures of **Setup while the rotor is stopped** section.

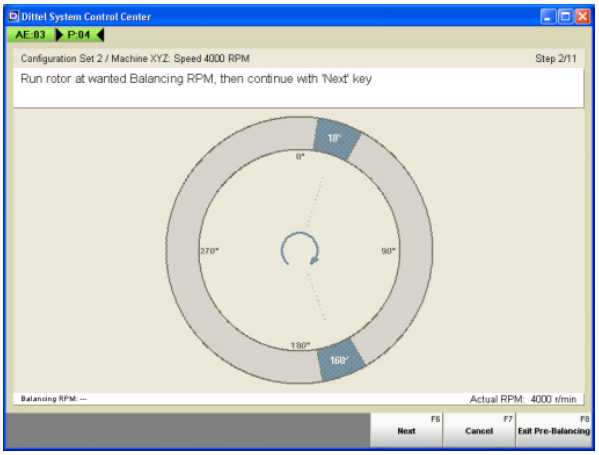
Setup while the rotor is stopped



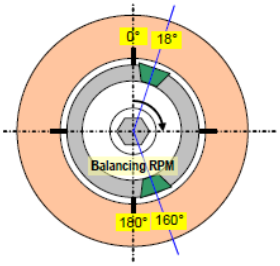
If the setup function is started when the rotor is stopped, the screen shows the balancing weights at the beginning always in neutral position.
The positions of the balancing weights on the rotor have not been changed since the last balancing.

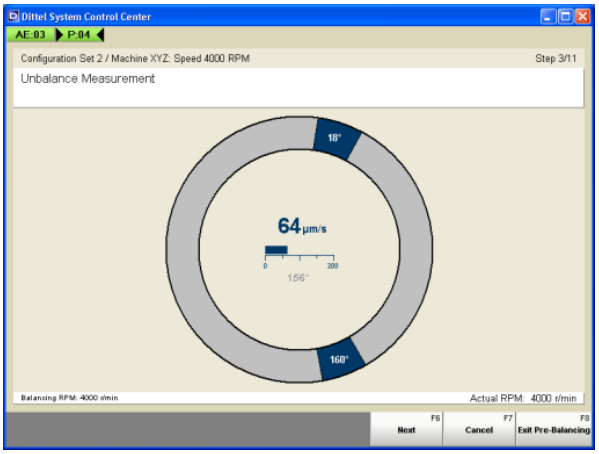


Continue by clicking on key [Apply last balancing position] or pressing the function key [F3].
The screen shows the last balancing weights positions.
Continue by pressing the [Next] / [F6] key.

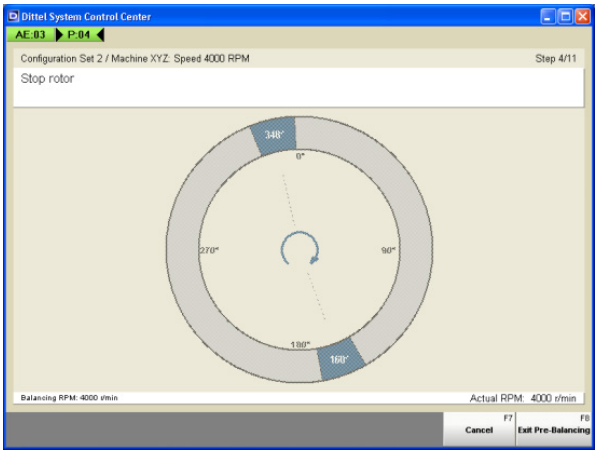


Run rotor at wanted Balancing RPM.
After reaching the wanted Balancing Speed (indication in this example: Actual RPM: 4000 r/min) continue by pressing or clicking the [Next] key.

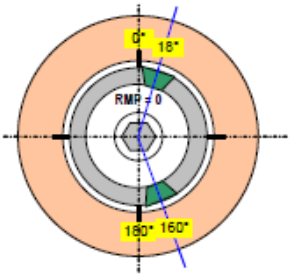


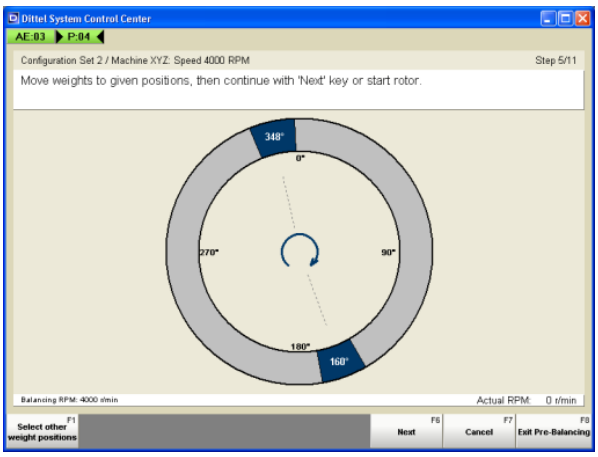


The P6002 UP line module starts its first measurement to determine the initial unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen!
When the key [Next] is available press the [Next] key.
With this action the angular position and value of the initial unbalance, together with the Balancing Speed of the first trial run are stored (= Display Balancing RPM: 4000 r/min).

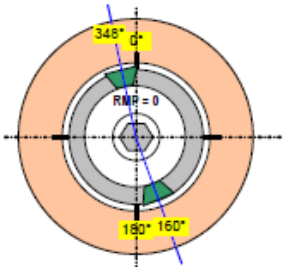


The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.

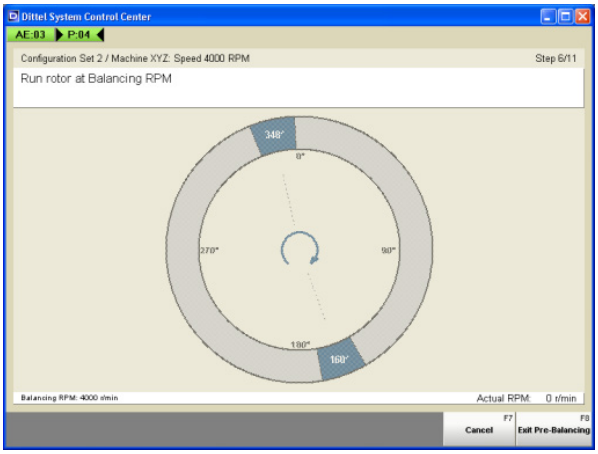




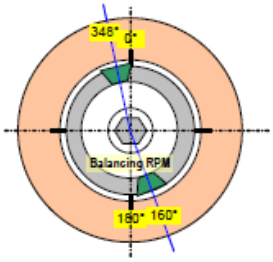
To create a trial unbalance, position the 18° balancing weight to precisely 348° - as shown on the screen - and clamp.
To continue press the [Next] key.

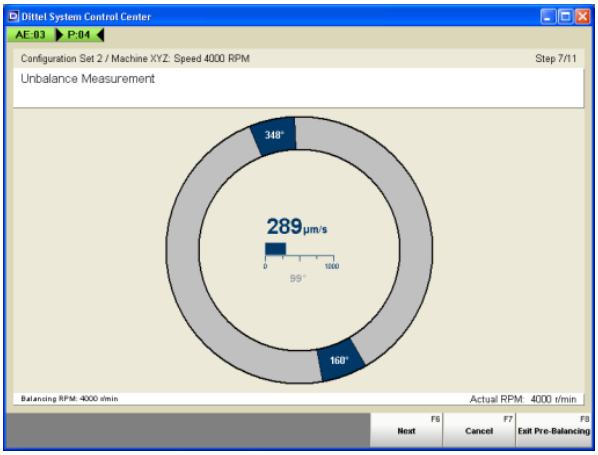


N.B.
If the displayed trial unbalance is not suitable (e.g. too light or too heavy), the spread weights can be adjusted individually. With the key [Select other weight positions] the new positions of the spread weights must be transferred.
This key should be operated by experienced machine fitters only (see section “10.2 The Key “Select other weight positions”” on page 119)!



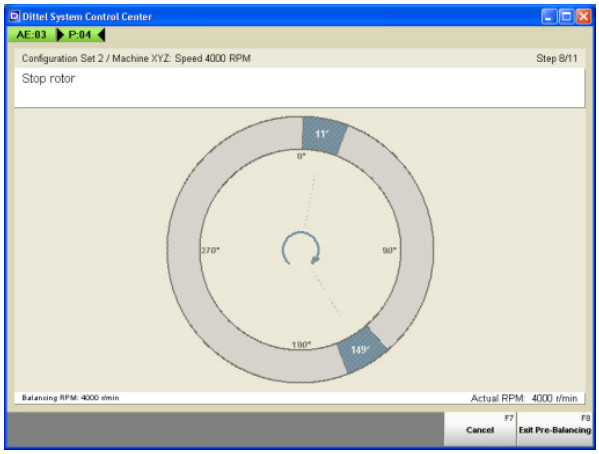
Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM:4000 r/min) the Module starts automatically the next measurement run.



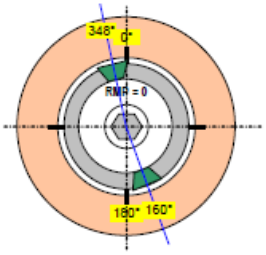


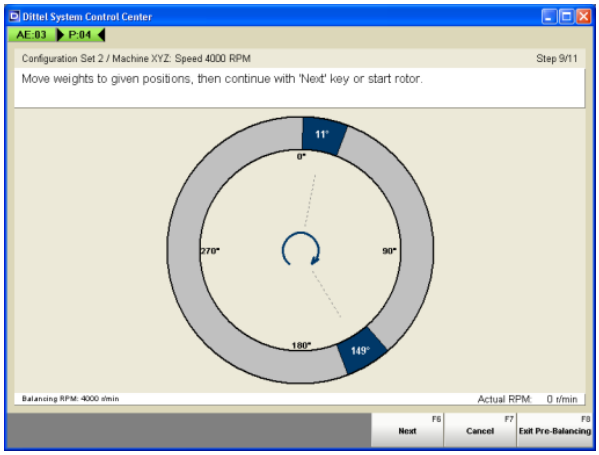
In the second run, the Module repeats its Setup unbalance measurements with the test unbalance.
During the unbalance measurements, the actual unbalance is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen!
When the key [Next] is available press the [Next] key.
With this action, the angular position and value of the “new” unbalance are stored.

10.1.5 *Pre-Balancing*

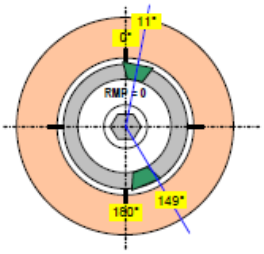


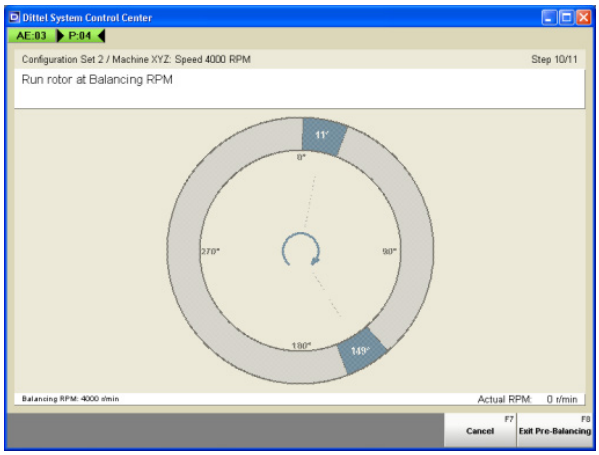
The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



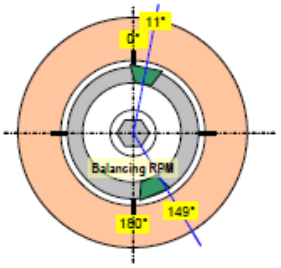


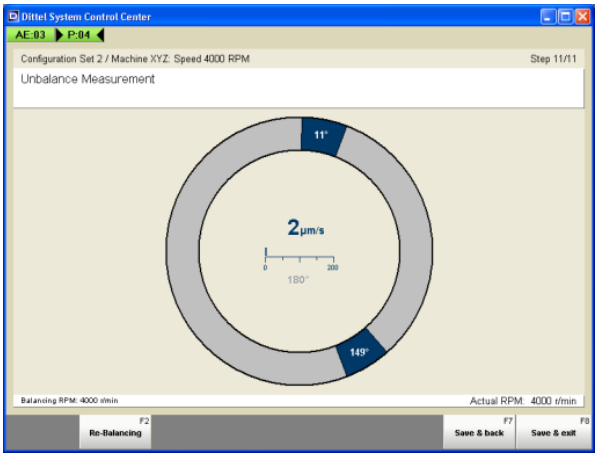
Position the balancing weights as shown in the location detail.
Example: move one balancing weight to 11°, move the other balancing weight to 149°, and clamp both weights.
Continue by pressing the [Next] key.



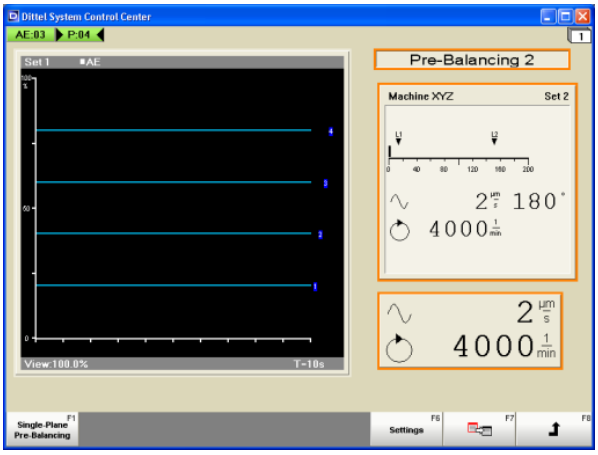


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 4000 r/min«) the Modul starts automatically its last measurement run.





During the last measurement run (check run) the software of the Module checks the position of the balancing weights and shows the residual unbalance in units of µm/s (here 2 µm/s).
If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, press the [Save & Exit] key.

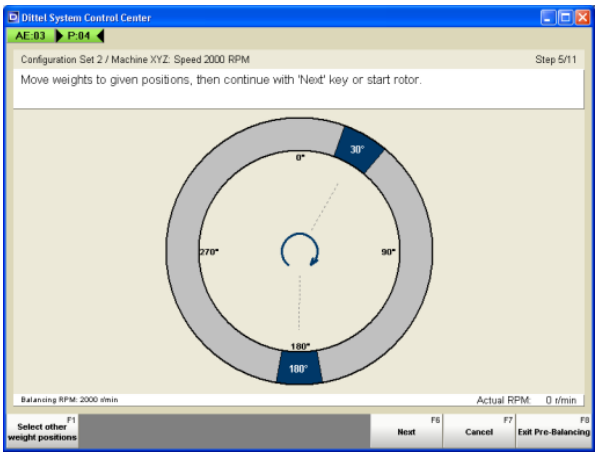


You return to the Monitoring screen.

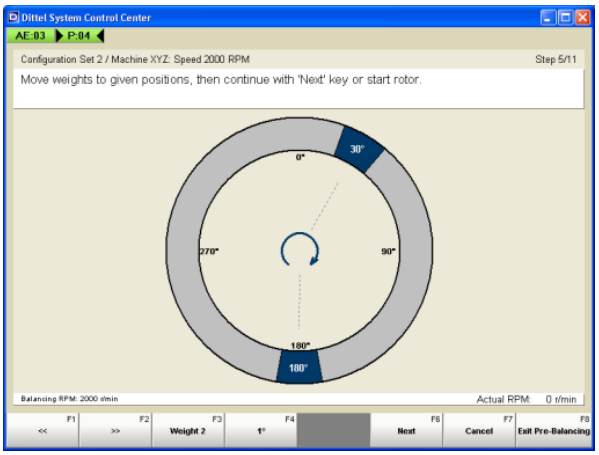
THUS, THE SETUP AND PRE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

10.2 *The Key "Select other weight positions"*

N.B.
If the approximate position of the unbalance is already known before setup the weights on the rotor can be brought in the respective positions.
Then it is imperative, that with the key [Select other weight positions] the weight positions are transferred to the screen.
If the test unbalance at a suggested standard spread angle of 150° causes an inadmissible unbalance for the rotor (increase spread angle), or a Warning message **Testunbalance is too light** appears (decrease spread angle), position the balancing weights that you deem to be suitable.
Also here it is imperative, that with the key [Select other weight positions] the weight positions are transferred to the screen.



To continue press or click on the [Select other weight positions] key.



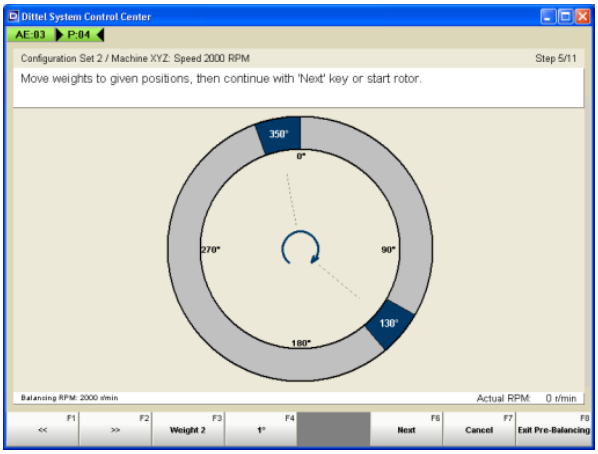
By clicking or by pressing the following keys, the positions of the two weights can be transferred exactly on the screen:

Weight 1 – Weight 2
By pressing this key, the weight to be changed is selected.

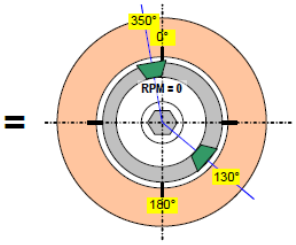
10° - 1°
This key determines whether to change the position of the selected balancing weight in steps of 1° or in steps of 10°.

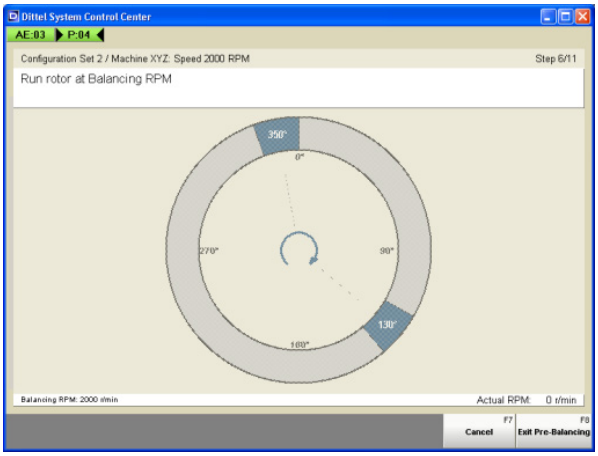
>>
By pressing this key, the selected balancing weight turns to the right in the chosen degree step.

<<
By pressing this key, the selected balancing weight turns to the left in the chosen degree step.



Transfer the positions and angle of the balancing weights to the rotor as indicated.
Example: move one weight to the 350° position and the other weight to the 130° position and clamp.
To continue press the [Next] key.





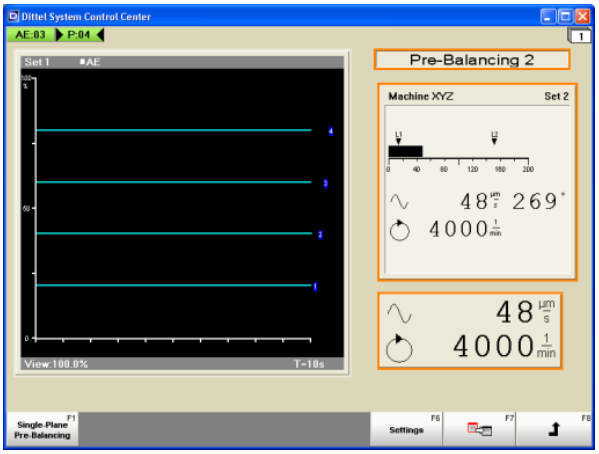
Further process of pre-balancing is carried out as described before. See section “10.1.1 Setup with spread weights in the neutral position” on page 108 or “10.1.4 Setup with spread weights in any position” on page 113).

10.3 *Re-Balancing using Angular Method*

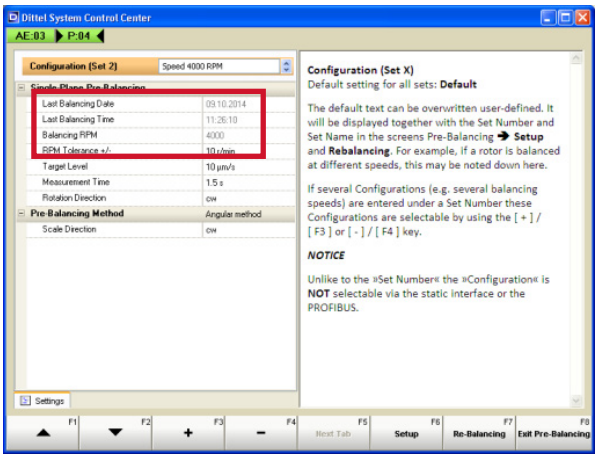
The rotor should be re-balanced,

- when the result of the first pre-balancing after Setup was not satisfactory,
- when the grinding wheel was changed or replaced, or
- when the unbalance exceeds the permitted value after several grinding cycles.

N.B.
During Re-Balancing both Unbalance Limits and the Speed Limits are monitored (see Connector # 2 or # 13)!



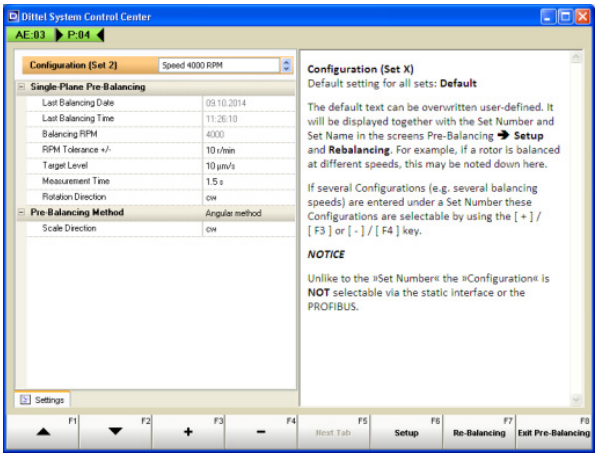
Make the P6002 UP line module available.
Select for the rotor to be re-balanced the **Set Number** under which the rotor was pre-balanced the last time.
While in the Module Mode click or press on the key [Pre-Balancing].



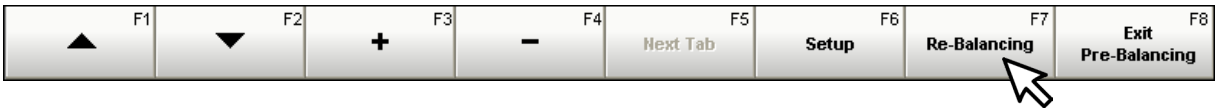
Date, time, and Balancing RPM of the last Pre- Balancing procedure must be displayed.
The key [Re-Balancing] must be available.
Particularly check

- the desired **Configuration**, if any,
- the Pre-Balancing Method = **Angular Method**
- the Rotation Direction, and
- the Scale Direction.

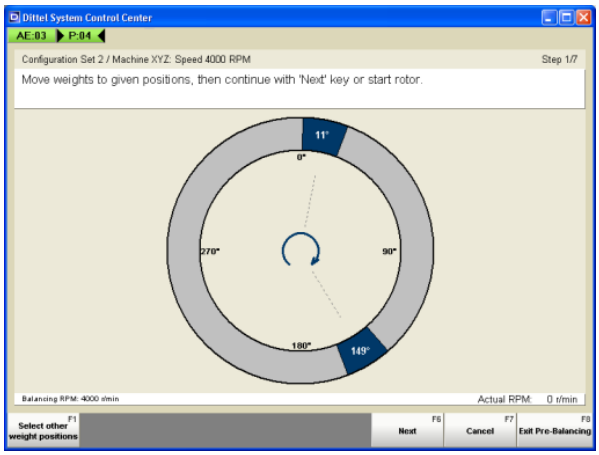
N.B.
With the selected Set Number and Configuration, Setup and prebalancing of the rotor was already performed once with the same Balancing RPM, Rotation Direction, and Pre-Balancing Method.
Follow the operating guide step by step what to do next.
The [Next] key will not be available until the **Run rotor at Balancing RPM** condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the re-balancing process.
Angles, speed, etc. shown below are examples! Follow the instructions as displayed!
Before Re-Balancing NEVER change
- the Rotation Direction,
- the Pre-Balancing Method,
- the Scale Direction!
Each change deletes the stored data of the Setup!



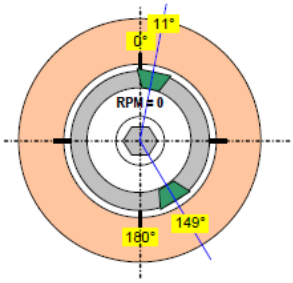
Launch the Re-Balancing function by clicking on soft key [Re-Balancing] or pressing the function key [F7].

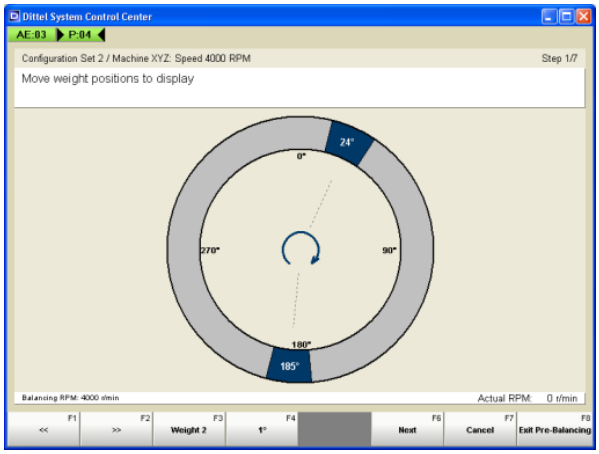


N.B.
Re-Balancing can be started either
- with a stopped rotor,
- with a rotor running at Balancing RPM, or
- with a rotor running at less than Balancing RPM.
The number of steps changes correspondingly, as well the start screen.

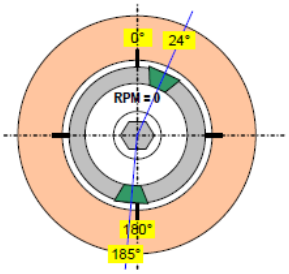


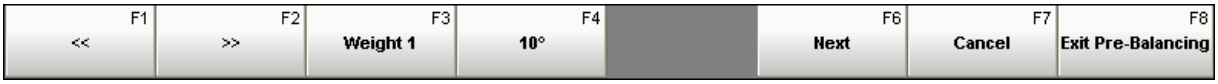
The following example shows Re-Balancing of a rotor stopped at the beginning (Step 1/7).
If changed in between, move the weights exactly into position as indicated on the screen and clamp weights.





Alternatively, transfer the actual angular position of the balancing weights onto the screen.
To do so press or click on the [Select other weight positions] key.





By clicking or by pressing the following keys, the positions of the two weights can be transferred exactly on the screen:

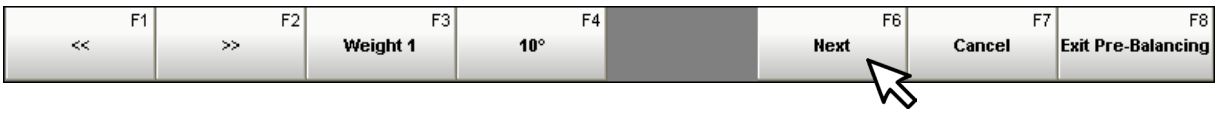
Weight 1 – Weight 2
By pressing this key, the weight to be changed is selected.

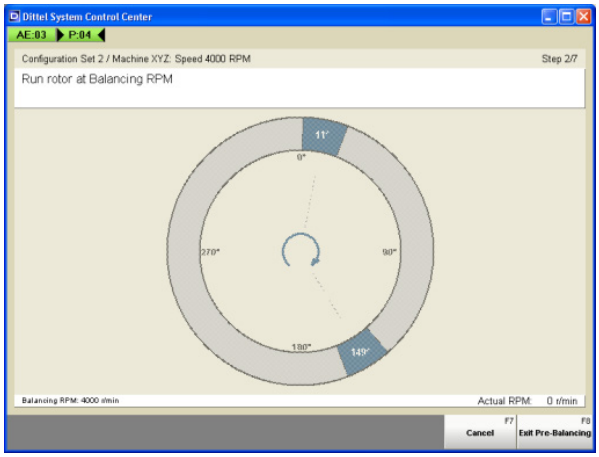
10° - 1°
This key determines whether to change the position of the selected balancing weight in steps of 1° or in steps of 10°.

>>
By pressing this key, the selected balancing weight turns to the right in the chosen degree step.

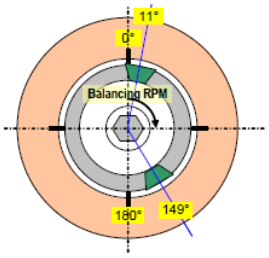
<<
By pressing this key, the selected balancing weight turns to the left in the chosen degree step.

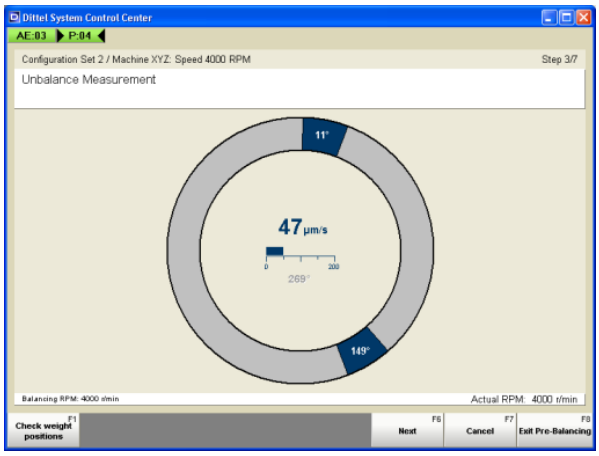
If the angular position of the balancing weights and the indication on the screen agree press the [Next] key.





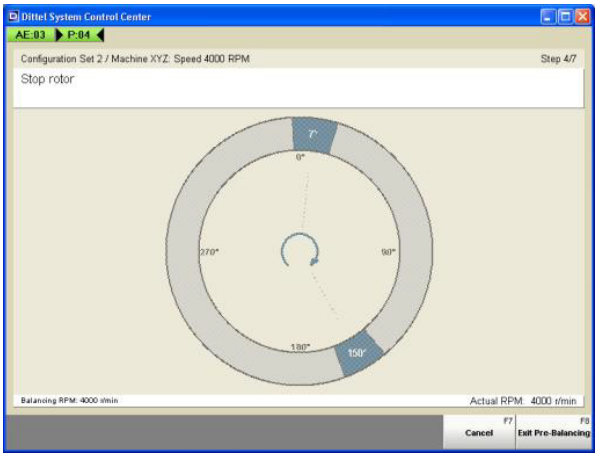
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 4000 r/min) the Module starts automatically the first re-balancing measurement run.



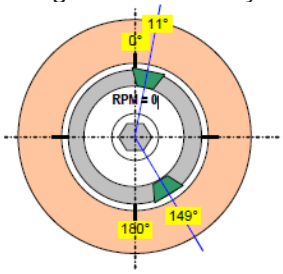


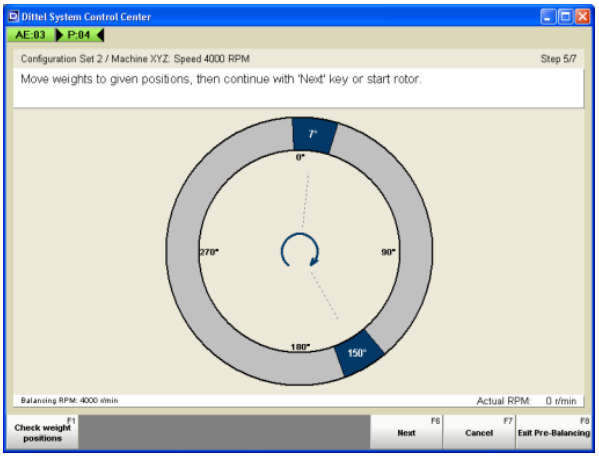
The P6002 UP line module starts its measurement to determine the unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen!
When the key [Next] is available press the [Next] key.

N.B.
Re-Balancing can be started either with a stopped or with a running rotor. If Re-Balancing is started with a running rotor, Figure here above, is the first screen (Step 1/5). If required, you can check the weight positions in this step again.
Then the Re-Balancing sequence is extended by one step due to → Stop rotor.

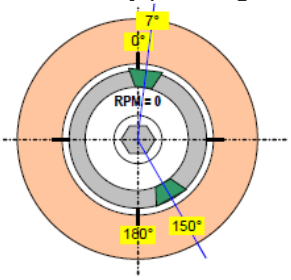


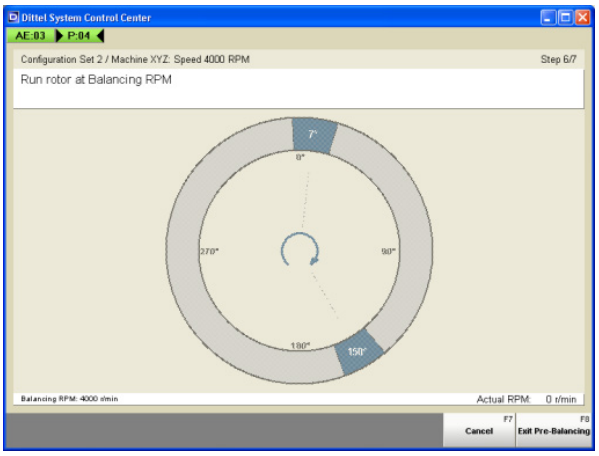
The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



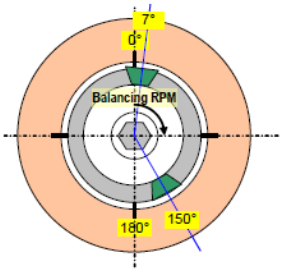


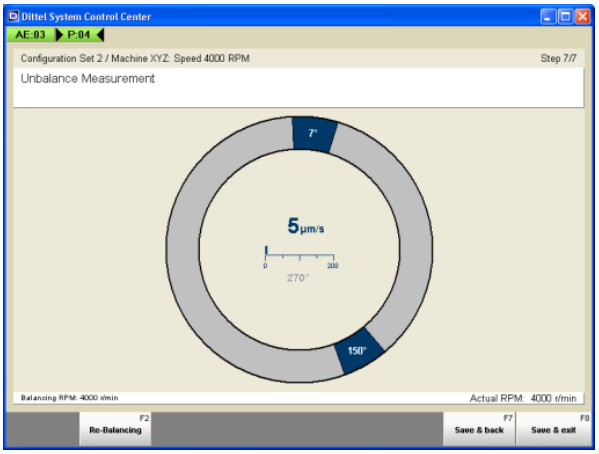
Position the balancing weights as shown in the location detail.
Example: move one balancing weight from 11° to 7°, the second balancing weight from 149° to 150°. Clamp both weights.
Continue by pressing the [Next] key.



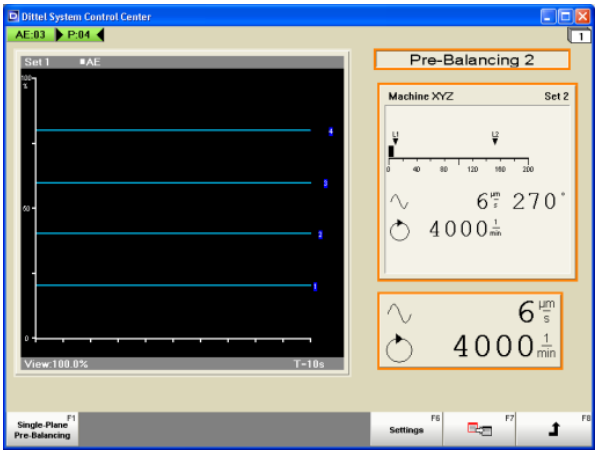


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 4000 r/min) the Module starts automatically its last measurement run.





During the last measurement run (check run) the software of the Module checks the position of the balancing weights and shows the residual unbalance in units of µm/s (here 5 µm/s).
If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, finally press the [Save & exit] key.

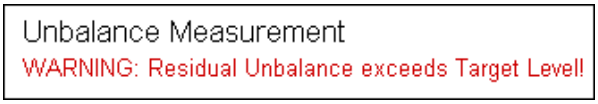


You return to the standard monitoring screen.

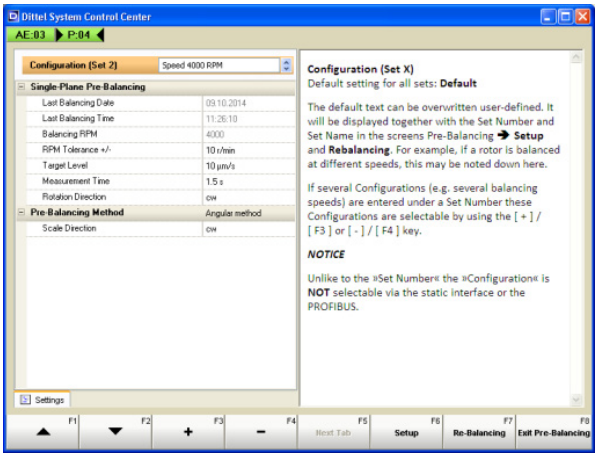
THUS, THE RE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

The date and time of Re-Balancing are stored under the adjusted Set Number and its Configuration.

10.3.1 *If the Re-Balancing Process is NOT finished successfully*



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears on the screen.

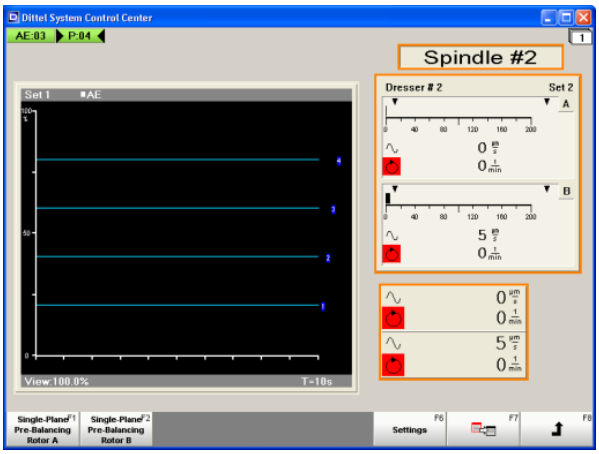


By pressing the [Save & back] key or the [Re- Balancing] key you return to the tab **Settings**.
Try to improve the result by a second re-balancing run.

11 SINGLE PLANE PRE-BALANCING USING FIXED POSITION METHOD

11.1 Setup and Single Plane Pre-Balancing

N.B.
The following description of the Single Plane Pre-Balancing Method Fixed Position uses two or three correction masses (e.g. different heavy screws) which are placed on three (3) to twenty four (24) fixed locations (e.g. equidistant tapped holes at the rotor).
The equidistant Fixed Positions at the rotor must be numbered permanently.
During Setup, Pre-Balancing and Re-Balancing the Unbalance Limit 1 and 2 and the Speed Limit is monitored (see connector # 2 or # 13 of P6002 UP line module).

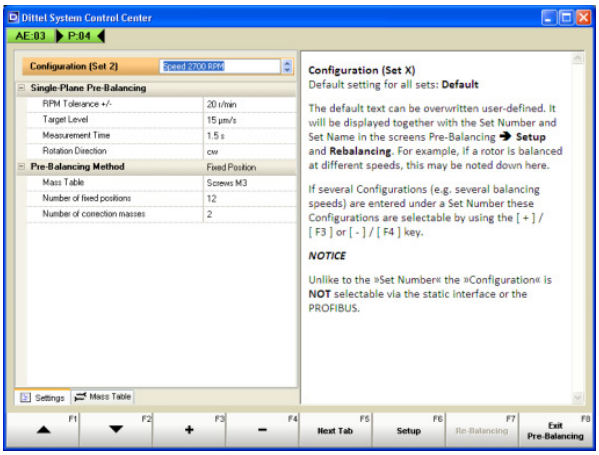


Make the P6002 UP line module available.
For the rotor to be pre-balanced, select the **Set Number,** under which the desired operating mode and accompanying parameters were stored.

Manual: To select the Set Number open the tab **Settings**. Adjust the proper Set Number and leave the tab using soft key [Back].

External: Via hardwire interface connector # 2 or PROFIBUS the proper Set Number is set by the Automation System.

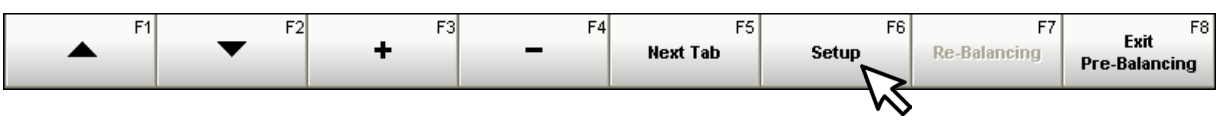
Depending on **Operating Mode**, stored under the selected Set Number, individual Module Views with its specific soft keys are displayed.
The opposite screen shows, for example, **Set Number 2** and the Operating Mode **2x Single-Plane** (recognizable by two bargraph indications marked A and B).
To pre-balance the rotor A click or press the key [Single Plane Pre-Balancing Rotor A].



If available, select the desired **Configuration**.
Particularly check:

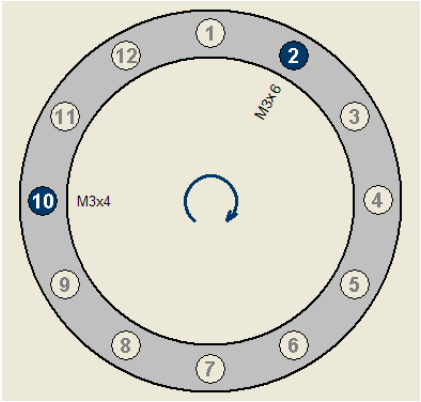
- the Pre-Balancing Method = **FixedPosition**
- the Mass Table (all masses available?),
- the Number of fixed positions (here e.g. 12),
- the Number of correction masses (here 2).

Launch the function of the Setup by clicking on soft key [Setup] or pressing the function key [F6].



WARNING
Risk of injury from rotating parts!
Switch OFF the machine when replacing or changing the Correction Masses!
Ensure that the rotor has stopped, before working on it!
Protect the machine against unauthorized or accidental switching ON!
NEVER operate a machine tool without all proper safety guarding in place.
DO NOT suspend any Safety Facilities!

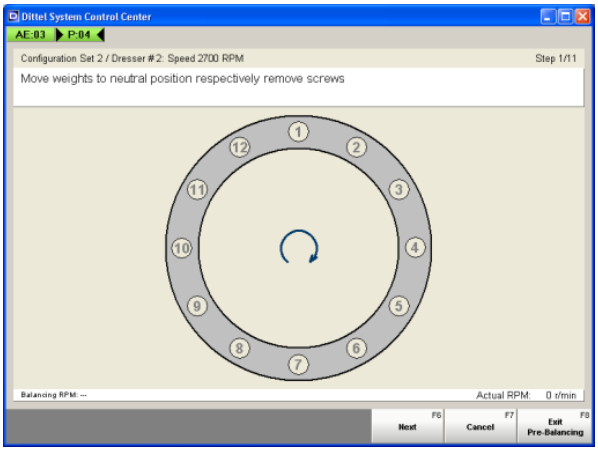
N.B.
Careful selection of the Correction Masses is very essential to successful operation of the pre-balancing process!
Follow the display step by step what to do next.
The [Next] key will not be available until the “Run rotor at Balancing RPM” condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the pre-balancing process.
Correction masses, speed, etc. shown below are examples! Follow the instructions as displayed!



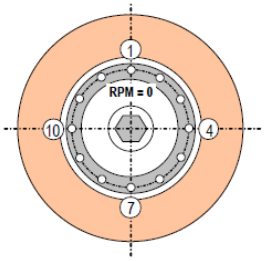
If for each correction mass, a Name (e.g. M3x4) was entered in the Mass Table then during Setup, Pre-Balancing or Re-Balancing the respective name instead of the weight is shown on the screen.

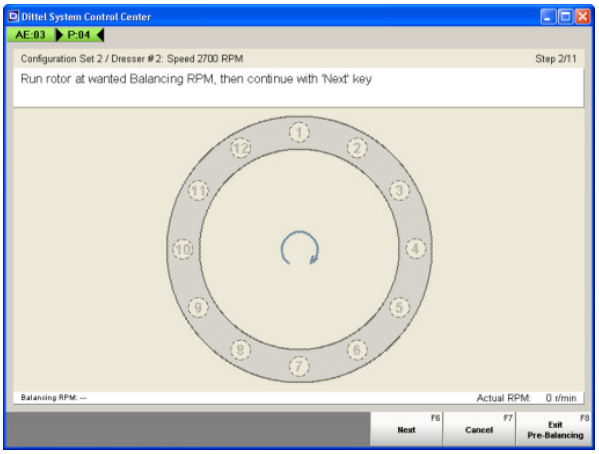
11.1.1 *Setup*

N.B.
The Setup can be started either with a stopped or with a running rotor. If the Setup is started with a running rotor the Setup procedure is extended by one step (additional: → Stop rotor or confirm Neutral Position).

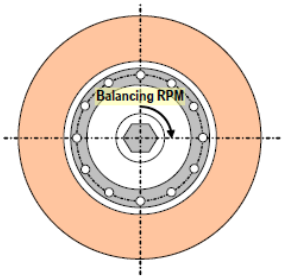


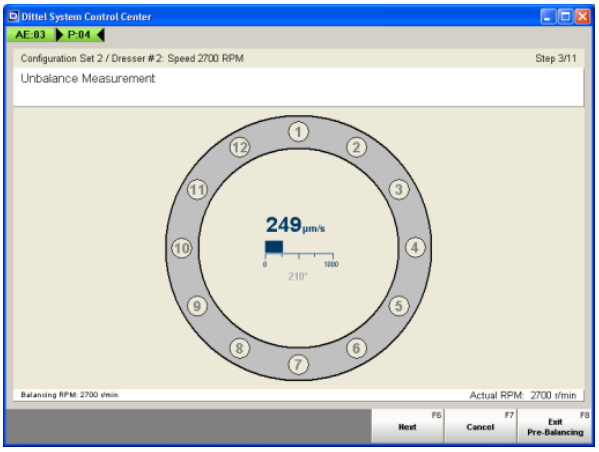
The following example shows the Setup procedure starting with a stopped rotor (Step 1/11).
Remove all correction masses / screws from the fixing flange / rotor.
Continue by pressing or clicking the [Next] key.



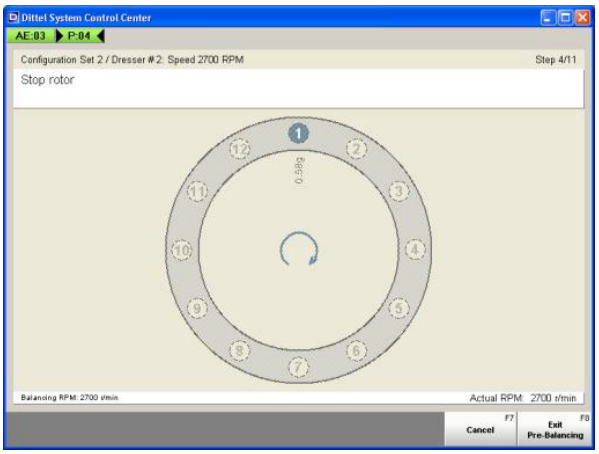


Run rotor at wanted Balancing RPM.
The example shows Rotational Direction: cw.
After reaching the wanted Balancing Speed (indication in this example: Actual RPM: 2700 r/min) continue by pressing or clicking the [Next] key.

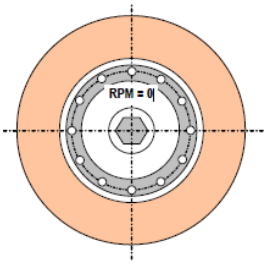


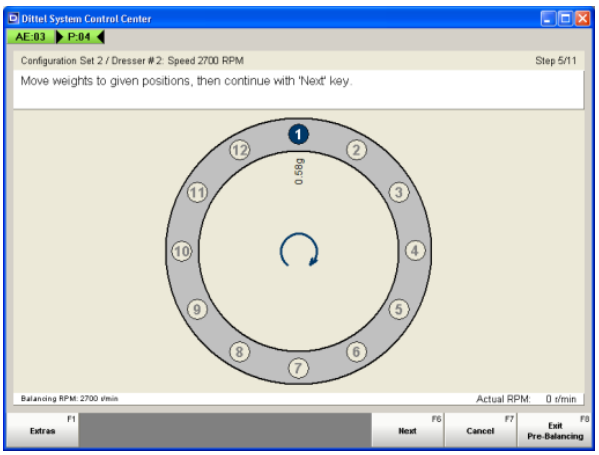


The P6002 UP line module starts its first measurement to determine the initial unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action the angular position and value of the initial unbalance, together with the Balancing Speed of the first test run are stored (= Display Balancing RPM: 2700 r/min).

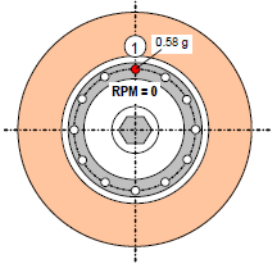


The screen already shows the new correction mass position.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.

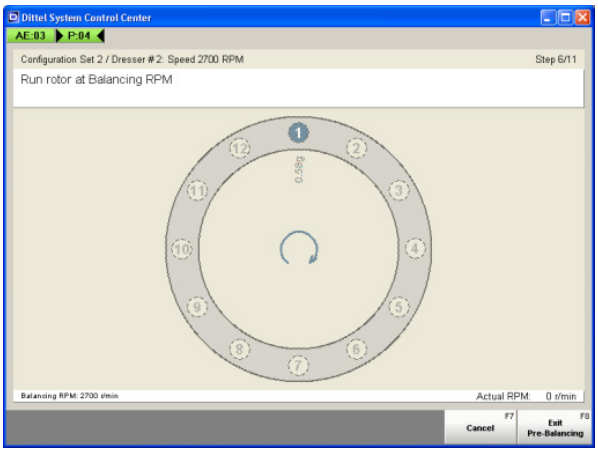




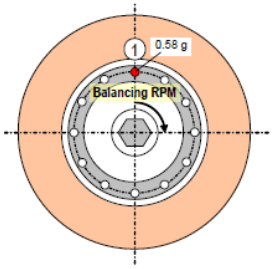
To create a test unbalance add a correction mass (e.g. screw) of indicated weight (e.g. 0.58 g) to position 1 - as shown on the display.
To continue press the [Next] key.

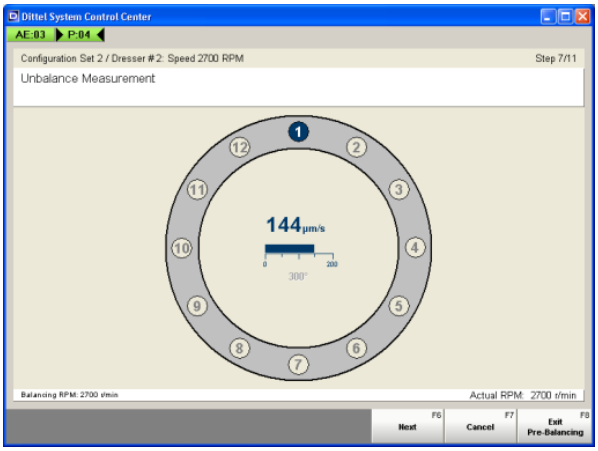


N.B.
The [Adjust positions] key is used to set an individual test unbalance and should be used by experienced personnel only (see section “11.2 The Adjust positions Key” on page 135)!



Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically the next measurement run.

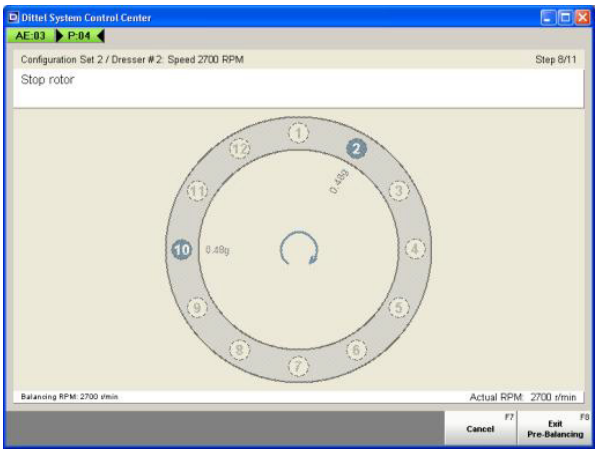




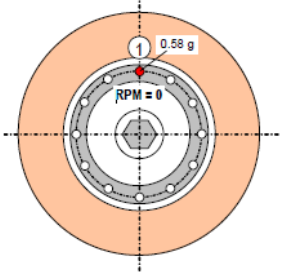
In the second run, the Module repeats its successive Setup unbalance measurements with the test unbalance.
During the unbalance measurements, the actual unbalance is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action, the angular position and value of the “new” unbalance are stored.

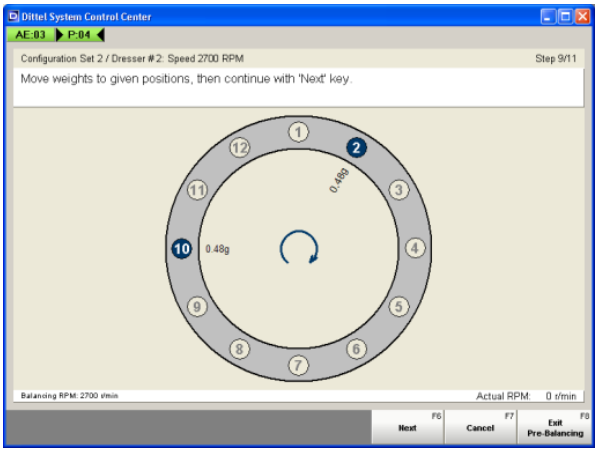
11.1.2 *Pre-Balancing with two correction masses*

N.B.
If the **Number of correction masses** under tab **Settings** is set to **2**, the positions and weights or Names of two correction masses are displayed.
The following example shows **12 Fixed Positions**.

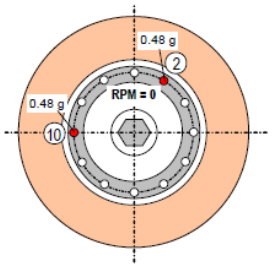


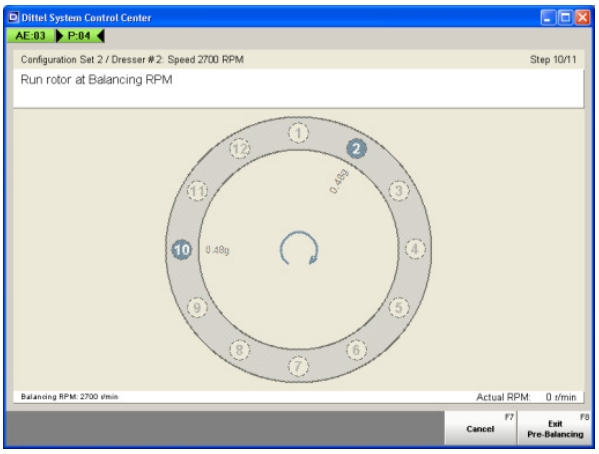
The screen already shows the new correction mass positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



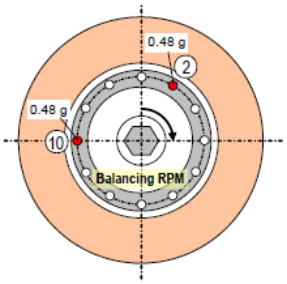


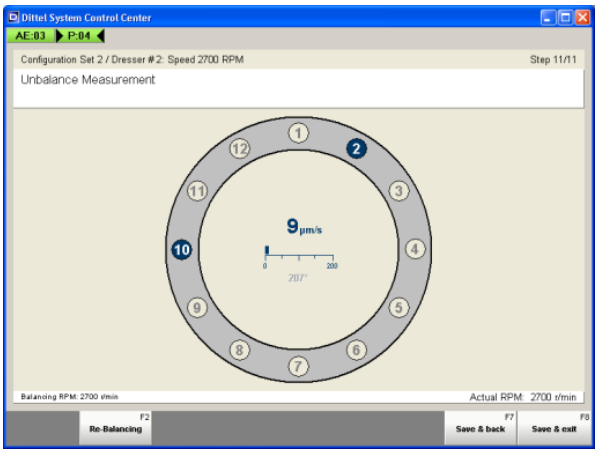
Remove the test unbalance (e.g. screw) from position 1.
Example: add a correction mass of 0.48 g to position 2 and a second correction mass of 0.48 g to position 10.
Continue by pressing the [Next] key.



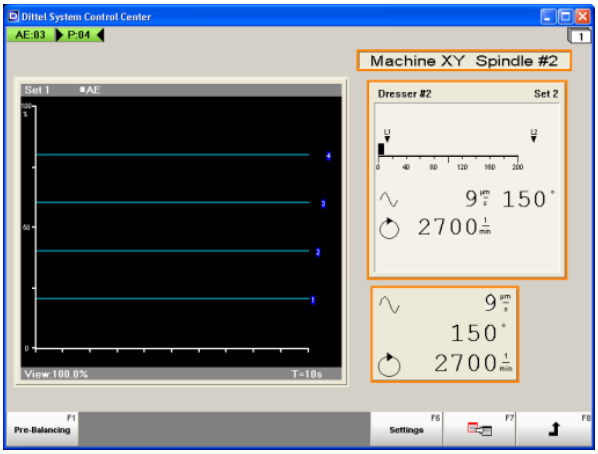


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically its last measurement run.





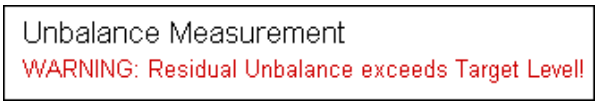
During the last measurement run (check run) the software of the Module checks the position and weight of the correction masses and shows the residual unbalance in units of µm/s (here 9 µm/s). If the result is OK, i.e. the displayed residual unbalance is below the Target Level set in the tab Settings, press the [Save & exit] key.



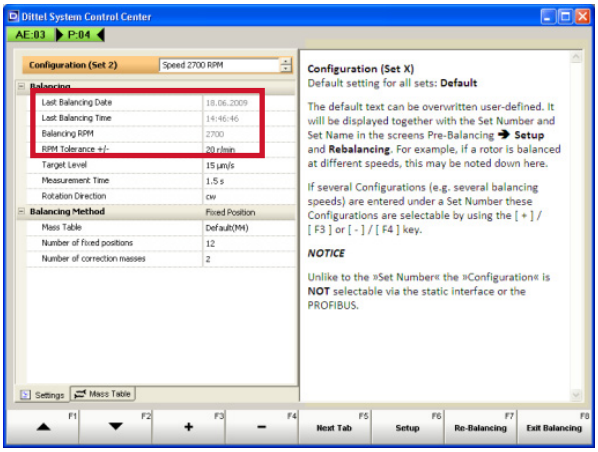
You return to the Monitoring screen.

THUS, THE FIRST TIME SETUP AND PREBALANCING PROCESS IS FINISHED SUCCESSFULLY!

If the first time Setup and Pre-Balancing Process is NOT finished successfully:



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears at the screen.
Continue by pressing the [Save & back] or [Re-Balancing] key and try to improve the result by using this function.



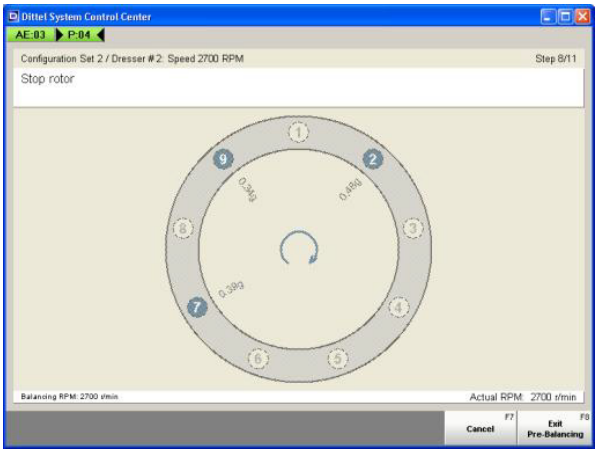
After pressing or clicking the [Save & back] key you return to the tab **Settings**.
Additionally it is indicated:

- the date of the last Pre-Balancing
- the time of the last Pre-Balancing, and
- the Pre-Balancing RPM.

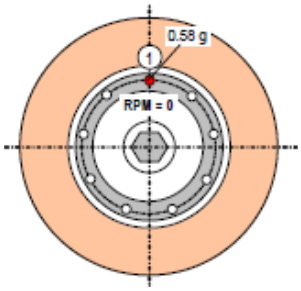
N.B.
A restart of the Setup procedure of the same rotor (optionally under a new Configuration) is required
- when the operational speed has changed,
- when the Rotation Direction has changed..

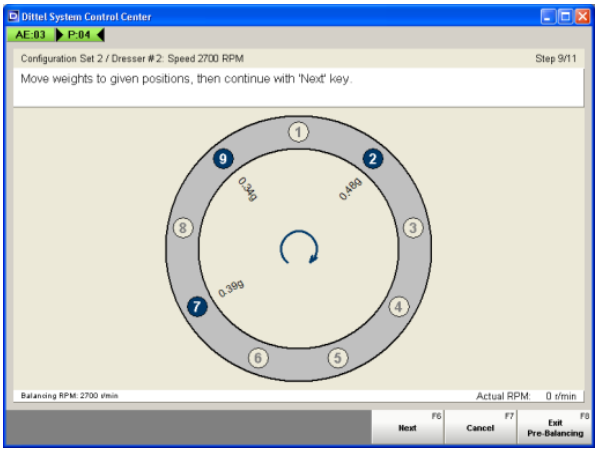
11.1.3 *Pre-Balancing with three correction masses*

N.B.
If the **Number of correction masses** under tab **Settings** is set to **3**, the positions and weights or Names of three correction masses are displayed.
Step 1/11 to Step 7/11 corresponds to paragraph “11.1.3 Pre-Balancing with three correction masses” on page 133
The following example shows **9 Fixed Positions**.

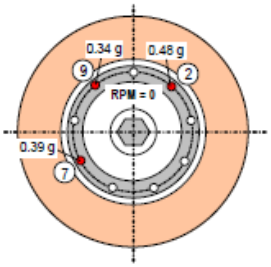


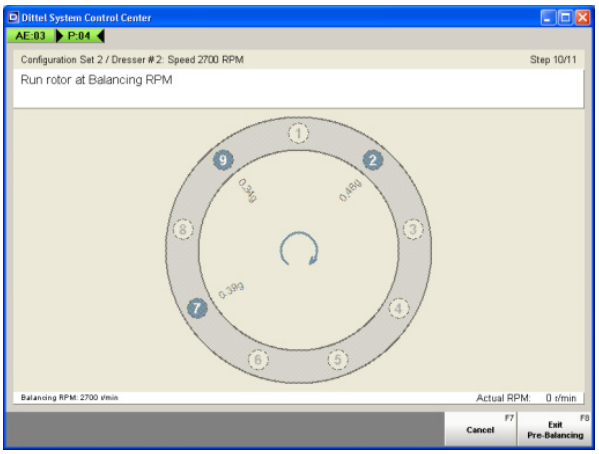
The screen already shows the new correction mass positions and weights.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



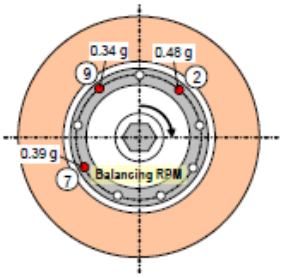


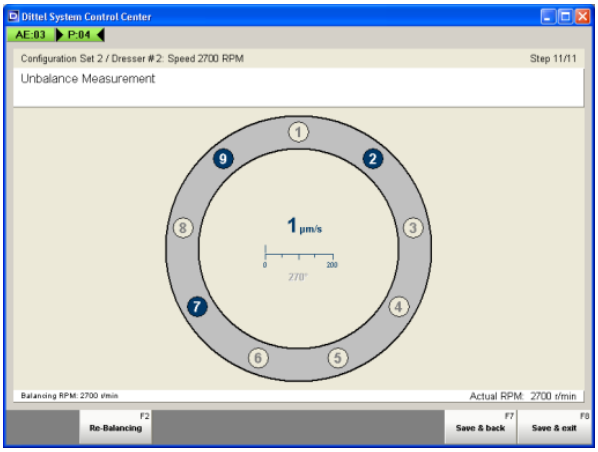
Remove the test unbalance (e.g. screw) from position 1.
Example:
Add a correction mass of 0.48 g to position 2, a second correction mass of 0.39 g to position 7, and a third correction mass of 0.34 g to position 9.
Continue by pressing the [Next] key.



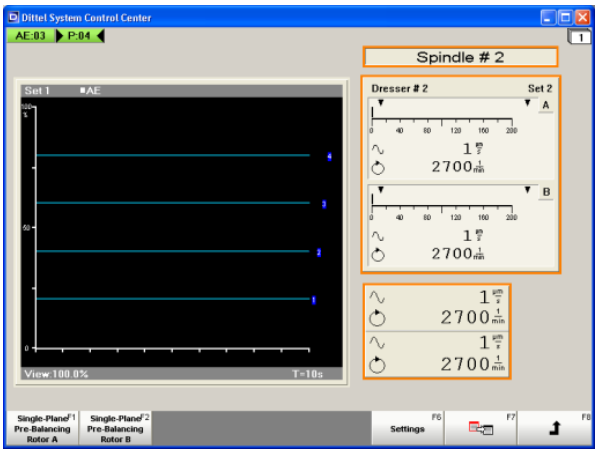


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically its last measurement run.





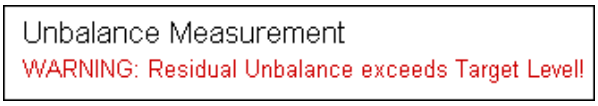
During the last measurement run (check run) the software of the Module checks position and weight of the correction masses and shows the residual unbalance in units of µm/s (here 1 µm/s). If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, press the [Save & exit] key.



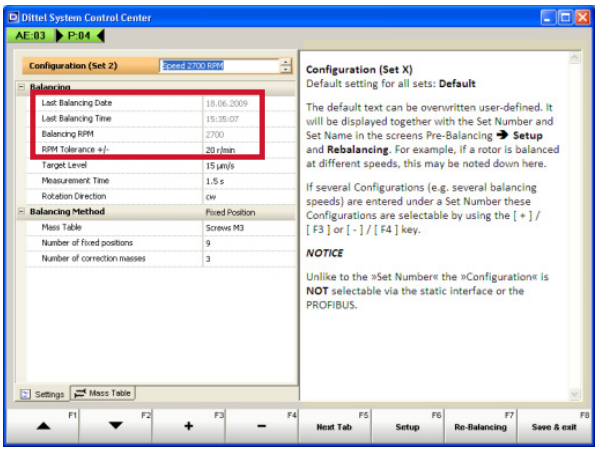
You return to the Monitoring screen.

THUS THE FIRST TIME SETUP AND PREBALANCING PROCESS IS FINISHED SUCCESSFULLY!

If the first time Setup and Pre-Balancing Process is NOT finished successfully:



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears at the screen.
Continue by pressing the [Save & back] or [Re-Balancing] key and try to improve the result by using this function.



After pressing or clicking the [Save & back] key you return to the tab **Settings**.
Additionally it is indicated:

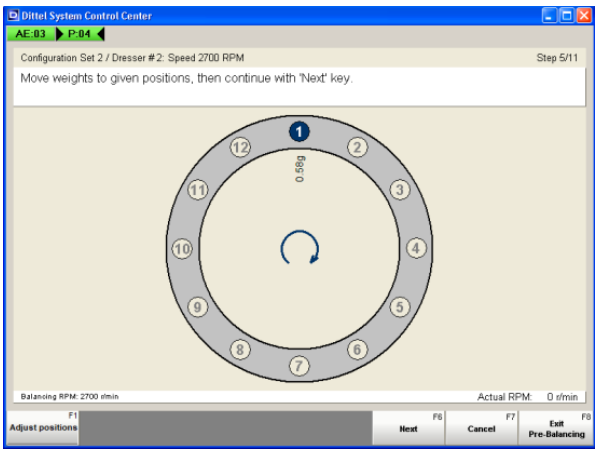
- the date of the last Pre-Balancing
- the time of the last Pre-Balancing, and
- the Pre-Balancing RPM.

N.B.
A restart of the Setup procedure of the same rotor (optionally under a new Configuration) is required
- when the operational speed has changed,
- when the Rotation Direction has changed..

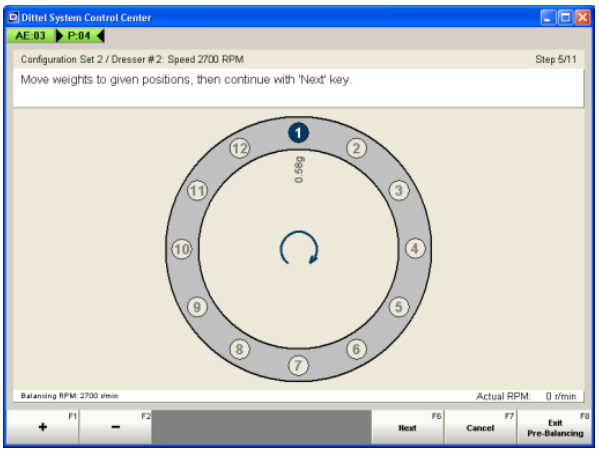
11.2 *The Adjust positions Key*

Balancing must be terminated.
Testunbalance is too light!

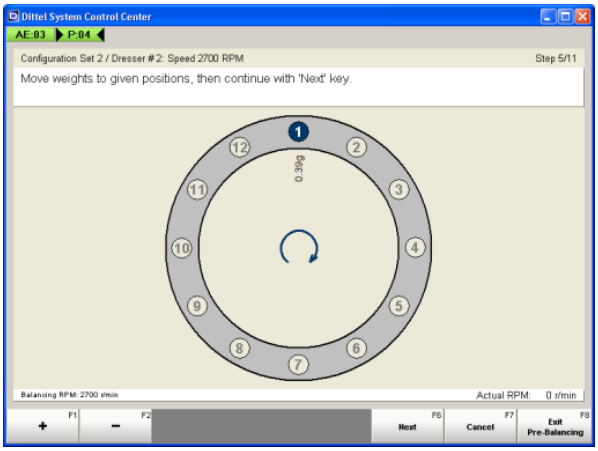
If the suggested correction mass for the test unbalance causes an inadmissible unbalance for the rotor or a Warning message **Testunbalance is too light** appears the weight of the correction mass can be changed using the **Adjust positions** key:



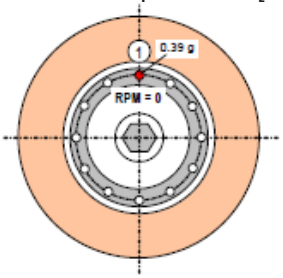
To continue press or click on the [Adjust positions] key.

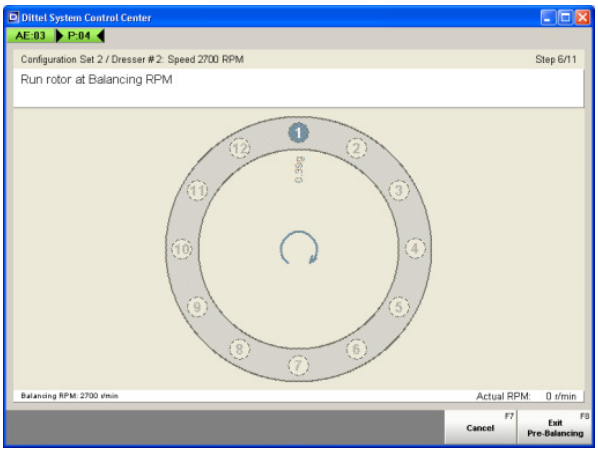


By pressing the [+] or [-] key every correction mass, which is entered in the Mass Table, can be adjusted on the screen. Adjust a correction mass, which you regard as suitable.



To create a new test unbalance add a correction mass (e.g. screw) of indicated weight (e.g. 0.39 g) to position 1 - as shown on the display.
To continue press the [Next] key.



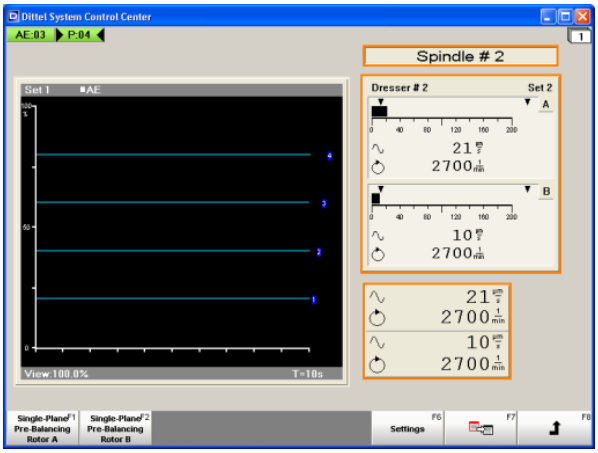


Further process of Pre-Balancing is carried out as described before (see paragraph “11.1.1 Setup” on page 128).

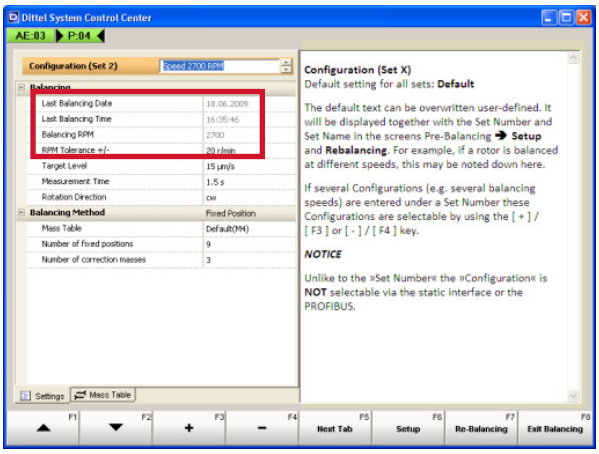
11.3 *Re-Balancing using Fixed Position Method*

The rotor should be re-balanced,
- when the result of the first pre-balancing after Setup was not satisfactory,
- when the grinding wheel was changed or replaced, or
- when the unbalance exceeds the permitted value after several grinding cycles.

N.B.
During Re-Balancing, both Unbalance Limits and the Speed Limit are monitored (see Connector # 2 or # 13)!



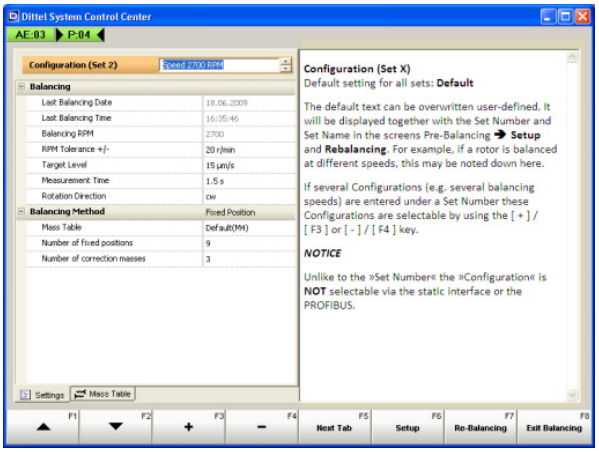
Make the P6002 UP line module available.
Select for the rotor to be re-balanced the Set Number, under which the rotor was balanced the last time.
While in the Module Mode click or press on the key [Single-Plane Pre-Balancing Rotor A].



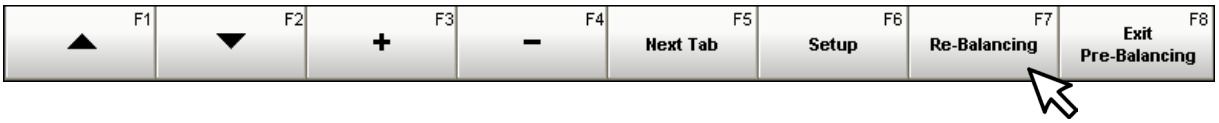
Date, time, and Balancing RPM of the last Pre-Balancing procedure must be displayed.
The key [Re-Balancing] must be available.
Particularly check

- the Pre-Balancing Method = Fixed Position,
- the Mass Table used.
- the desired Configuration, if any,
- the Number of fixed positions
- the Number of correction masses.

N.B.
With the selected Set Number and Configuration, Setup and Pre-Balancing of the rotor was already performed once with the same Balancing RPM, Rotation Direction, and Pre-Balancing Method.
Follow the operating guide step by step what to do next.
The [Next] key will not be available until the Run rotor at Balancing RPM condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the re-balancing process.
Correction masses, speed, etc. shown below are **examples**!
If, for each correction mass a Name (e.g. M3x4) was entered in the Mass Table then during Re-Balancing the respective name instead of the weight is shown on the screen.
Before Re-Balancing NEVER change
- the Rotation Direction,
- the Pre-Balancing Method.
Each change deletes the stored data of the Setup!



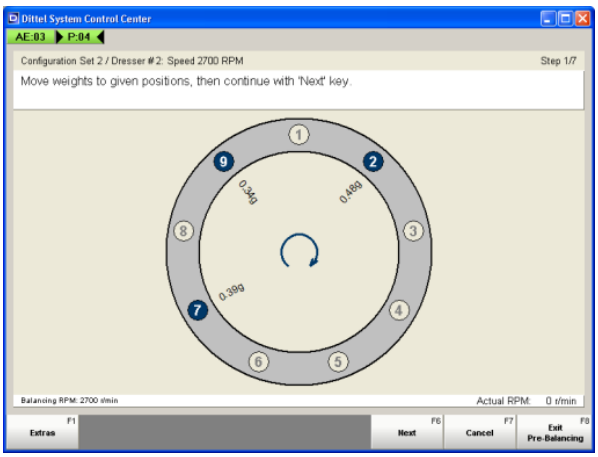
Launch the function of Re-Balancing by clicking on key [Re-Balancing] or by pressing the function key [F7]..



N.B.
Re-Balancing can be started either
- with a stopped rotor,
- with a rotor running at Balancing RPM, or
- with a rotor running at less than Balancing RPM.
The number of steps changes correspondingly, as well as the start screen.

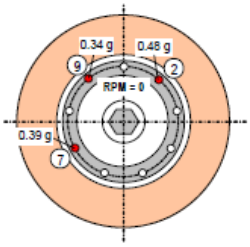
11.3.1 *Positions and weights of the correction masses agree with the indication on the screen*

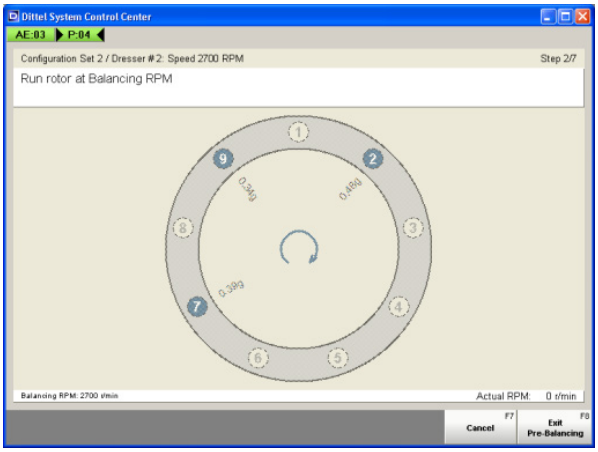
The following example shows Re-Balancing of a rotor stopped at the beginning (Step 1/7).
The rotor contains 9 fixed positions and 3 correction masses..



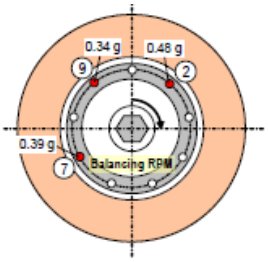
If the positions and weights of the correction masses agree with the indication on the screen press the [Next] key.

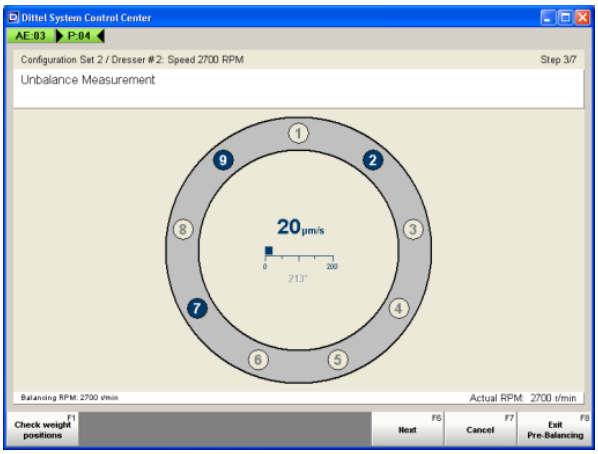
=





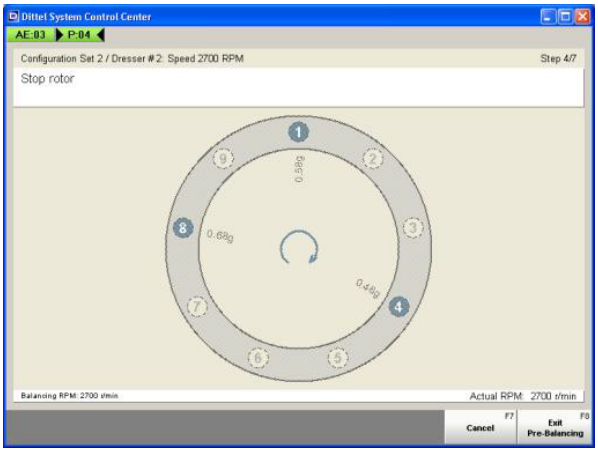
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically the first rebalancing measurement run.



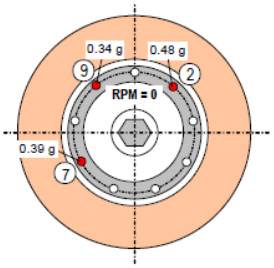


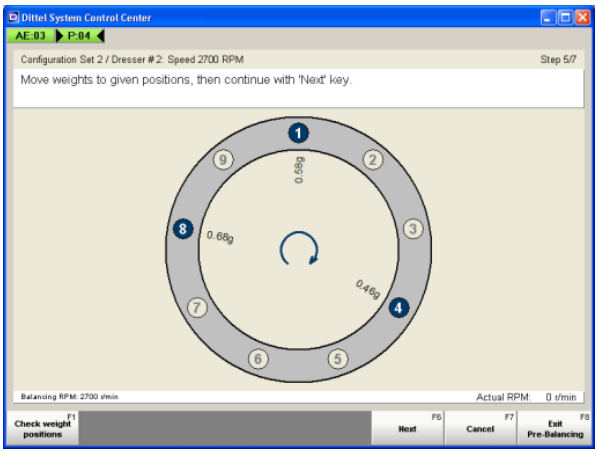
The Module P6002 UP line module starts its measurement to determine the unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.

N.B.
Re-Balancing can be started either with a stopped or with a running rotor. If Re-Balancing is started with a running rotor, Figure here above, is the first screen (Step 1/5). If required, you can check the correction mass positions in this step again.
Then the Re-Balancing procedure is extended by one step due to → Stop rotor. Continue with Figure here above.

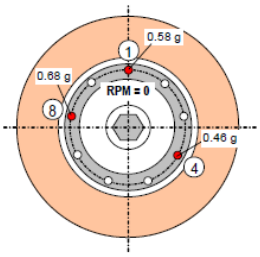


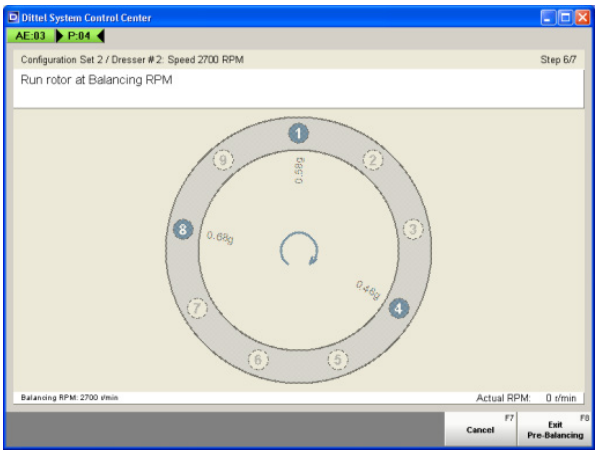
The screen already shows the new positions and weights of the correction masses.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



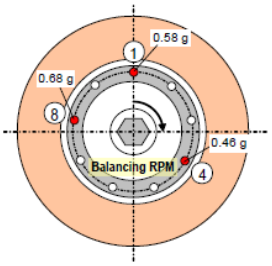


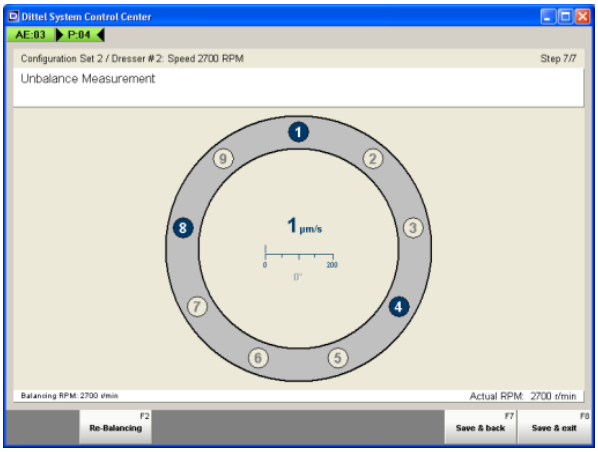
Example:
Remove the correction masses from positions 2, 7 and 9.
Add a correction mass of 0.58 g to position 1, a second correction mass of 0.46 g to position 4, and a third one of 0.68 g to position 8.
Continue by pressing the [Next] key.





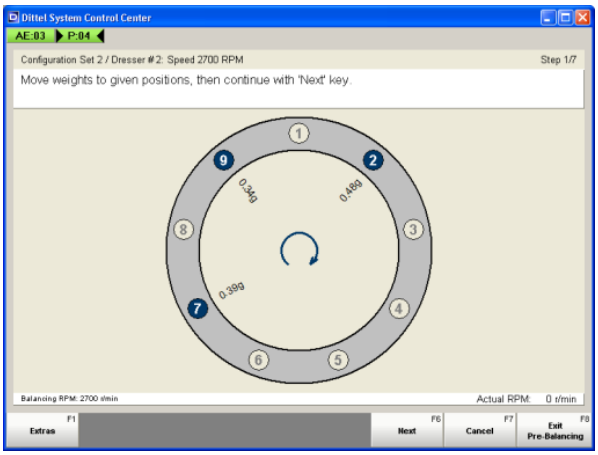
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically its last measurement run.



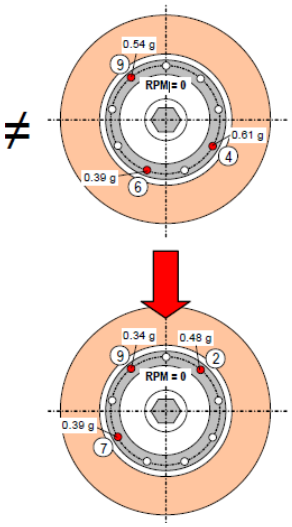


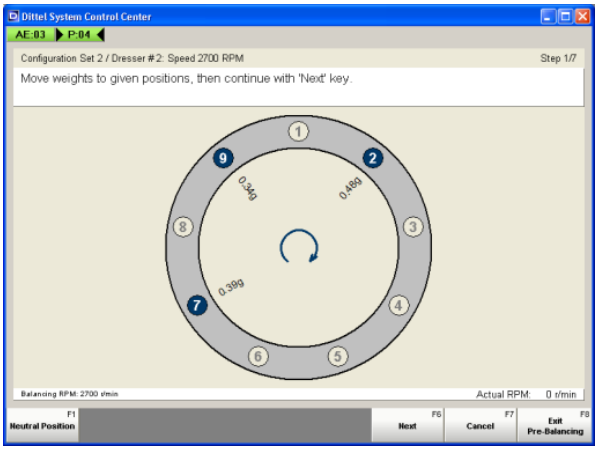
During the last measurement run (check run) the software of the Module checks position and weight of the correction masses and shows the residual unbalance in units of µm/s (here 1 µm/s). If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, finally press the [Save & exit] key.

11.3.2 *Positions and weights of the correction masses DO NOT agree with the indication on the screen*



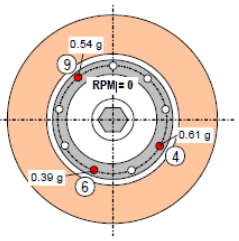
If the positions and weights of the correction masses DO NOT agree with the indication on th
screen either
- change the weights and positions of the correction masses as indicated on the screen and continue with the first Figure of Section “11.3.1 Positions and weights of the correction masses agree with the indication on the screen” on page 138,
- or press the [Adjust positions] key.

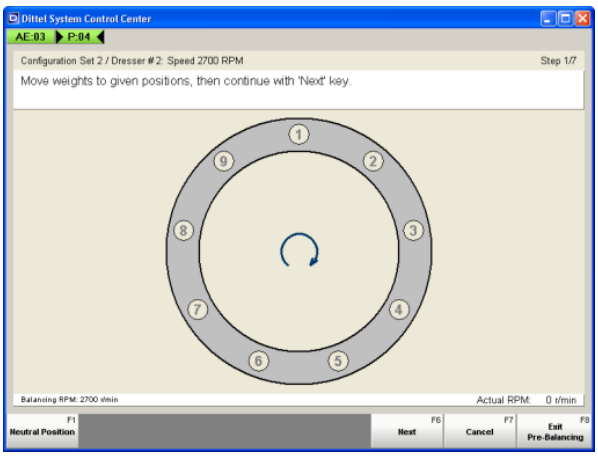




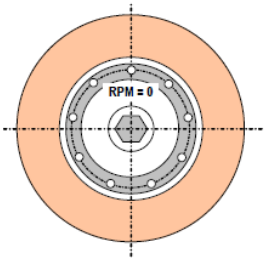
The [Adjust positions] key changes to [Neutral Position] key.
Press the [Neutral Position] key..

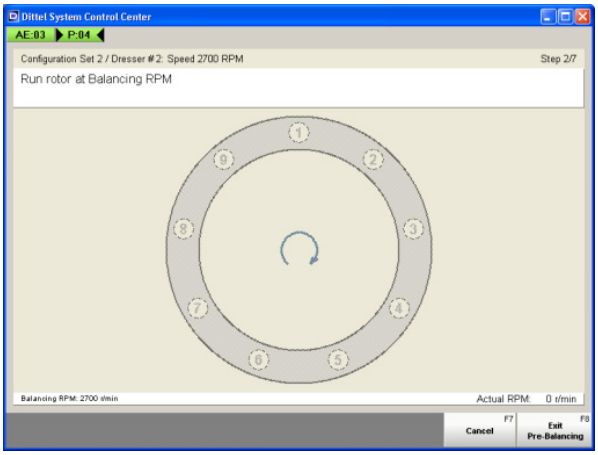
≠



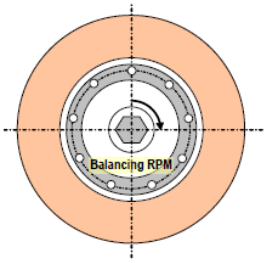


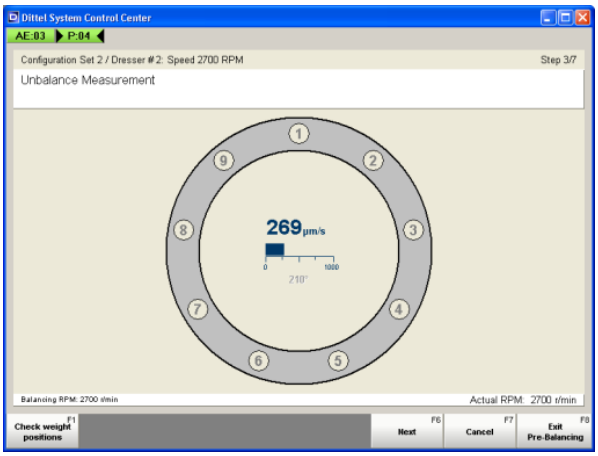
The displayed correction masses disappear on the screen.
Remove all correction masses / screws from the fixing flange / rotor.
Continue by pressing the [Next] key.





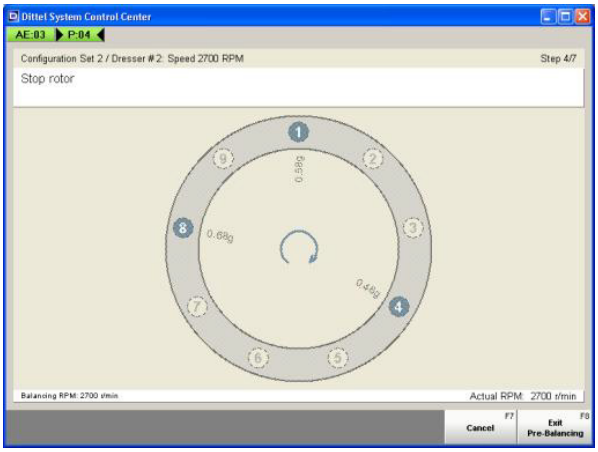
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically the first rebalancing measurement run.



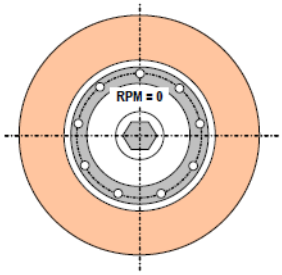


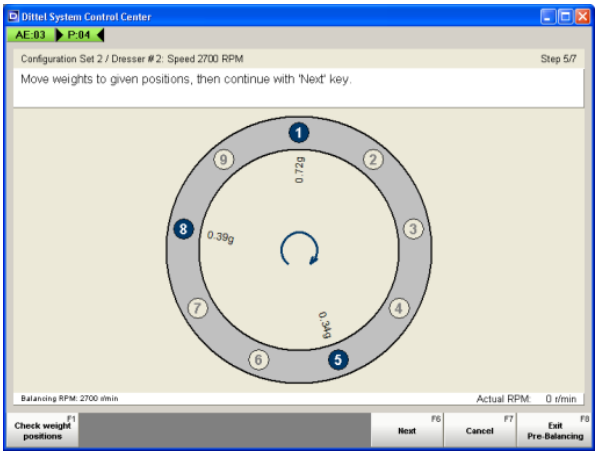
The Module P6002 UP line module starts its measurement to determine the unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle is shown.
Watch the screen! When the key [Next] is available press the [Next] key.

N.B.
Re-Balancing can be started either with a stopped or with a running rotor. If Re-Balancing is started with a running rotor, Figure here above is the first screen (Step 1/5). If required, you can check the correction mass positions in this step again..

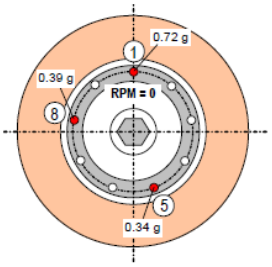


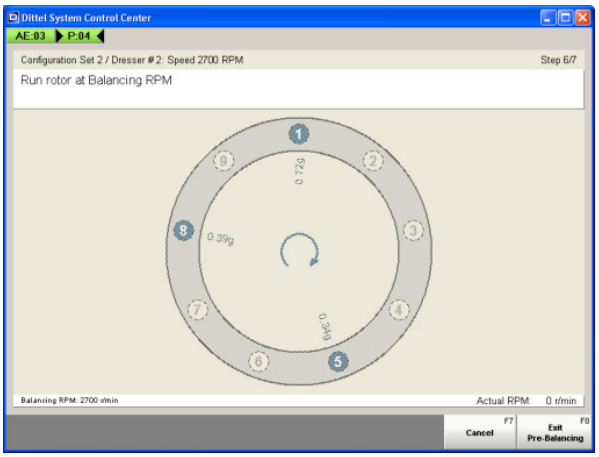
The screen already shows the new positions and weights of the correction masses.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



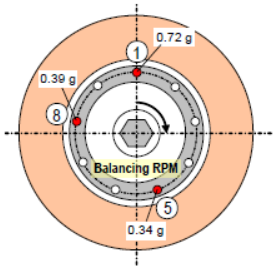


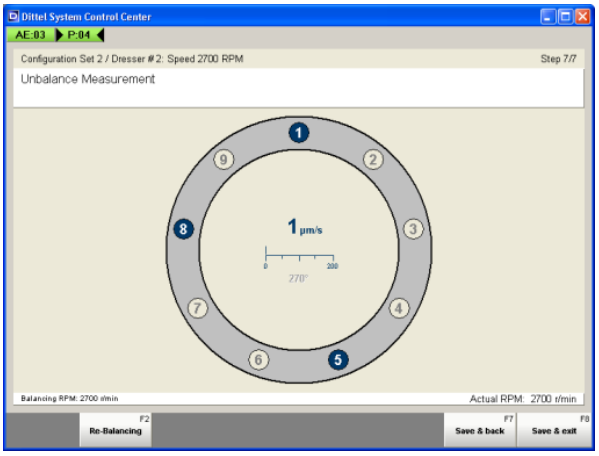
Example:
Add a correction mass of 0.72 g to position 1, a second correction mass of 0.34 g to position 5, and a third one of 0.39 g to position 8.
Continue by pressing the [Next] key.



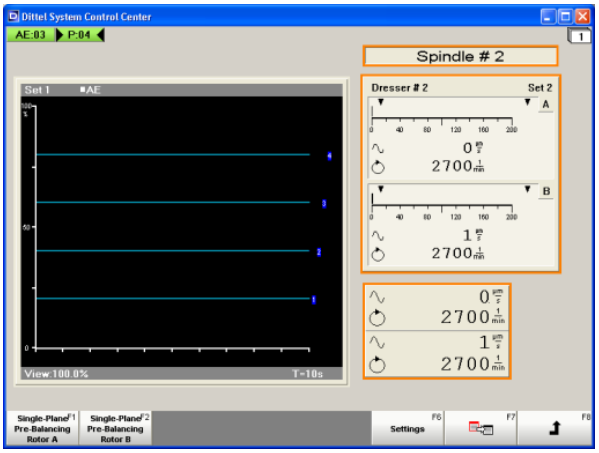


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 2700 r/min) the Module starts automatically its last measurement run.





During the last measurement run (check run) the software of the Module checks the position and weight of the correction masses and shows the residual unbalance in units of µm/s (here 1 µm/s). If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, finally press the [Save & exit] key.

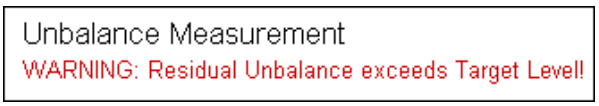


In all cases, you return to the standard monitoring screen.

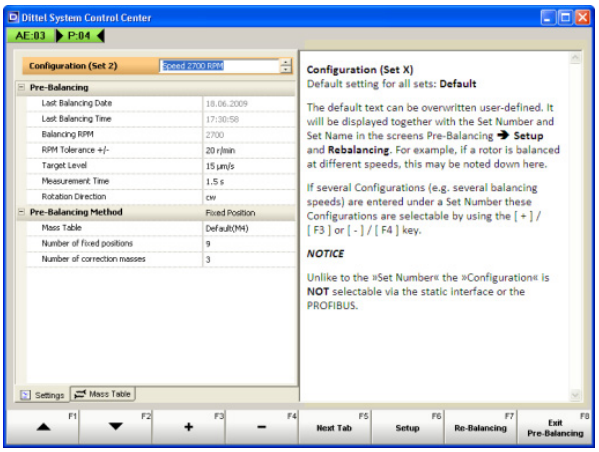
THUS THE RE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

The date and time of Re-Balancing are stored under the adjusted Set Number and its Configuration.

If the Re-Balancing Process is NOT finished successfully:



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears on the screen.



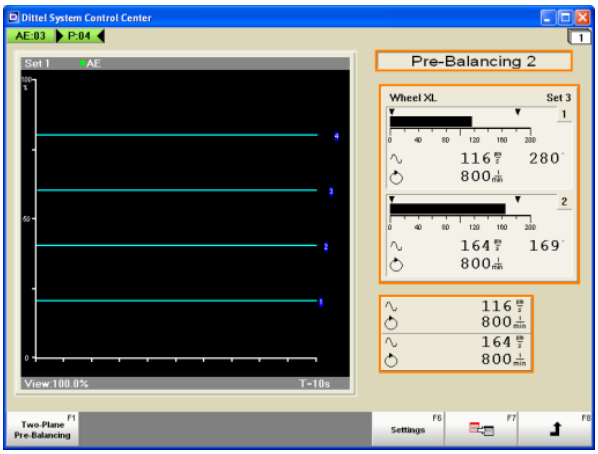
By pressing the [Save & back] or the [Re-Balancing] key you return to the tab **Settings**.
Try to improve the result by a second re-balancing run.

12 TWO PLANE PRE PRE-BALANCING USING ANGULAR METHOD

12.1 Setup and Two-Plane Pre-Balancing

N.B.
From DSCC software version 3.61 on it is possible to start the setup as follows:
- With the balancing (spread) weights in neutral position (spread angle 180°)
- or with pre-adjusted balancing weights if the position and size of the unbalance is approximately known. With this method unpredictably large imbalances can be avoided at high speed when starting balancing at low speed and after each increase in speed, balance again.

The following description of the Two-Plane (dynamic) Pre-Balancing Method **Angular Method** uses for each plane two equal fixed mass balancing weights, which can be positioned and clamped at any specific angle on the wheel holder as compensating masses.
Plane 1 is defined as described in tab **Settings** → **General Settings** → **Vibration Transducer Plane 1** → **Input** ....
During Setup, Pre-Balancing and Re-Balancing, the Unbalance Limit 1 and 2 and the Speed Limits 1 and 2 of the rotor are monitored (see connector # 2 or # 13 of P6002 UP line).

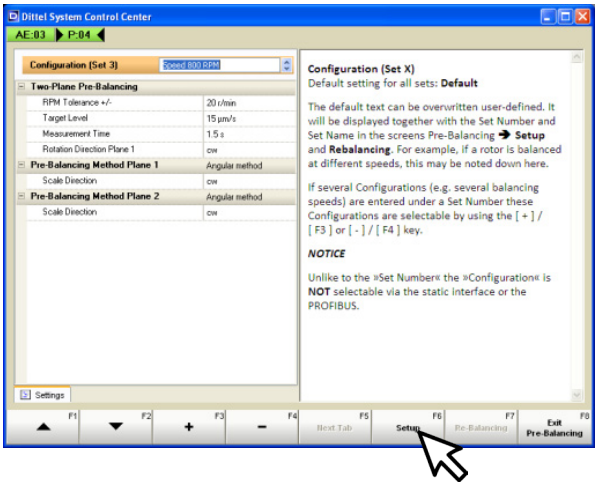


Make the P6002 UP line module available.
Select for the rotor to to be balanced dynamically, the **Set Number** under which the desired operating mode and accompanying parameters were stored.

Manual: To select the Set Number open the tab **Settings**. Adjust the proper Set Number and leave the tab using soft key [Back].

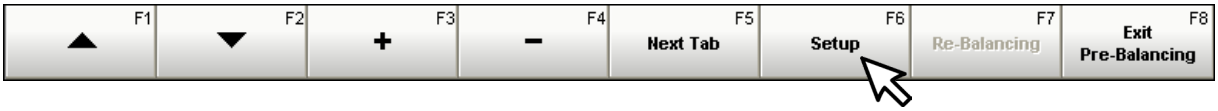
External: Via hardwire interface connector # 2 or PROFIBUS the proper Set Number is set by the Automation System.

Depending on **Operating Mode**, stored under the selected Set Number, individual Module Views with its specific soft keys are displayed.
The opposite screen shows, for example, **Set Number 3** and the Operating Mode **Two-Plane**, recognizable by two bargraph indications marked (plane) **1** and (plane) **2**.
To pre-balance the rotor in two planes, click or press the key [Two-Plane Pre-Balancing]..



If available, select the desired **Configuration**.
Particularly check:
- the Pre-Balancing Method of both planes = **Angular Method** each,
- the Rotation Direction of **Plane 1** (here **cw**) and
- the Scale Direction of both planes (here **cw** each).

Launch the function of the Setup by clicking on soft key [Setup] or pressing the function key [F6].



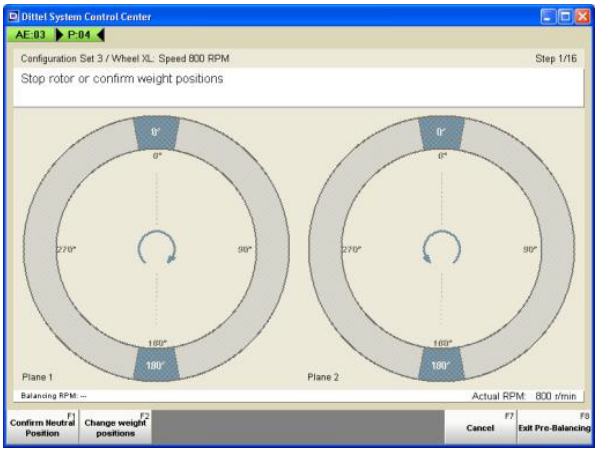
WARNING
Risk of injury from rotating parts!
Switch OFF the machine when installing or adjusting the Balancing Weights!
Ensure that the rotor has stopped, before working on it!
Protect the machine against unauthorized or accidental switching ON!
NEVER operate a machine tool without all proper safety guarding in place.
DO NOT suspend any Safety Facilities!

N.B.
Precise setting of the balancing weights is very essential to successful operation of the pre-balancing process!
Follow the display step by step what to do next.
The [Next] key will not be available until the "**Run rotor at Balancing RPM**" condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the pre-balancing process.
Angles, speed, etc. shown below are **examples**! Follow the instructions as displayed!

12.1.1 *Setup with spread weights in the neutral position*

N.B.
The Setup can be started either with a stopped or with a running rotor. If the Setup is started with a running rotor the Setup procedure is extended by one step (additional: → Stop rotor or confirm Neutral Position).

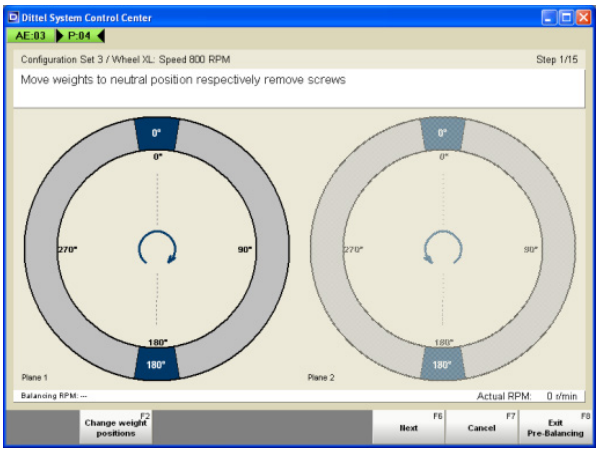
Setup while the rotor is running



When you start setup while the rotor is running the setup is extended by one step, as opposed to setup the rotor, while the rotor is stopped (additional: → Stop rotor or confirm Neutral Position).
Pre-balancing can be shortened by one step
- when the spread weights on the rotor are in the same neutral position as shown on the display
- and without stopping the rotor, confirm the position of the spread weights by pressing the key [Confirm Neutral Position]

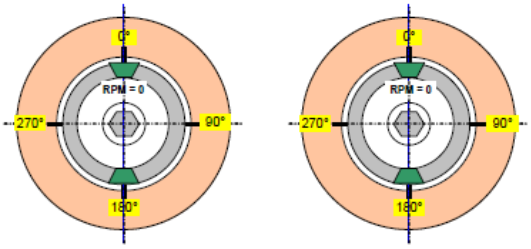
N.B.
The key [Change weight positions] is used to set individual position of the balancing weights. This key should be operated by experienced machine fitters only (see section "10.2 The Key "Select other weight positions"" on page 119).

Setup while the rotor is stopped



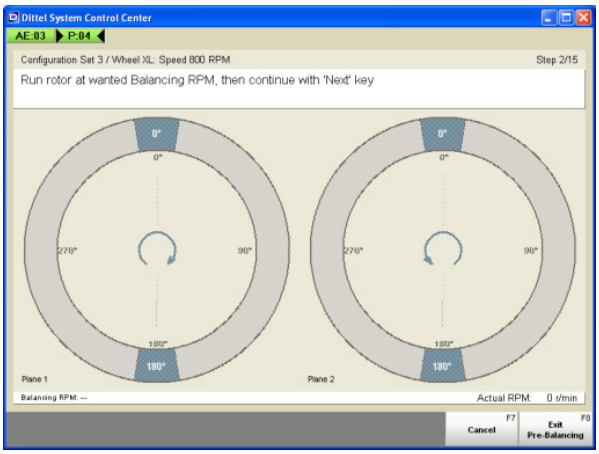
The following example shows the Setup procedure starting with a stopped rotor. (Step 1/15) and the Balancing weights in Neutral Position.

Position the balancing weights of both planes precisely to the neutral position as indicated on the screen and clamp.
The example shows for both planes Scale Direction: cw.
Continue by pressing or clicking the [Next] key.

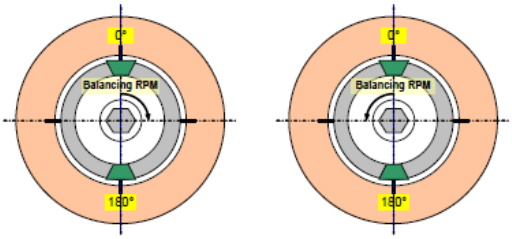


Looking at Plane 1 Looking at Plane 2

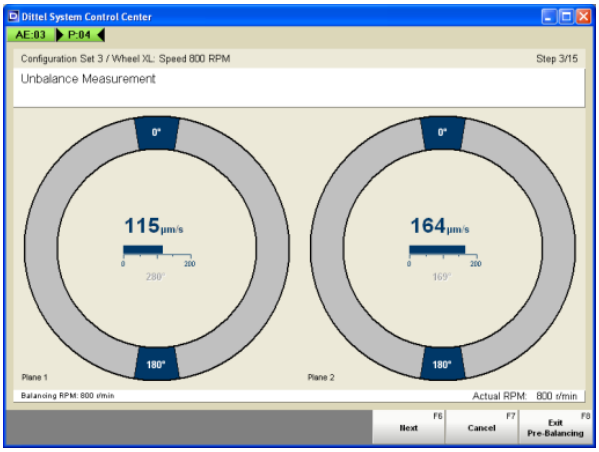
N.B.
With the key [Select other weight positions] or [Change weight positions] the spread weights can be adjusted individually.
This key should be operated by experienced machine fitters only (see section “10.2 The Key “Select other weight positions”” on page 119).



Run rotor at wanted Balancing RPM.
The example shows Rotational Direction of Plane 1:: cw.
After reaching the wanted Balancing Speed (indication in this example: Actual RPM: 800 r/min) continue by pressing or clicking the [Next] key.

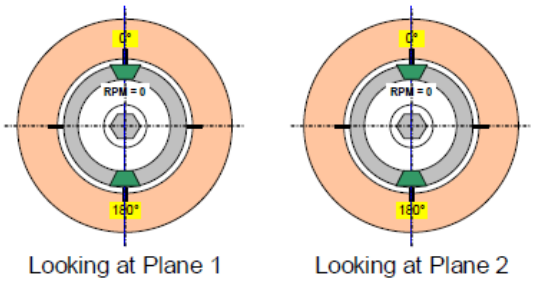


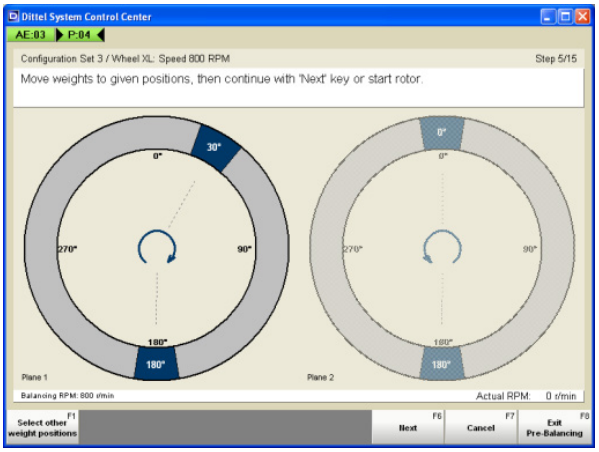
Looking at Plane 1 Looking at Plane 2



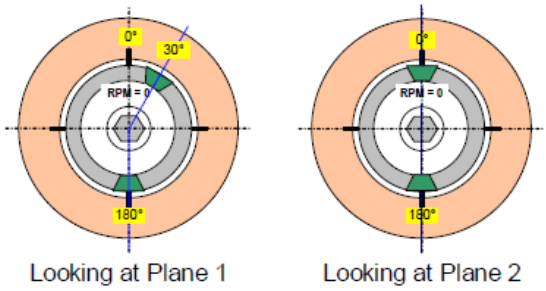
The P6002 UP line module starts its first measurement to determine the initial unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action the angular position and value of the initial unbalance, together with the Balancing Speed of the first trial run are stored (= Display Balancing RPM: 800 r/min).

The screen already shows the new balancing weight positions. Stop rotor. After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



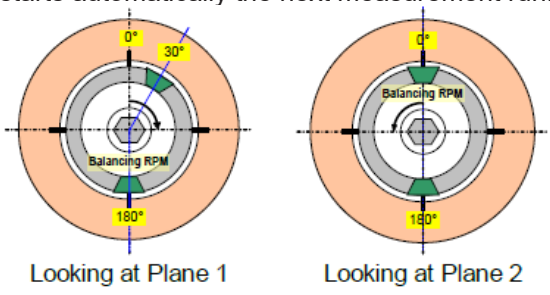


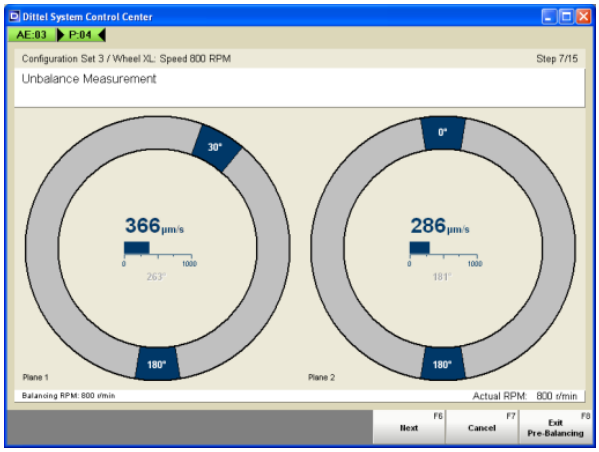
Plane 1:
To create a trial unbalance in Plane 1,, position the 0° balancing weight to precisely 30° - as shown on the display - and clamp. To continue press the [Next] key.



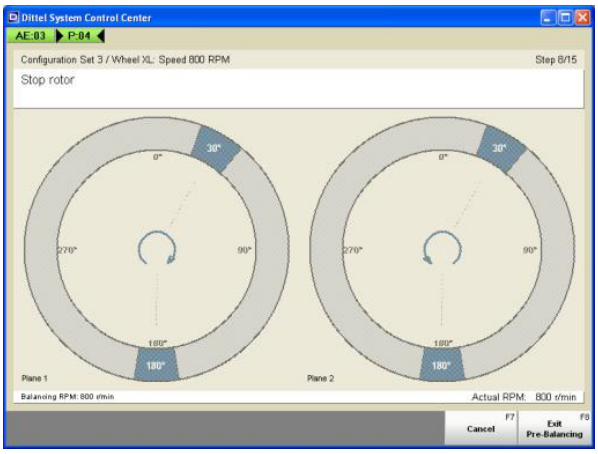
N.B.
If the displayed trial unbalance is not suitable (e.g. too light or too heavy), the spread weights can be adjusted individually. With the key [Select other weight positions] the new positions of the spread weights must be transferred.
This key should be operated by experienced machine fitters only (see section “10.2 The Key “Select other weight positions”” on page 119)!

Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 800 r/min) the Module starts automatically the next measurement run.

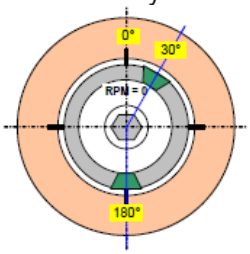




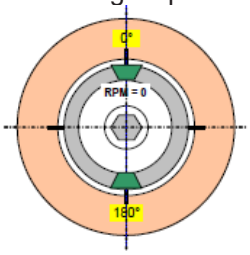
In the second run, the Module repeats its Setup unbalance measurements with a test unbalance in Plane 1.
During the unbalance measurements, the actual unbalance is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action, the angular position and value of the “new” unbalance are stored for each plane..



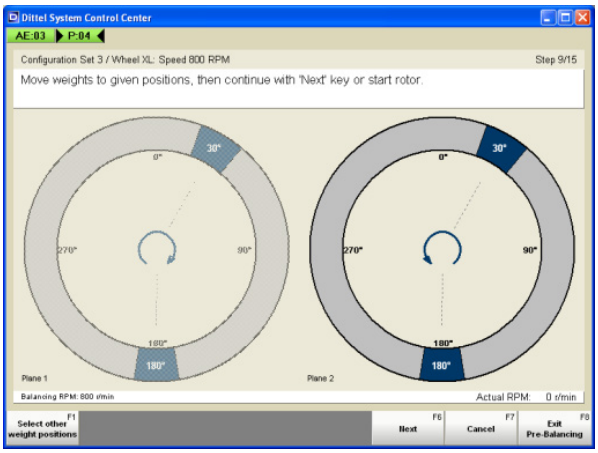
The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



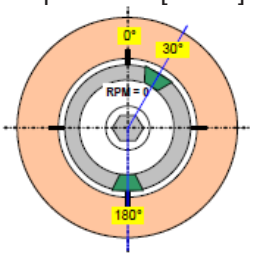
Looking at Plane 1



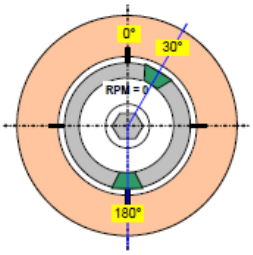
Looking at Plane 2



Plane 2:
To create a test unbalance in Plane 2, position the 0° balancing weight to precisely 30° - as shown on the display - and clamp.
To continue press the [Next] key.

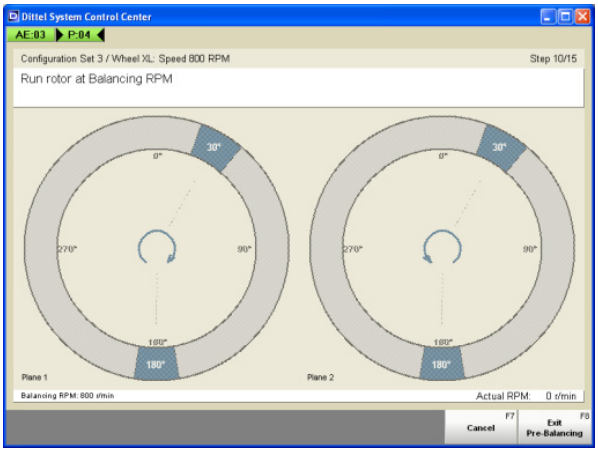


Looking at Plane 1

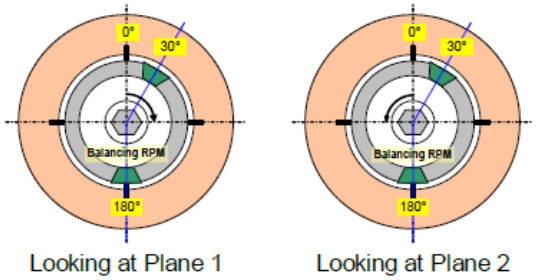


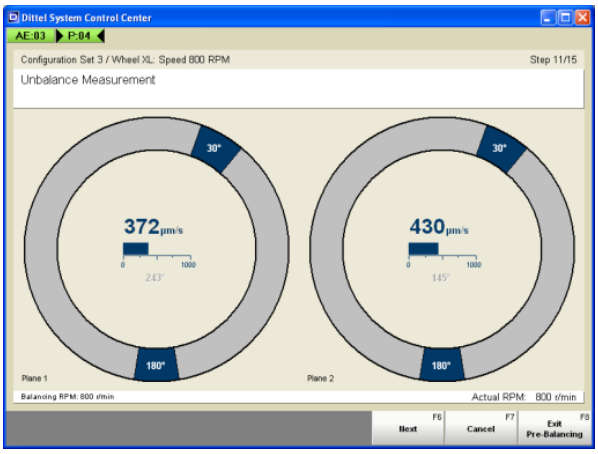
Looking at Plane 2

N.B.
If the displayed trial unbalance is not suitable (e.g. too light or too heavy), the spread weights can be adjusted individually. With the key [Select other weight positions] the new positions of the spread weights must be transferred to the display..
This key should be operated by experienced machine fitters only (see section “10.2 The Key “Select other weight positions”” on page 119).



Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 800 r/min) the Module starts automatically its last measurement run.

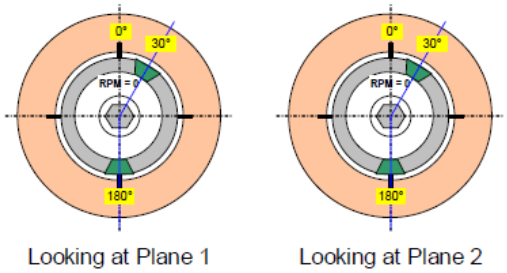


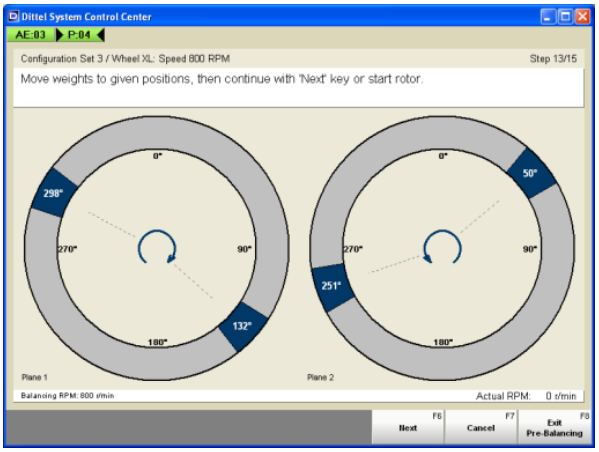


In the third run, the Module repeats its Setup unbalance measurements with a trial unbalance in Plane 1 and Plane 2.
During the unbalance measurements the actual unbalance for each plane is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action the angular position and value of the “new” unbalance are stored for each plane.

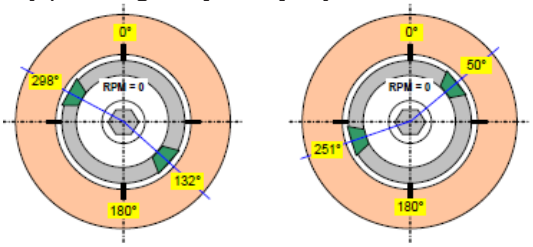
12.1.2 *Pre-Balancing*

The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.

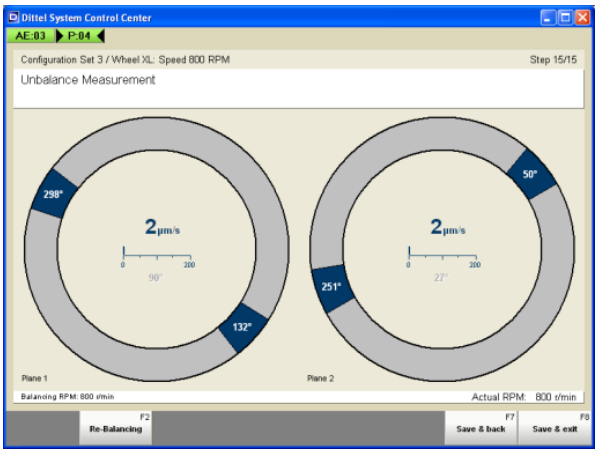




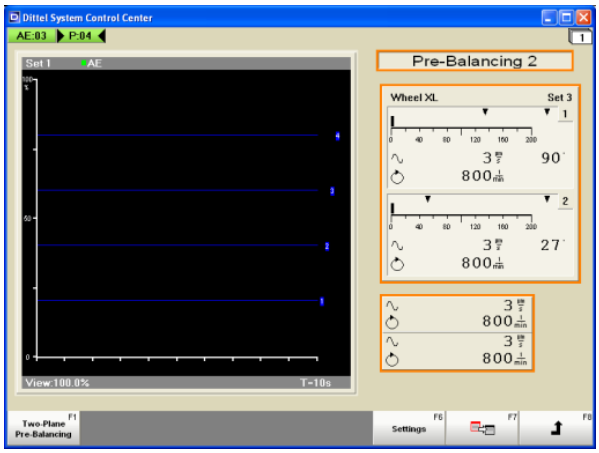
Plane 1:
Position the balancing weights as shown in the location detail.
Example: move one balancing weight to 132°, move the other balancing weight to 298°.
Plane 2:
Position the balancing weights as shown in the location detail.
Example: move one balancing weight to 50°, move the other balancing weight to 251°.
Please the Scale Direction! Clamp all weights.
Continue by pressing the [Next] key.



Looking at Plane 1 Looking at Plane 2



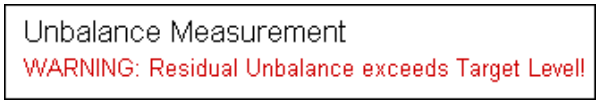
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance the Module starts automatically its last measurement run. During the last measurement run (check run) the software of the Module checks the position of the balancing weights and shows the residual unbalance in units of µm/s (here for Plane 1: 2 µm/s, for Plane 2: 2 µm/s).
If the result is OK, i.e. the displayed residual unbalance of each plane is below the **Target Level** set in the tab **Settings**, press the [Save & Exit] key.



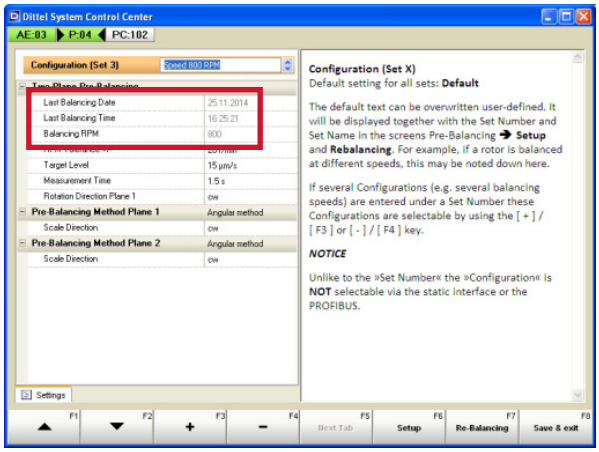
You return to the Monitoring screen.

THUS, THE SETUP AND PRE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

12.1.3 *If the first time Setup and Balancing process is NOT finished successfully*



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears at the screen.
Continue by pressing the [Save & back] or [Re-Balancing] key and try to improve the result by using this function.



After pressing or clicking the [Save & back] key you return to the tab **Settings**.
Additionally it is indicated:

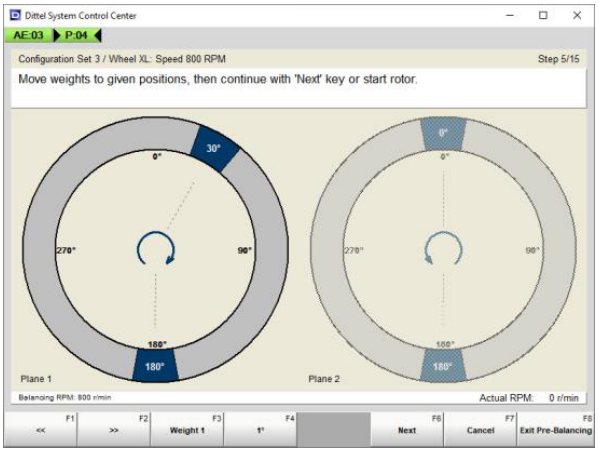
- the date of the last Pre-Balancing
- the time of the last Pre-Balancing, and
- the Balancing RPM.

N.B.
A restart of the Setup procedure of the same rotor (optionally under a new Configuration) is required
- when the operational speed has changed,
- when the Rotation Direction has changed.

12.2 *The Adjust positions Key*

N.B.
If there is already nearly known the position of the unbalance, it is possible to adjust the weights of the rotor already in this positions. In this condition it is evident to transmit the positions of the weight at the rotor to the positions on the software, by using the Adjust positions key.
If the test unbalance at a suggested standard spread angle causes an inadmissible unbalance for the rotor, or a Warning message **Testunbalance is too light** appears, the position of the balancing weights can be changed using the Adjust positions key:

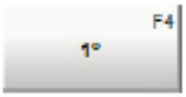
To continue press or click on the [Adjust positions] key.



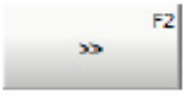
By pressing the following keys almost every position of the two balancing weights can be adjusted on the screen:

Plane 1 / Plane 2
Pressing this key, the plane that must be changed will be selected, the selected plane is highlighted. Be aware, this key is missing by the step changing the probe unbalance

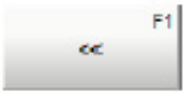
Weight 1 – Weight 2
Pressing this key the weight that should be moved is selected



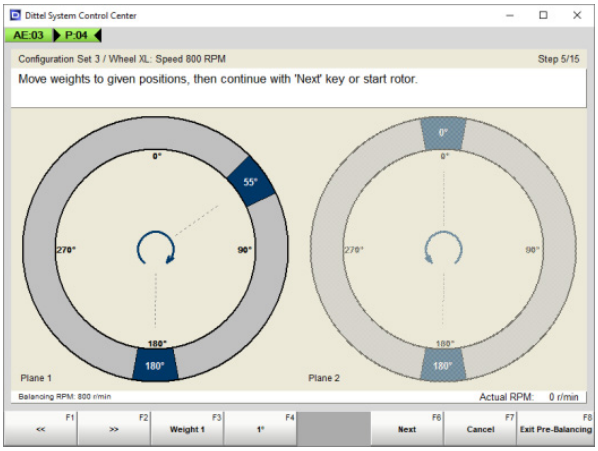
1° - 10°
By pressing this key it is selected, if the change of position of selected weight is done in steps of 1°or in steps of 10°



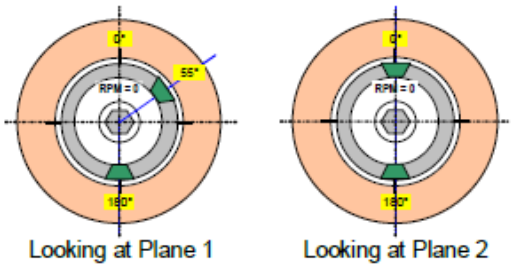
>>
Pressing this key will turn the selected Weight with the selected step to the right (cw).



<<
Pressing this key will turn the selected Weight with the selected step to the leftt (ccw).



Please take care, that the position for the balancing weights for every plane, are in the same position at the plane and at the display, like indicated above.
To continue press the [Next] key.



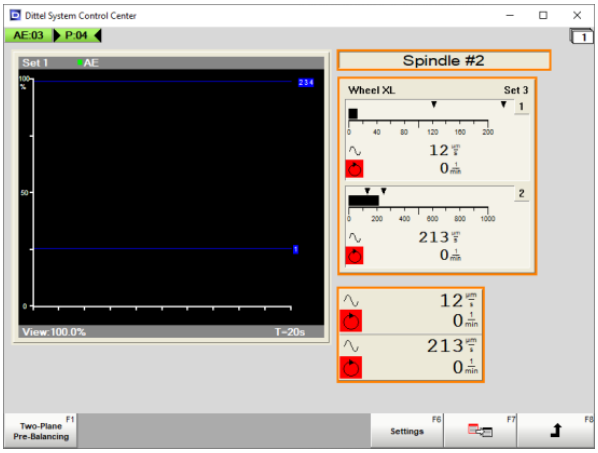
Further sequence of pre-balancing is carried out as described before (see section for Plane 1 from Step 6/15 on, for Plane 2 from Step 10/15 on).

12.3 *Re-Balancing using Angular Method*

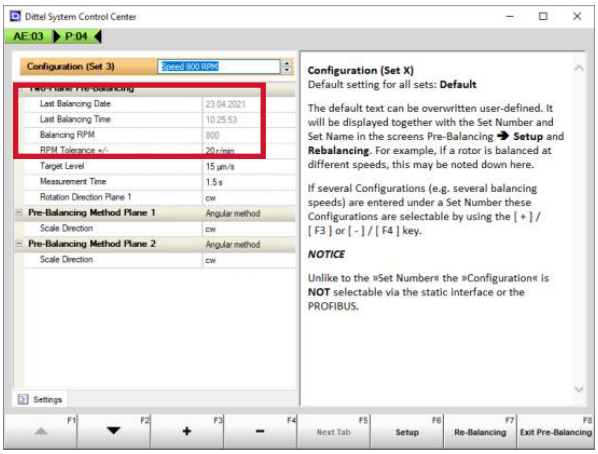
The rotor should be re-balanced,

- when the result of the first pre-balancing after Setup was not satisfactory,
- when the grinding wheel was changed or replaced, or
- when the unbalance exceeds the permitted value after several grinding cycles.

N.B.
During Re-Balancing both Unbalance Limits and the Speed Limits 1 and 2 of both planes and the Speed Limits 1 and 2 of the rotor are monitored (see Connector # 2 or # 13)!



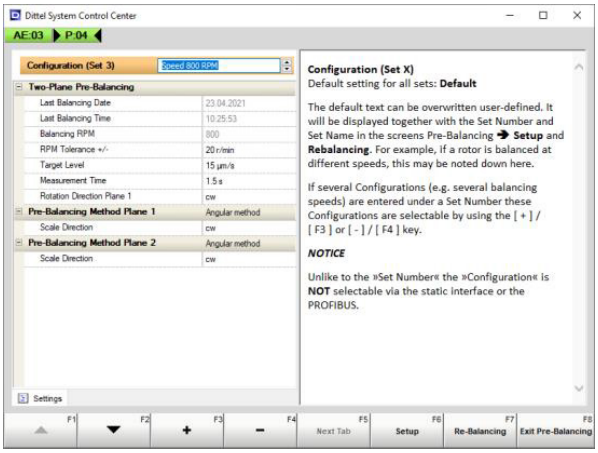
Make the P6002 UP line module available.
Select for the rotor to be re-balanced the **Set Number** under which the rotor was pre-balanced the last time.
While in the Module Mode click or press on the key [Pre-Balancing].



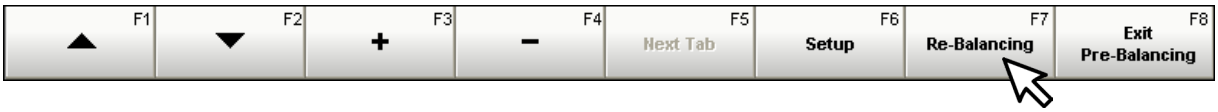
Date, time, and Balancing RPM of the last Pre- Balancing procedure must be displayed.
The key [Re-Balancing] must be available.
Particularly check

- the desired **Configuration**, if any,
- the Pre-Balancing Method of both planes = **Angular Method**
- the Rotation Direction of **Plane 1**, and
- the Scale Direction of both planes.

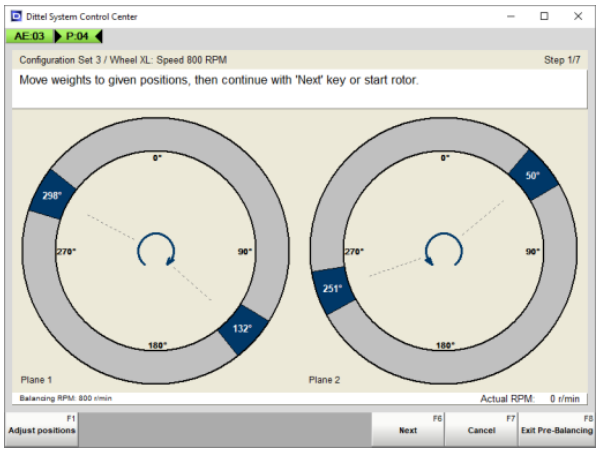
N.B.
With the selected Set Number and Configuration, Setup and prebalancing of the rotor was already performed once with the same Balancing RPM, Rotation Direction, and Pre-Balancing Method.
Follow the operating guide step by step what to do next.
The [Next] key will not be available until the **Run rotor at Balancing RPM** condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the re-balancing sequence.
Angles, speed, etc. shown below are examples! Follow the instructions as displayed!
Before Re-Balancing NEVER change
- the Rotation Direction,
- the Pre-Balancing Method,
- the Scale Direction!
Each change deletes the stored data of the Setup!



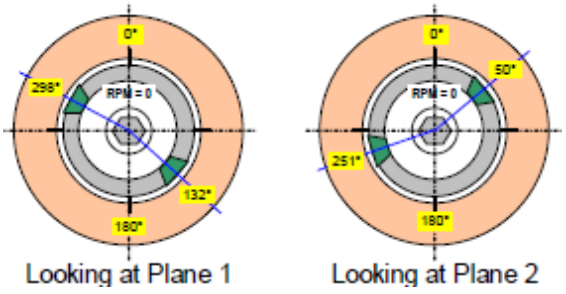
Launch the Re-Balancing function by clicking on soft key [Re-Balancing] or pressing the function key [F7].

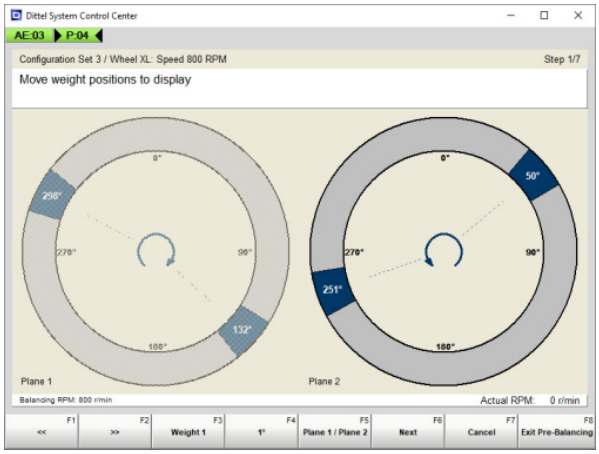


N.B.
Re-Balancing can be started either
- with a stopped rotor,
- with a rotor running at Balancing RPM, or
- with a rotor running at less than Balancing RPM.
The number of steps changes correspondingly, as well the start screen.

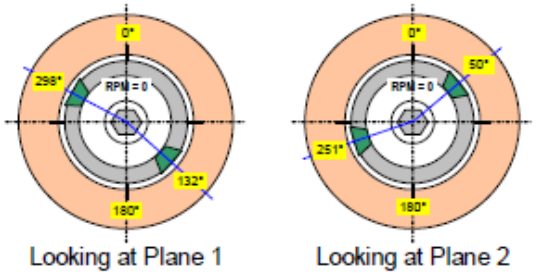


The following example shows Re-Balancing of a rotor stopped at the beginning (Step 1/7).
If changed in between, move the weights in each plane exactly into position as indicated on the screen and clamp weights.





Alternatively, transfer the actual angular position of the balancing weights for each plane onto the screen.
To do so press or click on the [Adjust positions] key.

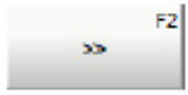


Through pressing the following explained keys, the positions of the balancing weights can be transferred in an exact way, separate for each plane

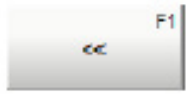
Plane 1 / Plane 2
Pressing this key, the plane that must be changed will be selected, the selected plane is highlighted. Be aware, this key is missing by the step changing the probe unbalance

Weight 1 – Weight 2
By pressing this key, the weight to be changed is selected.

1° - 10°
By pressing this key it is selected, if the change of position of selected weight is done in steps of 1°or in steps of 10°

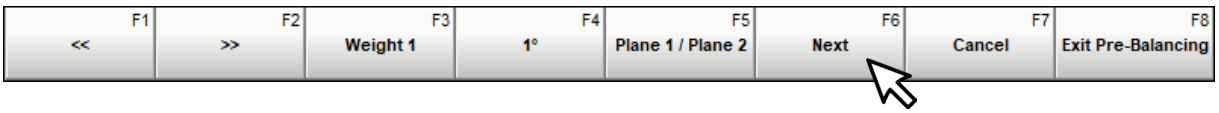


>>
Pressing this key will turn the selected Weight with the selected step to the right (cw).

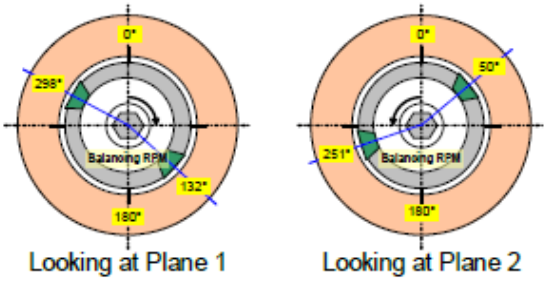


<<
Pressing this key will turn the selected Weight with the selected step to the leftt (ccw).

If the angular position of the balancing weights and the indication on the screen agree for each plane press the [Next] key.



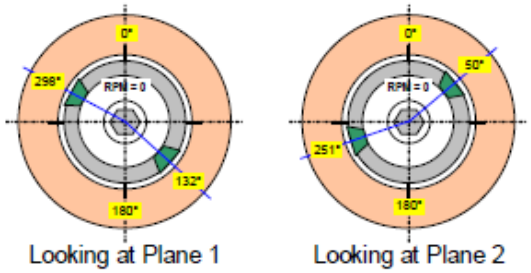
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 800 r/min) the Module starts automatically the first re-balancing measurement run.

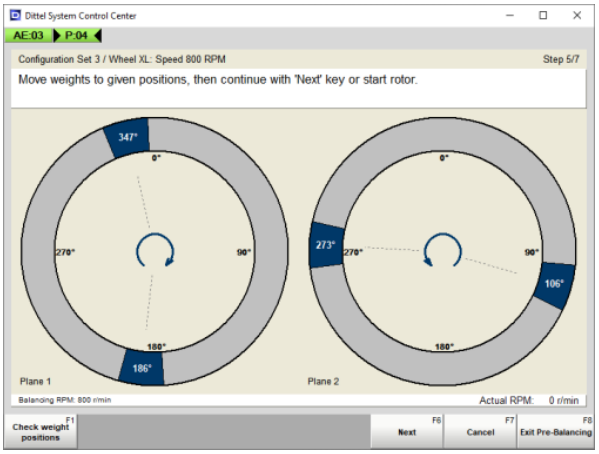


The P6002 UP line module starts its measurement to determine the unbalance.
For each plane it is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen!
When the key [Next] is available press the [Next] key.

N.B.
Re-Balancing can be started either with a stopped or with a running rotor. If Re-Balancing is started with a running rotor, Figure here above, is the first screen (Step 1/5). If required, you can check the weight positions in this step again.
Then the Re-Balancing sequence is extended by one step due to → Stop rotor.

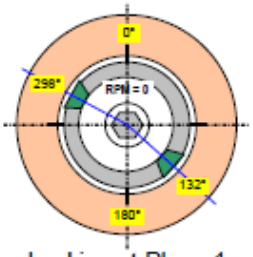
The screen already shows the new balancing weight positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



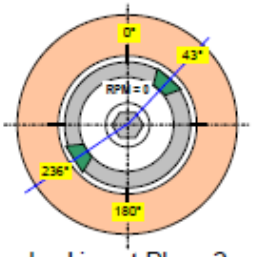


Plane 1:
Position the balancing weights as shown in the location detail.
Example: move one balancing weight from 132° to 186°, the second balancing weight from 298° to 347°. Clamp both weights.
Continue by pressing the [Next] key.

Plane 2:
Position the balancing weights as shown in the location detail.
Example: move one balancing weight from 50° to 106°, the second balancing weight from 251° to 273°.
Please note the Scale Direction! Clamp all weights.
Continue by pressing the [Next] key.

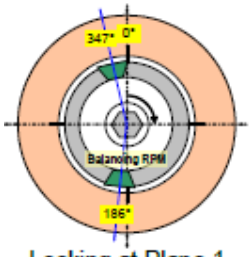


Looking at Plane 1

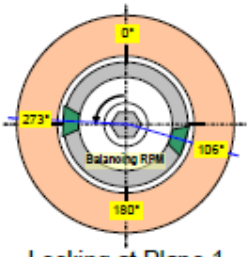


Looking at Plane 2

Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 800 r/min) the Module starts automatically its last measurement run.

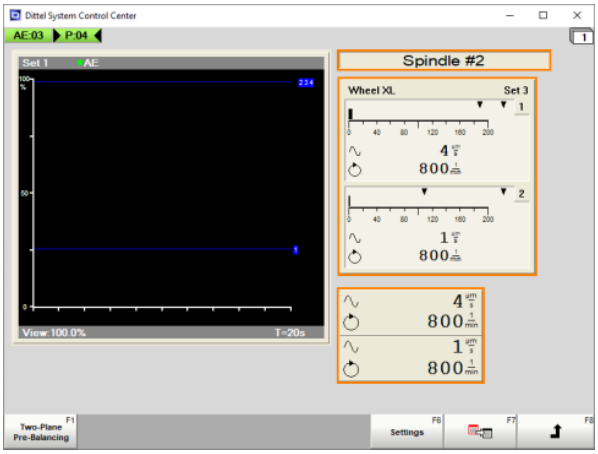


Looking at Plane 1



Looking at Plane 1

During the last measurement run (check run) the software of the Module checks the position of the balancing weights and shows the residual unbalance for each plane in units of µm/s (here 3 µm/s for Plane 1, 1 µm/s for Plane 2).
If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, finally press the [Save & exit] key.

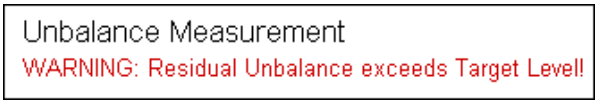


You return to the standard monitoring screen.

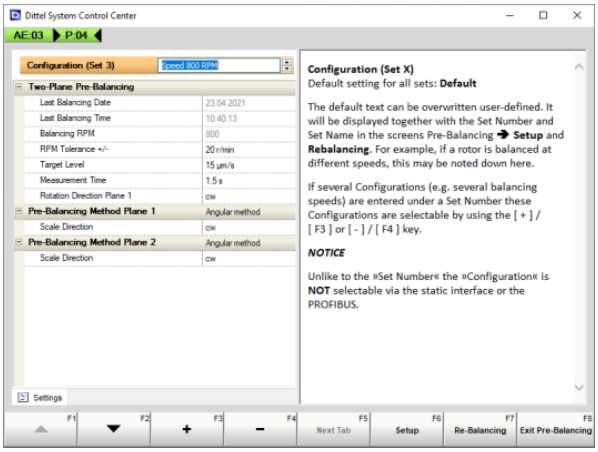
THUS, THE RE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

The date and time of Re-Balancing are stored under the adjusted Set Number and its Configuration.

12.3.1 *If the Re-Balancing Process is NOT finished successfully*



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears on the screen.

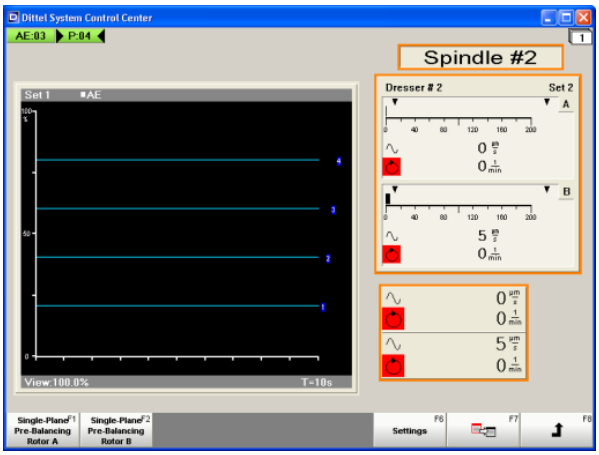


By pressing the [Save & back] key or the [Re- Balancing] key you return to the tab **Settings**.
Try to improve the result by a second re-balancing run.

13 TWO PLANE PRE-BALANCING USING FIXED POSITION METHOD

13.1 Setup and Pre-Balancing

N.B.
The following description of the Two-Plane (dynamic) Pre-Balancing Method Fixed Position uses screws as correction masses for each plane with the weights from a predefined Mass Table.
Pre-Balancing with a Mass Table produced by you (e.g. weighing different set pins, masses etc.) is carried out in the same way.
Plane 1 is defined as described in tab **Settings →General Settings → Vibration Transducer Plane 1 → Input** ....
The equidistant **Fixed Positions** at the planes of the rotor must be numbered permanently.
During Setup, Pre-Balancing and Re-Balancing the Unbalance Limits 1 and 2 of both planes and the Speed Limits 1 and 2 of the rotor are monitored (see connector # 2 or # 13 of P6002).

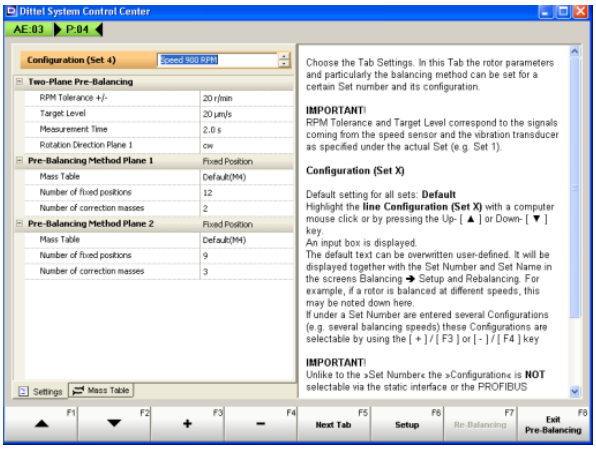


Make the P6002 UP line module available.
For the rotor to be pre-balanced, select the **Set Number,** under which the desired operating mode and accompanying parameters were stored.

Manual: To select the Set Number open the tab **Settings**. Adjust the proper Set Number and leave the tab using soft key [Back].

External: Via hardwire interface connector # 2 or PROFIBUS the proper Set Number is set by the Automation System.

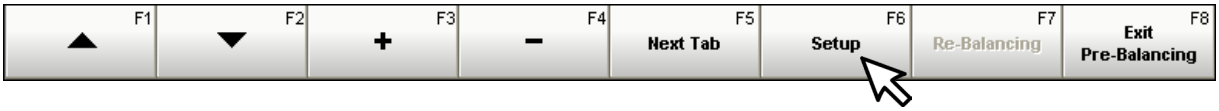
Depending on **Operating Mode**, stored under the selected Set Number, individual Module Views with its specific soft keys are displayed.
The opposite screen shows, for example, **Set Number 4** and the Operating Mode **Two-Plane** (recognizable by two bargraph indications marked (plane) **1** and (plane) **2**.
To pre-balance the rotor in two planes click or press the key [Two-Plane Pre-Balancing].



If available, select the desired **Configuration**.
Particularly check:

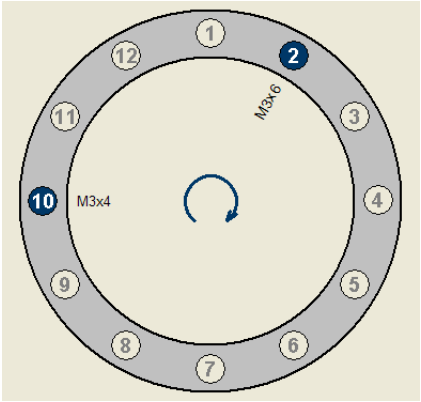
- the Pre-Balancing Method of both planes = **FixedPosition** each,
- the Rotation Direction of **Plane 1** (here **cw**),
- the Mass Table (all masses available?),
- the Number of fixed positions (here for Plane 1 = 12, for Plane 2 = 9), and
- the Number of correction masses (here for Plane 1 = 2 correction masses, for Plane 2 = 3 correction masses).

Launch the function of the Setup by clicking on key [Setup] or pressing the function key [F6].



WARNING
Risk of injury from rotating parts!
Switch OFF the machine when replacing or changing the Correction Masses!
Ensure that the rotor has stopped, before working on it!
Protect the machine against unauthorized or accidental switching ON!
NEVER operate a machine tool without all proper safety guarding in place.
DO NOT suspend any Safety Facilities!

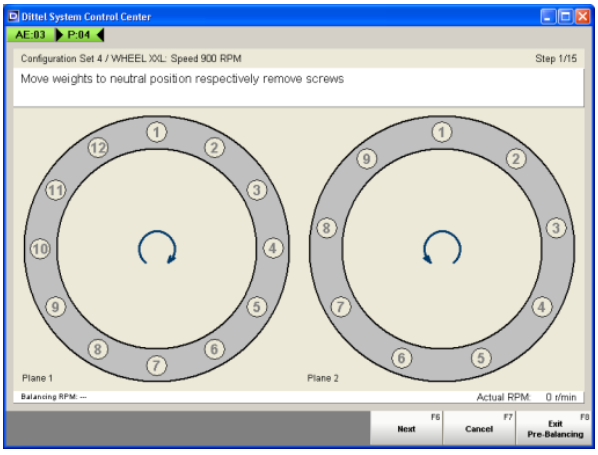
N.B.
Careful selection of the Correction Masses is very essential to successful operation of the pre-balancing process!
Follow the display step by step what to do next.
The [Next] key will not be available until the “Run rotor at Balancing RPM” condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the pre-balancing process.
Correction masses, speed, etc. shown below are examples! Follow the instructions as displayed!



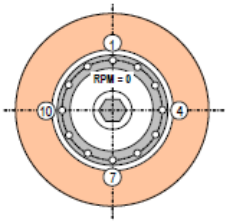
If for each correction mass, a Name (e.g. M3x4) was entered in the Mass Table then during Setup, Pre-Balancing or Re-Balancing the respective name instead of the weight is shown on the screen.

13.1.1 *Setup*

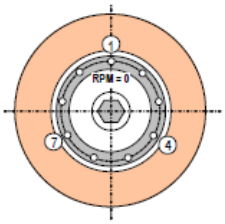
N.B.
The Setup can be started either with a stopped or with a running rotor. If the Setup is started with a running rotor the Setup procedure is extended by one step (additional: → Stop rotor or confirm Neutral Position).



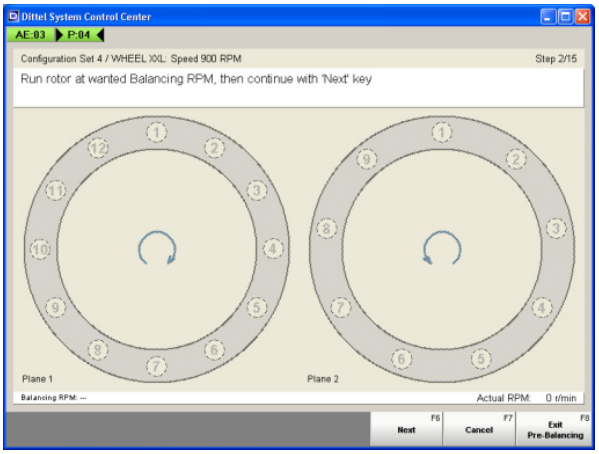
The following example shows the Setup procedure starting with a stopped rotor (Step 1/15).
Remove all correction masses / screws from the fixing flanges of both planes.
Continue by pressing or clicking the [Next] key.



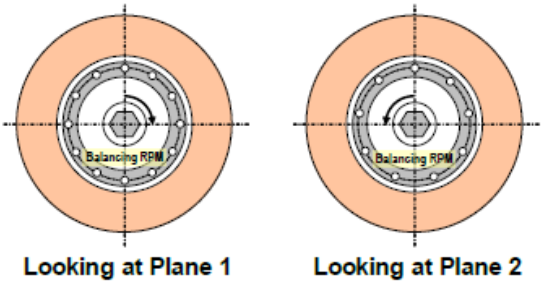
Looking at Plane 1
(12 fixed positions)



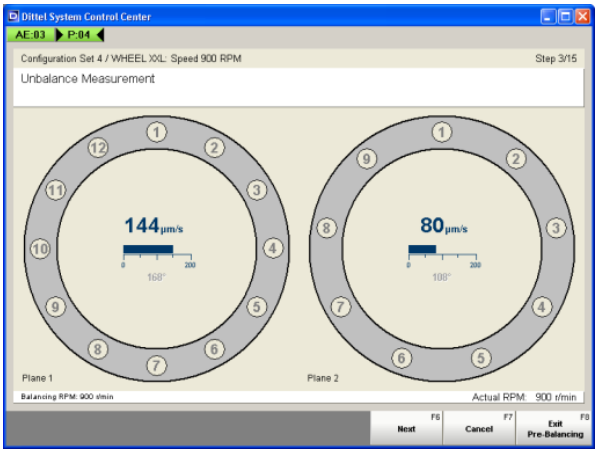
Looking at Plane 2
(9 fixed positions)



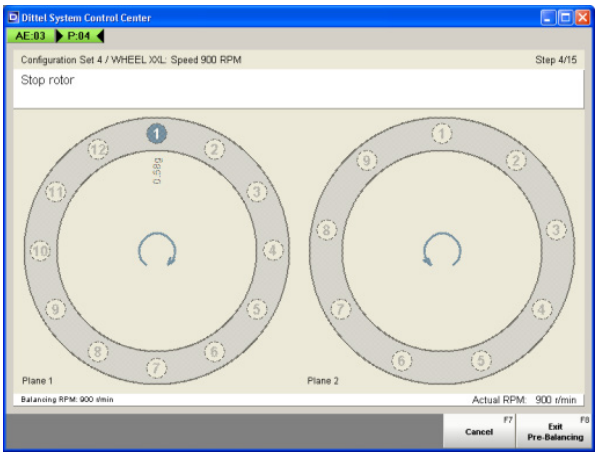
Run rotor at wanted Balancing RPM.
The example shows Rotational Direction of Plane 1: cw.
After reaching the wanted Balancing Speed (indication in this example: Actual RPM: 900 r/min) continue by pressing or clicking the [Next] key.



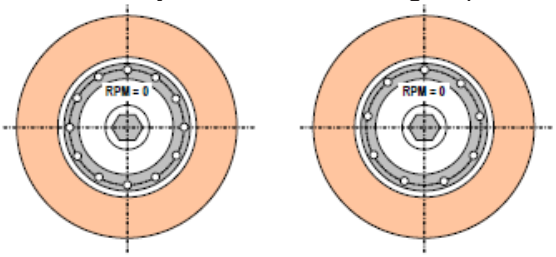
Looking at Plane 1 **Looking at Plane 2**



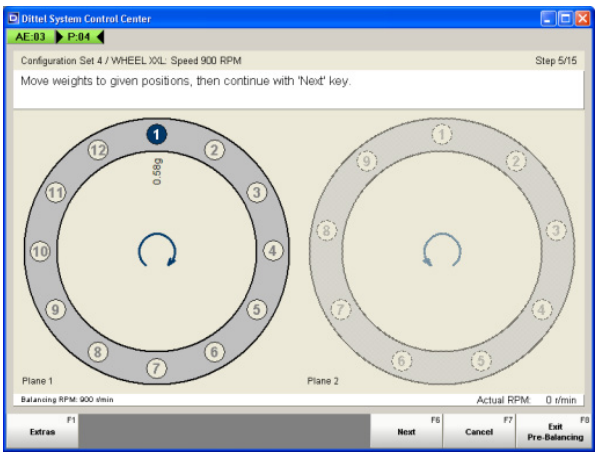
The P6002 UP line module starts its first measurement to determine the initial unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action the angular position and value of the initial unbalance, together with the Balancing Speed of the first test run are stored (= Display Balancing RPM: 900 r/min).



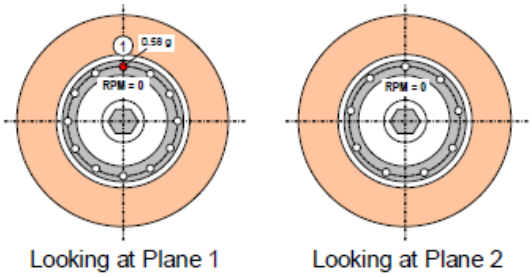
The screen already shows the new correction masses position.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



Looking at Plane 1 Looking at Plane 2

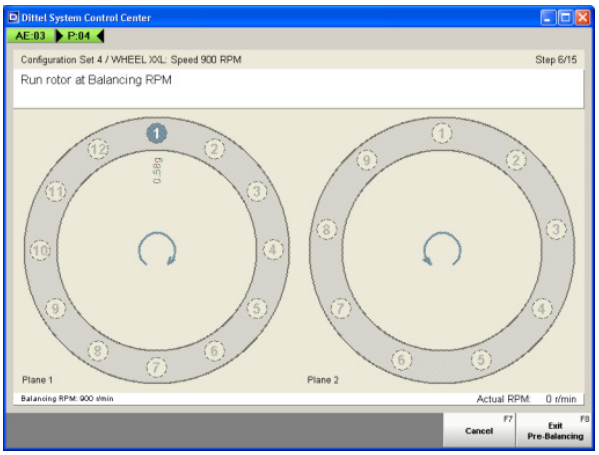


Plane 1:
To create a test unbalance in plane 1 add a correction mass (e.g. screw) of indicated weight (e.g. 0.58 g) to position 1 - as shown on the display.
To continue press the [Next] key.

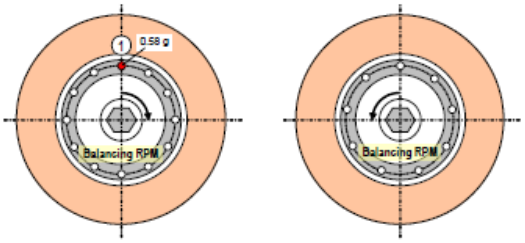


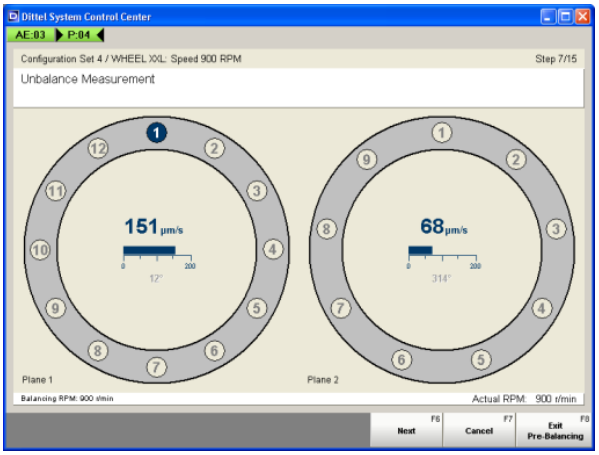
Looking at Plane 1 Looking at Plane 2

N.B.
The [Adjust positions] key is used to set an individual test unbalance of Plane 1 and should be used by experienced personnel only (see section “11.2 The Adjust positions Key” on page 135)!

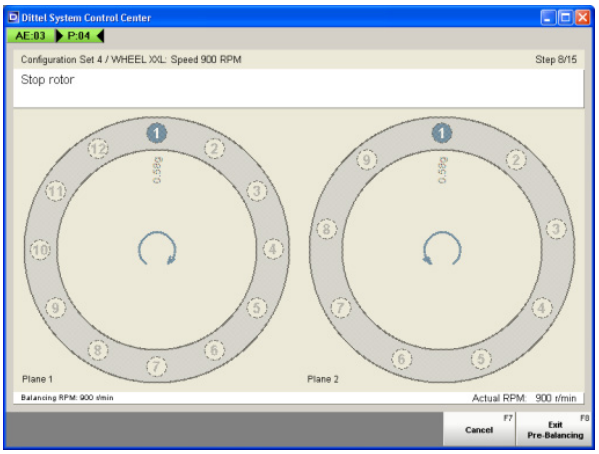


Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 800 r/min) the Module starts automatically the next measurement run.

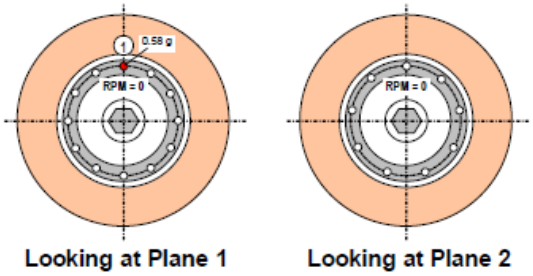


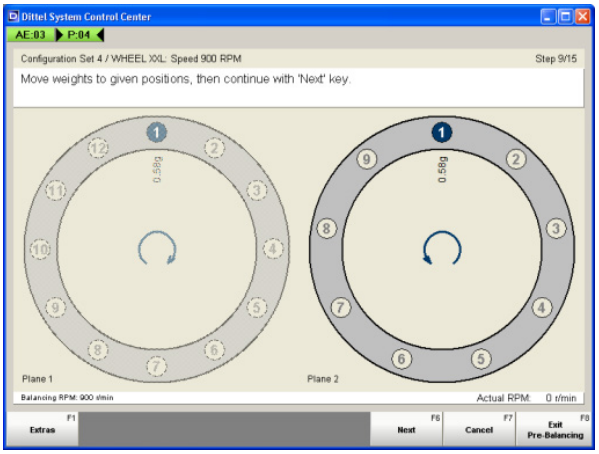


In the second run, the Module repeats its successive Setup unbalance measurements with a test unbalance of e.g. 0.58 g in plane 1.
During the unbalance measurements, the actual unbalance is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action, the angular position and value of the “new” unbalance are stored.

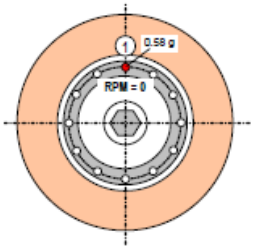


The screen shows already the new position of the correction mass.
Stop rotor.
After rotor standstill (Indication »Actual RPM: 0 r/min«) the Module changes automatically to the next balancing step.

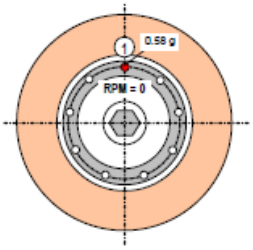




Plane 2:
To create a test unbalance in plane 2 add a correction mass (e.g. screw) of indicated weight or name (e.g. 0.58 g) to position 1 - as shown on the display.
To continue press the [Next] key.

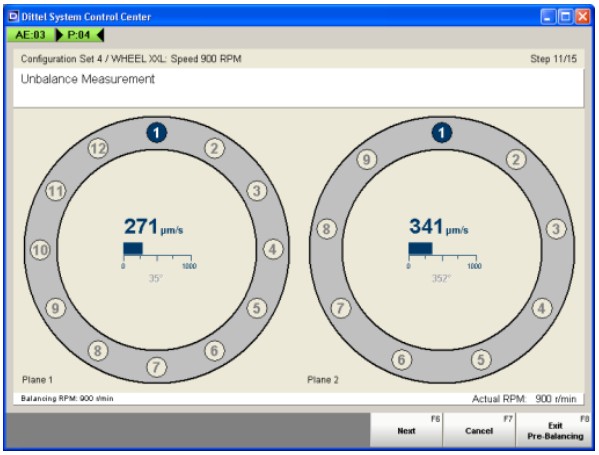


Looking at Plane 1



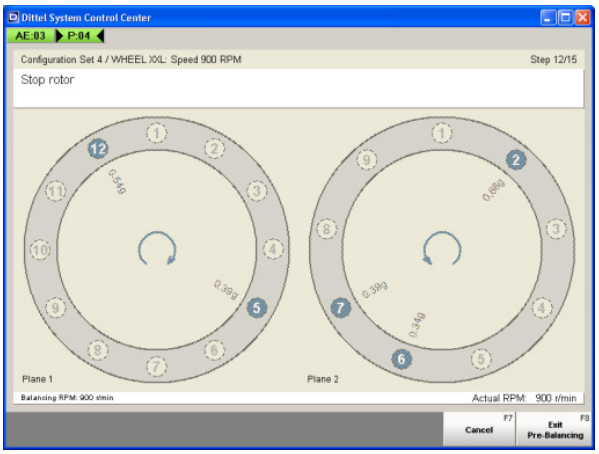
Looking at Plane 2

N.B.
The [Adjust positions] key is used to set an individual test unbalance of plane 2 and should be used by experienced personnel only (see section “13.2 The Adjust positions Key” on page 168)!

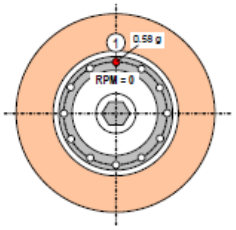


Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 900 r/min) the Module starts automatically the next measurement run.
In the third run, the Module repeats its Setup unbalance measurements with a test unbalance in plane 1 and plane 2.
During the unbalance measurements the actual unbalance for each plane is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen!
When the key [Next] is available press the [Next] key.
With this action the angular position and value of the “new” unbalance are stored for each plane.

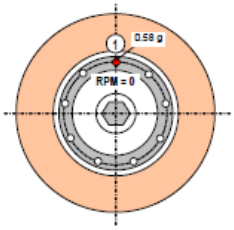
13.1.2 *Pre-Balancing*



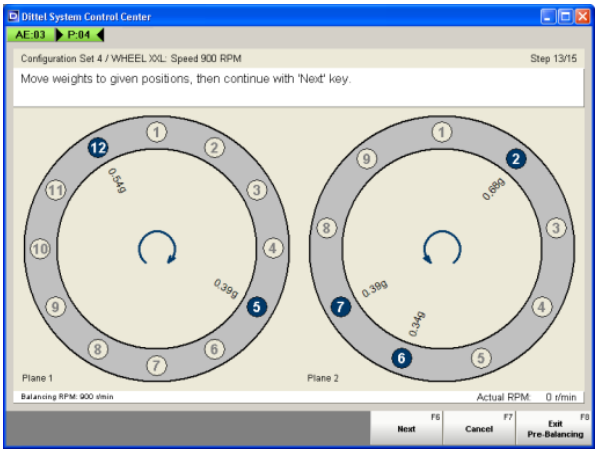
The screen already shows the new correction masses positions.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



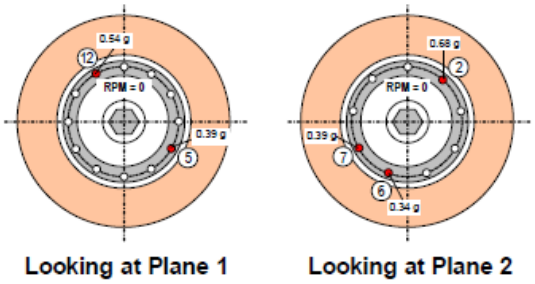
Looking at Plane 1



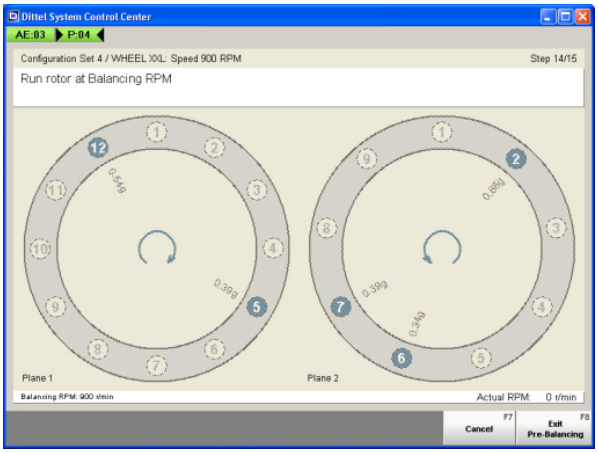
Looking at Plane 2



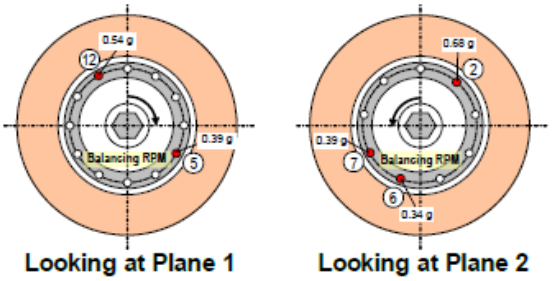
Plane 1:
Remove the test unbalance (e.g. screw) from position 1.
Example: add a correction mass of 0.39 g to position 5 and a second correction mass of 0.54 g to position 12.
Plane 2:
Remove the test unbalance (e.g. screw) from position 1.
Example: add a correction mass of 0.68 g to position 2, a second correction mass of 0.34 g to position 7, and a third correction mass of 0.39 g to position 7.
Continue by pressing the [Next] key.



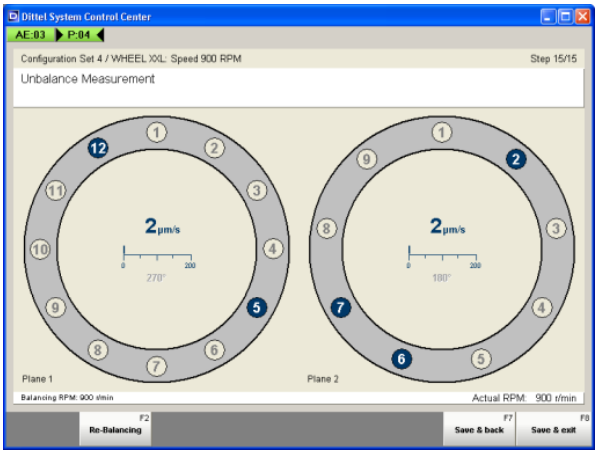
Looking at Plane 1 Looking at Plane 2



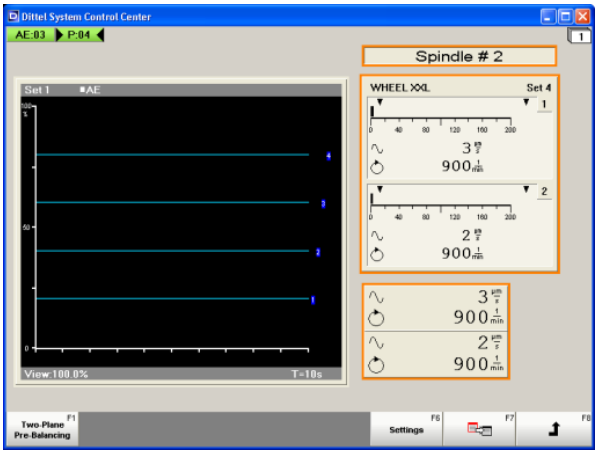
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance the Module starts automatically its last measurement run.



Looking at Plane 1 Looking at Plane 2



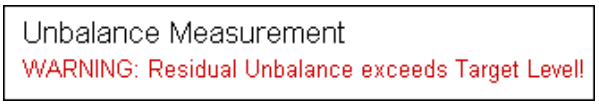
During the last measurement run (check run) the software of the Module checks the position and weight of the correction masses and shows the residual unbalance in units of µm/s (here for Plane 1: 2 µm/s, for Plane 2: 2 µm/s).
If the result is OK, i.e. the displayed residual unbalance of each plane is below the **Target Level** set in the tab **Settings**, press the [Save & exit] key.



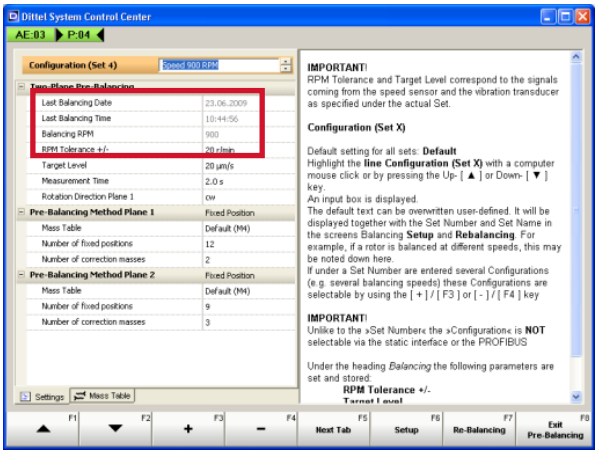
You return to the Monitoring screen.

THUS, THE FIRST TIME SETUP AND PREBALANCING PROCESS IS FINISHED SUCCESSFULLY!

If the first time Setup and Pre-Balancing Process is NOT finished successfully:



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears at the screen.
Continue by pressing the [Save & back] or [Re-Balancing] key and try to improve the result by using this function.



After pressing or clicking the [Save & back] key you return to the tab **Settings**.
Additionally it is indicated:

- the date of the last Pre-Balancing
- the time of the last Pre-Balancing, and
- the Pre-Balancing RPM.

N.B.
A restart of the Setup procedure of the same rotor (optionally under a new Configuration) is required
- when the operational speed has changed,
- when the Rotation Direction has changed..

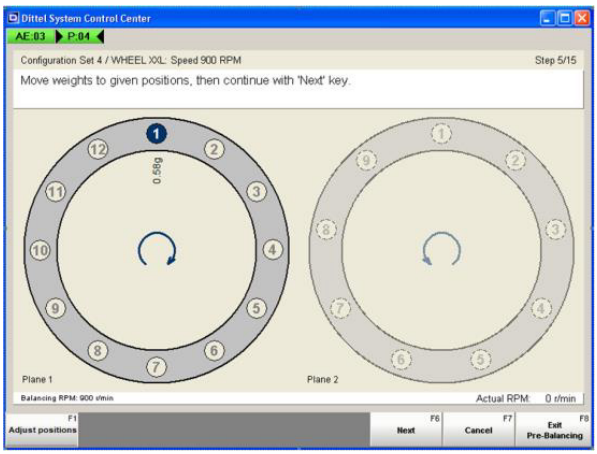
13.2 *The Adjust positions Key*

N.B.
The **Adjust positions** key is displayed during Setup:
- at **Step 5/15** for **Plane 1**,
- at **Step 9/15** for **Plane 2**.

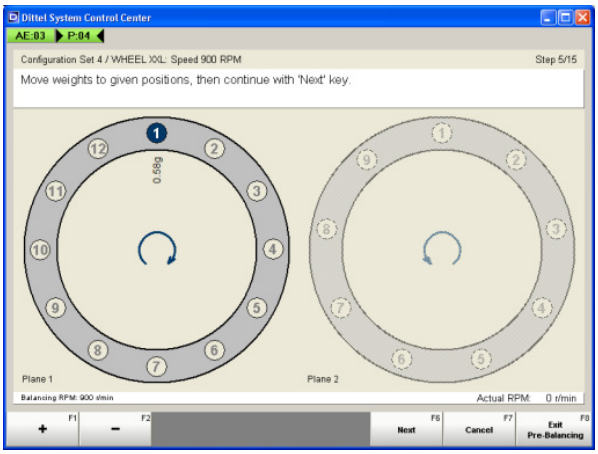
The operation of the [Adjust positions] key is identically for both planes!

Balancing must be terminated.
Testunbalance is too light!

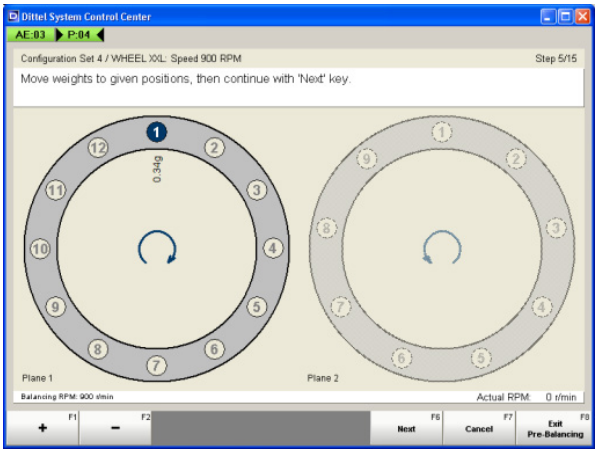
If the suggested correction mass for the test unbalance causes an inadmissible unbalance for the rotor or a Warning message **Testunbalance is too light** appears the weight of the correction mass can be changed using the **Adjust positions** key:



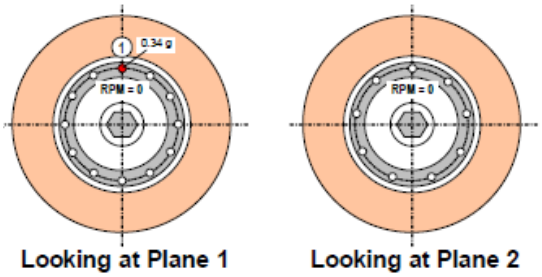
To continue press or click on the [Adjust positions] key.

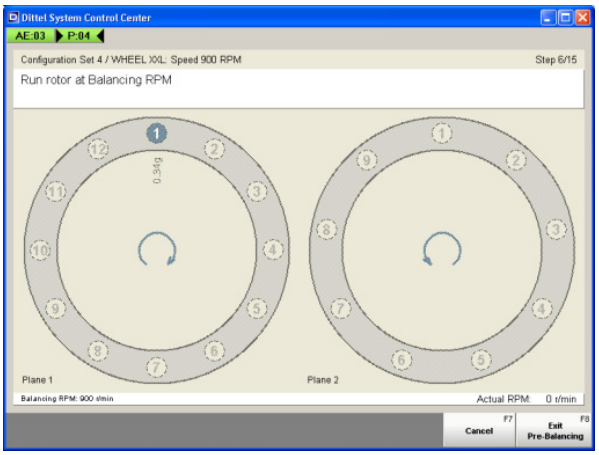


By pressing the [+] or [-] key every correction mass, which is entered in the Mass Table, can be adjusted on the screen. Adjust a correction mass, which you regard as suitable.



For the plane displayed add a correction mass with weight as indicated to position 1 of the rotor.
Example: in Plane 1 add a weight of 0.34 g to position 1.
To continue press the [Next] key.



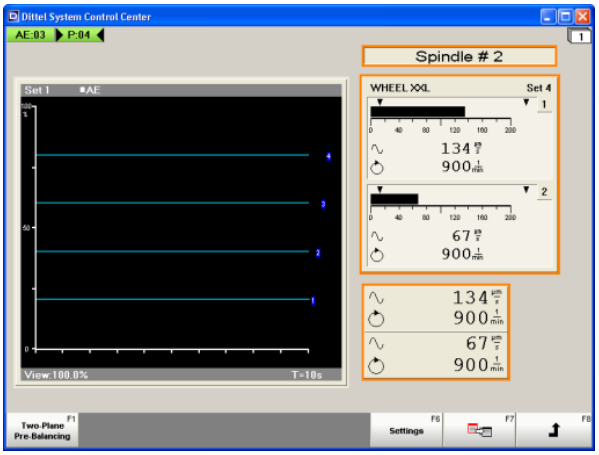


Further sequence of pre-balancing is carried out as described before (for Plane 1 from **Step 6/15** on, for Plane 2 from **Step 10/15** on).

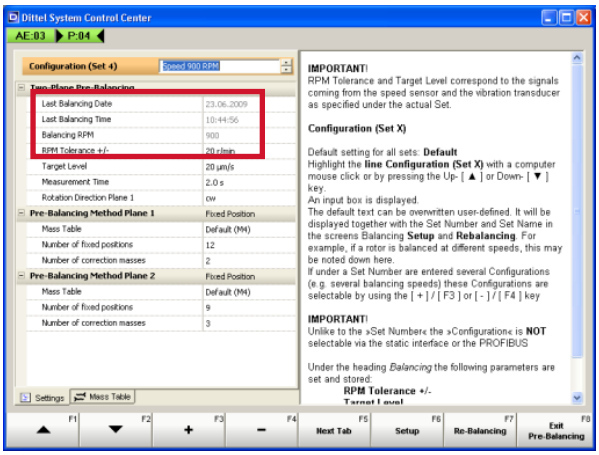
13.3 *Re-Balancing using Fixed Position Method*

The rotor should be re-balanced,
- when the result of the first pre-balancing after Setup was not satisfactory,
- when the grinding wheel was changed or replaced, or
- when the unbalance exceeds the permitted value after several grinding cycles.

N.B.
During Re-Balancing the Unbalance Limits 1 and 2 of both planes and the Speed Limits 1 and 2 of the rotor are monitored (see Connector # 2 or # 13)!



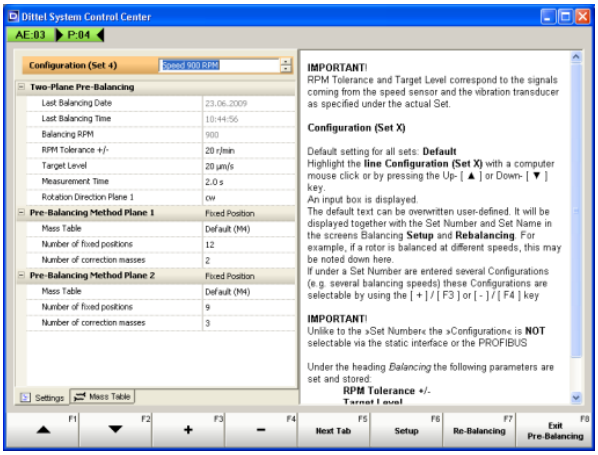
Make the P6002 UP line module available.
Select for the rotor to be re-balanced the Set Number, under which the rotor was balanced the last time.
While in the Module Mode click or press on the key [Two-Plane Pre-Balancing].



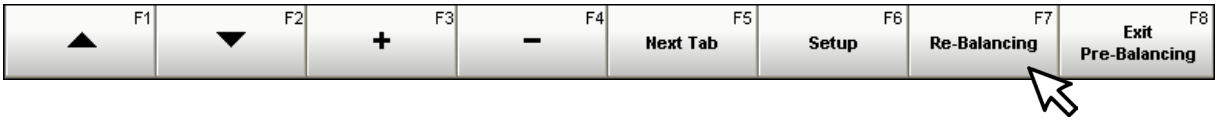
Date, time, and Balancing RPM of the last Pre-Balancing procedure must be displayed.
The key [Re-Balancing] must be available.
Particularly check

- the desired **Configuration**, if any,
- the Mass Table used.
- the Pre-Balancing Method of both planes = **Fixed Position**,
- the Rotation Direction of **Plane 1**,
- the Number of fixed positions per plane,
- the Number of correction masses per plane.

N.B.
With the selected Set Number and Configuration, Setup and Balancing the rotor was already performed once with the same Balancing RPM, Rotation Direction, and Pre-Balancing Method.
Follow the operating guide step by step what to do next.
The [Next] key will not be available until the Run rotor at Balancing RPM condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the re-balancing sequence.
Correction masses, speed, etc. shown below are **examples**!
Before Re-Balancing NEVER change
- the Rotation Direction,
- the Pre-Balancing Method.
Each change deletes the stored data of the Setup!



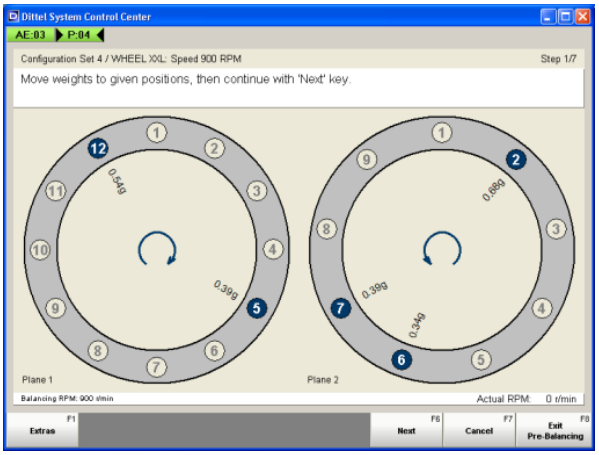
Launch the function of Re-Balancing by clicking on key [Re-Balancing] or by pressing the function key [F7]..



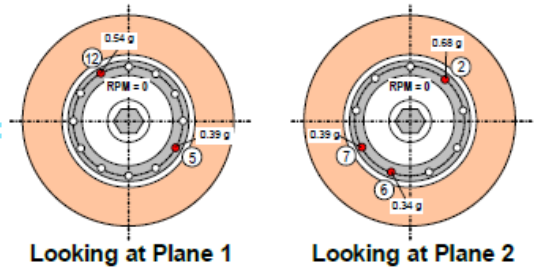
N.B.
Re-Balancing can be started either
- with a stopped rotor,
- with a rotor running at Balancing RPM, or
- with a rotor running at less than Balancing RPM.
The number of steps changes correspondingly, as well as the start screen.

13.3.1 *Positions and weights of the correction masses agree with the indication on the screen*

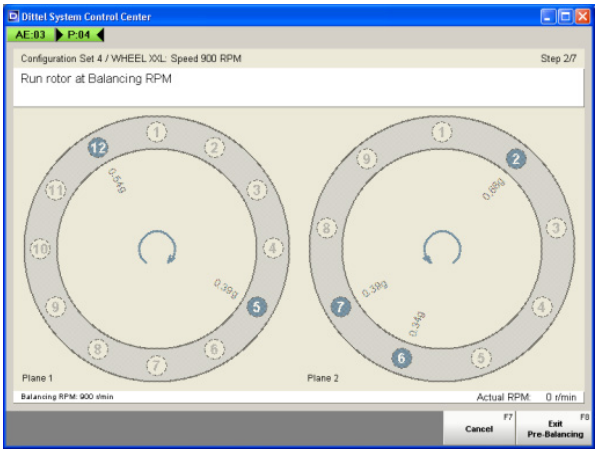
The following example shows Re-Balancing of a rotor stopped at the beginning (Step 1/7).
In Plane 1: The rotor contains 12 fixed positions and 2 correction masses.
In Plane 2: The rotor contains 9 fixed positions and 3 correction masses..



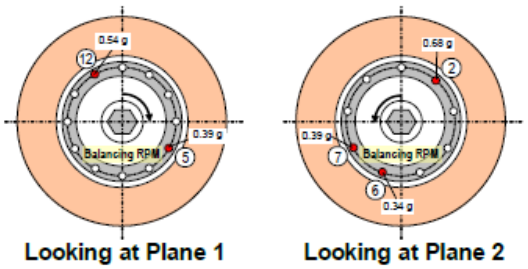
If the positions and weights of the correction masses and the indication on the screen agree for each plane press the [Next] key.



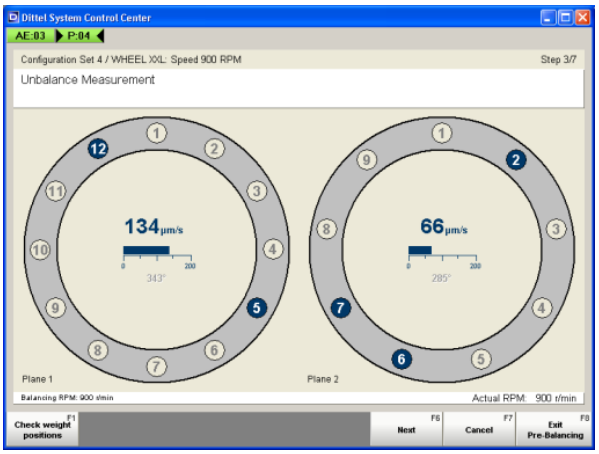
Looking at Plane 1 Looking at Plane 2



Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 900 r/min) the Module starts automatically the first rebalancing measurement run.

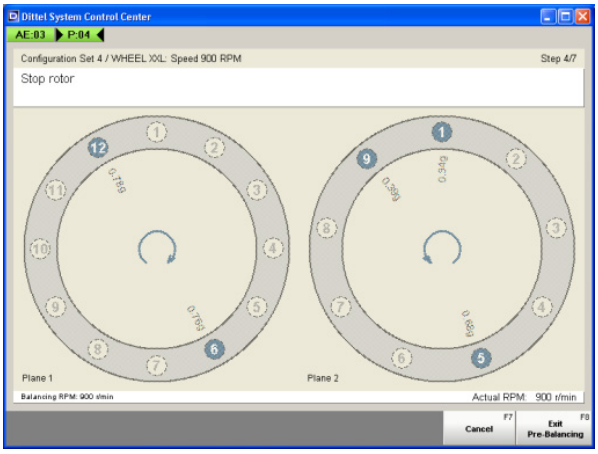


Looking at Plane 1 Looking at Plane 2

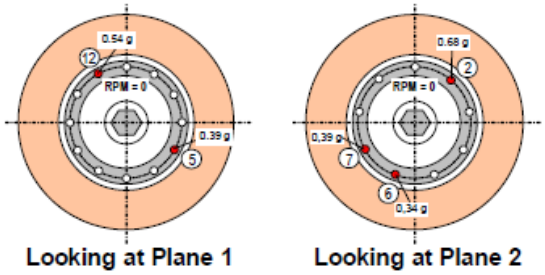


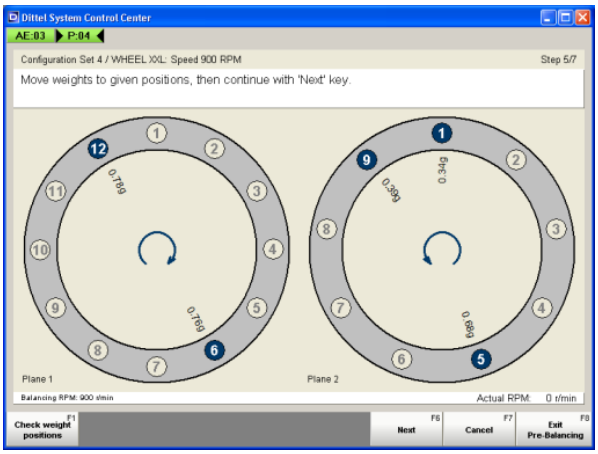
The Module P6002 UP line module starts its measurement to determine the unbalance.
For each plane it is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.

N.B.
Re-Balancing can be started either with a stopped or with a running rotor. If Re-Balancing is started with a running rotor, Figure here above, is the first screen (Step 1/5). If required, you can check the correction mass positions in this step again.
Then the Re-Balancing procedure is extended by one step due to → **Stop rotor**. Continue with Figure here above.

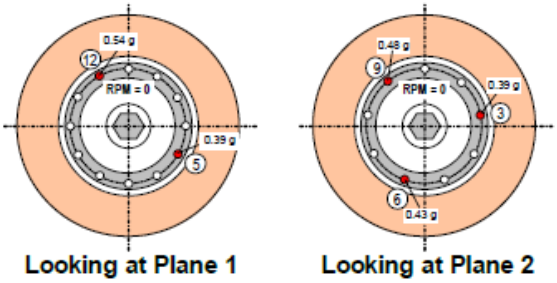


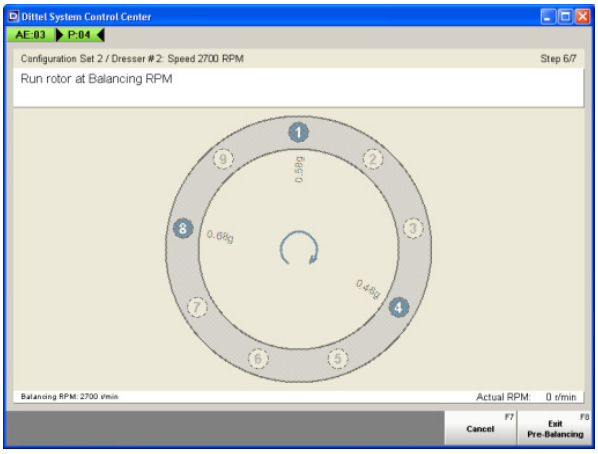
The screen already shows the new positions and weights of the correction masses.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



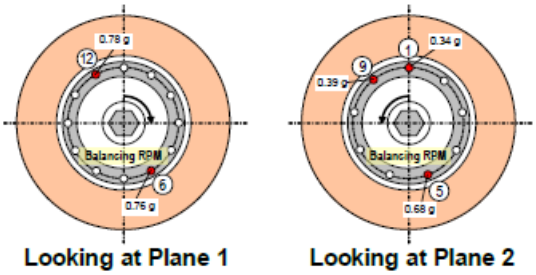


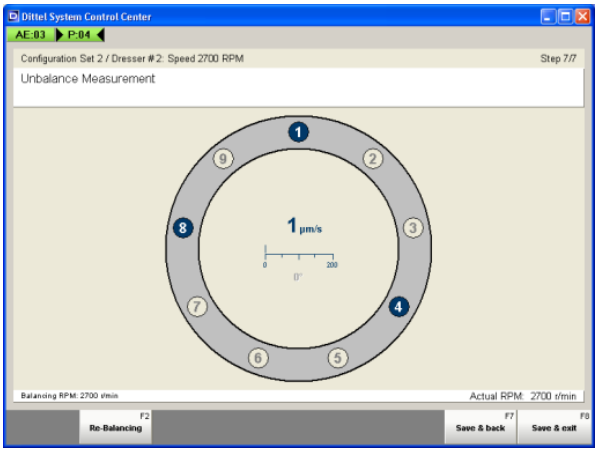
Plane 1:
In this example remove the correction masses from positions 5 and 12. Add a correction mass of 0.76 g to position 6, and a second correction mass of 0.78 g to position 12.
Plane 2:
In this example remove the correction masses from positions 2, 6 and 7. Add a correction mass of 0.34 g to position 1, a second correction mass of 0.68 g to position 5, and a third correction mass of 0.39 g to position 9.
Continue by pressing the [Next] key.





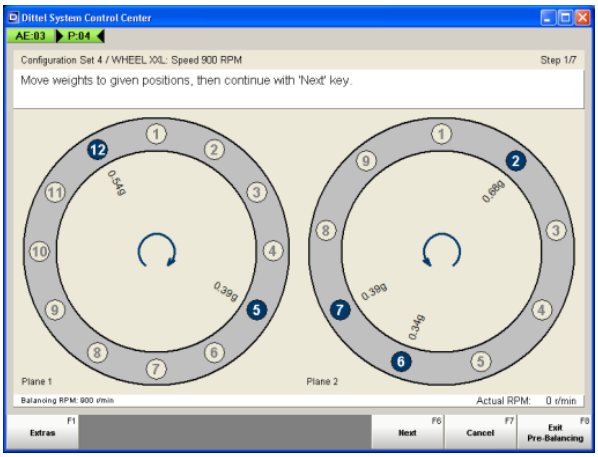
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 900 r/min) the Module starts automatically its last measurement run.



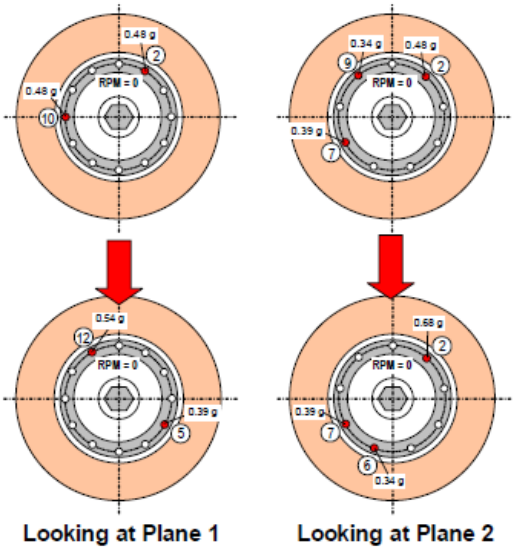


During the last measurement run (check run) the software of the Module checks the position and weight of the correction masses and shows the residual unbalance for each plane in units of µm/s (here 1 µm/s for each plane).
If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, finally press the [Save & exit] key.

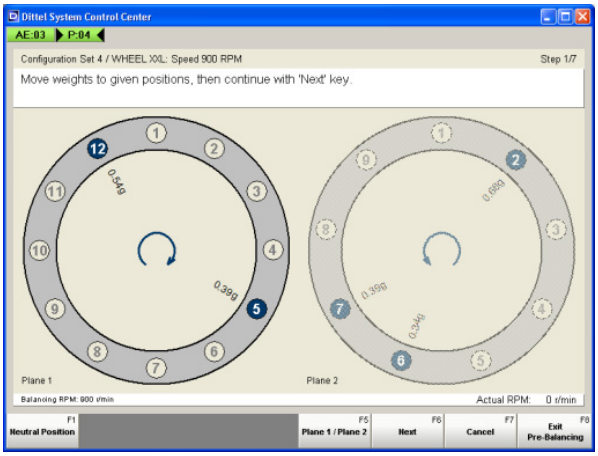
13.3.2 *Positions and weights of the correction masses DO NOT agree with the indication on the screen*



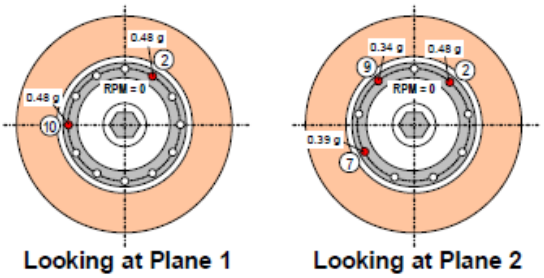
The following example shows Re-Balancing of a rotor stopped at the beginning (Step 1/7).
In Plane 1:
the rotor contains 12 fixed positions and 2 correction masses,
and in Plane 2:
the rotor contains 9 fixed positions and 3 correction masses.



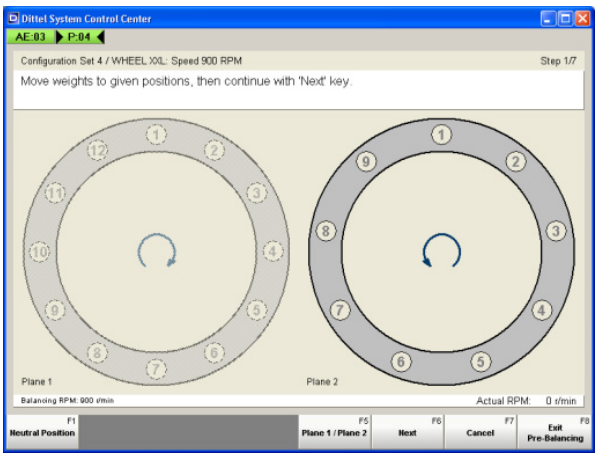
If the positions and weights of the correction masses DO NOT agree with the indication on the screen either
- change the weights and positions of the correction masses as indicated on the screen and continue,
- or press the [Adjust positions] key.



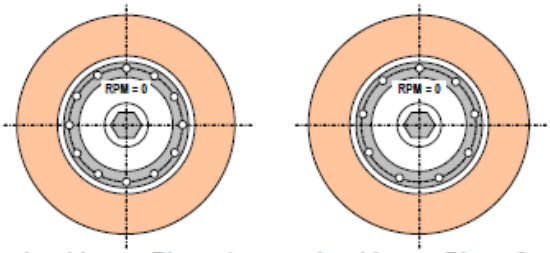
The [Adjust positions] key changes to [Neutral Position] key.
With the [Plane 1 / Plane 2] key select the plane which does not agree with the indication on the screen.



Looking at Plane 1 Looking at Plane 2

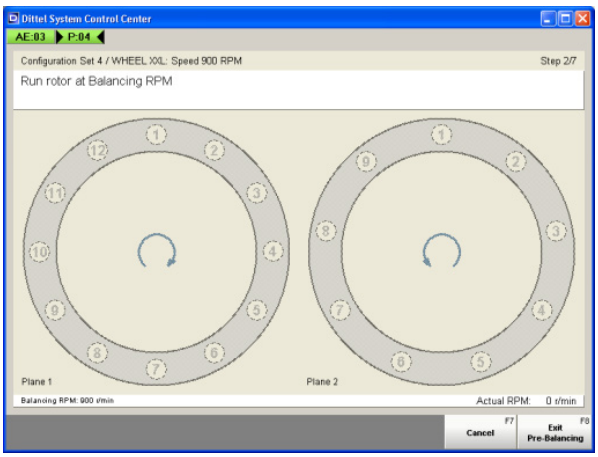


Press the [Neutral Position] key.
In this example both planes do not agree with the display.

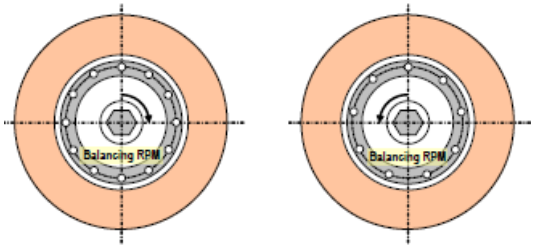


Looking at Plane 1 Looking at Plane 2

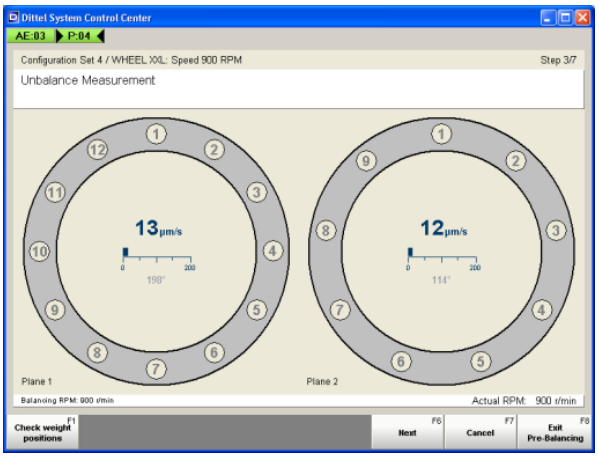
The suggested weights and positions disappear on the screen.
Remove all correction masses / screws from both fixing flanges / rotor.
Continue by pressing the [Next] key.



Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 900 r/min) the Module starts automatically the first rebalancing measurement run.

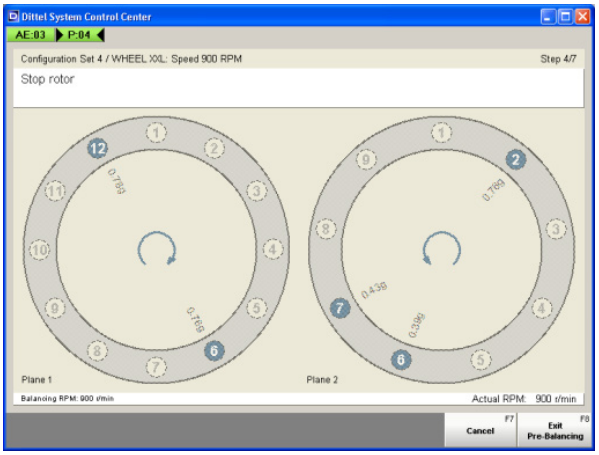


Looking at Plane 1 Looking at Plane 2

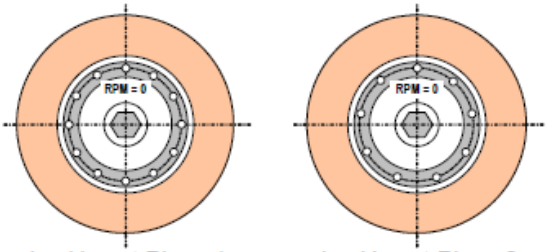


The Module P6002 UP line module starts its measurement to determine the unbalance.
For each plane it is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.

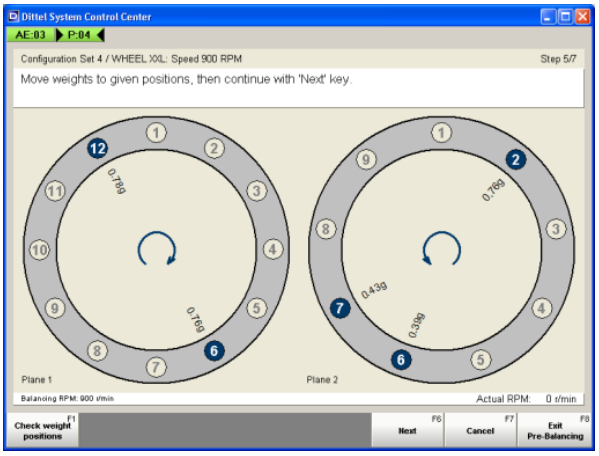
N.B.
Re-Balancing can be started either with a stopped or with a running rotor. If Re-Balancing is started with a running rotor, Figure here above is the first screen (Step 1/5). If required, you can check the correction mass positions in this step again..



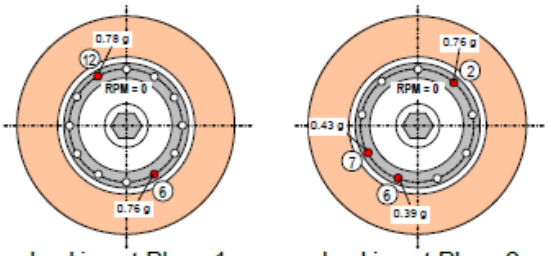
The screen already shows the new positions and weights of the correction masses.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



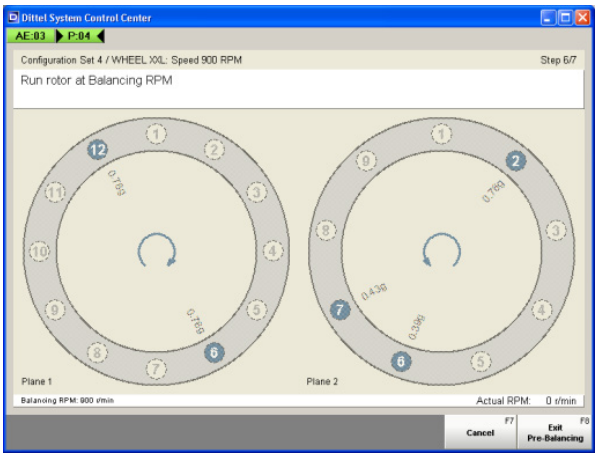
Looking at Plane 1 Looking at Plane 2



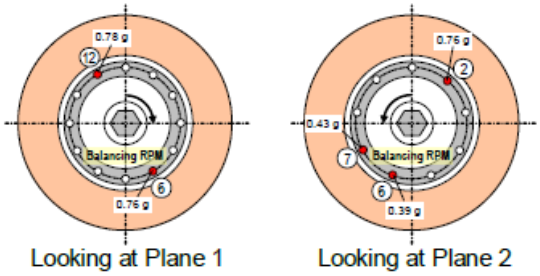
Plane 1:
In this example add a correction mass of 0.76 g to position 6, and a second correction mass of 0.78 g to position 12.
Plane 2:
In this example add a correction mass of 0.76 g to position 2, a second correction mass of 0.39 g to position 6, and a third correction mass of 0.43 g to position 7.
Continue by pressing the [Next] key.

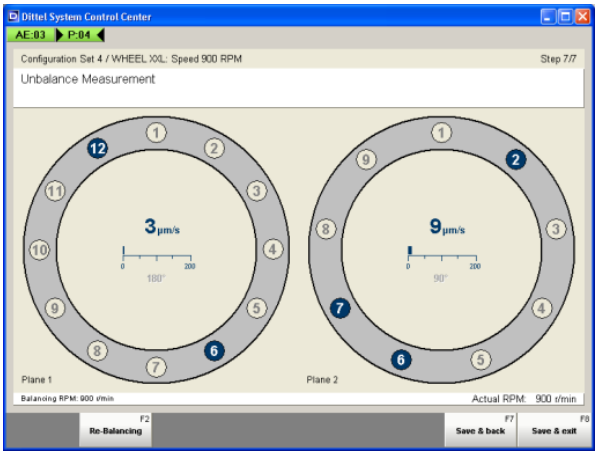


Looking at Plane 1 Looking at Plane 2

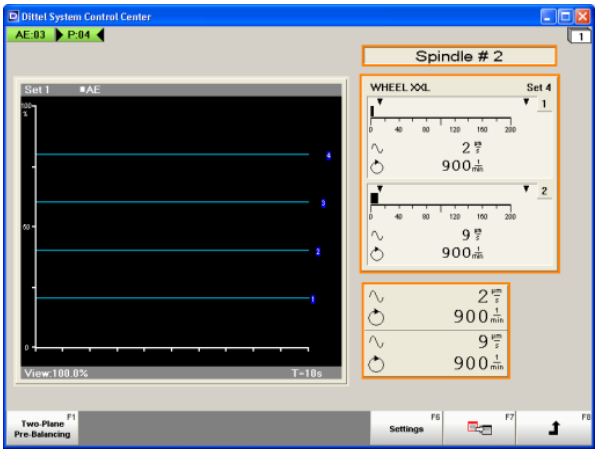


Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 900 r/min) the Module starts automatically its last measurement run.





During the last measurement run (check run) the software of the Module checks the position and weight of the correction masses and shows the residual unbalance in units of µm/s (for plane 1 = 3 µm/s, for plane 2 = 9 µm/s).
If the result is OK, i.e. the displayed residual unbalance is below the **Target Level** set in the tab **Settings**, finally press the [Save & exit] key.

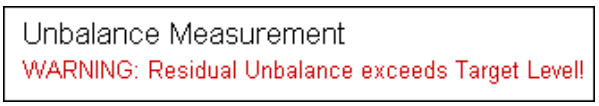


In all cases, you return to the standard monitoring screen.

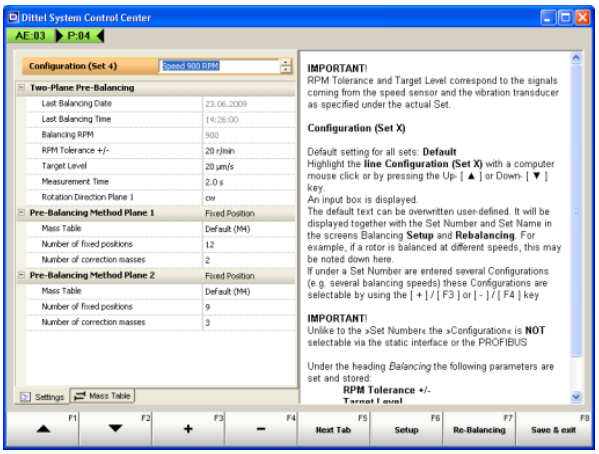
THUS THE RE-BALANCING PROCESS IS FINISHED SUCCESSFULLY!

The date and time of Re-Balancing are stored under the adjusted Set Number and its Configuration.

If the Re-Balancing Process is NOT finished successfully:



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears on the screen.

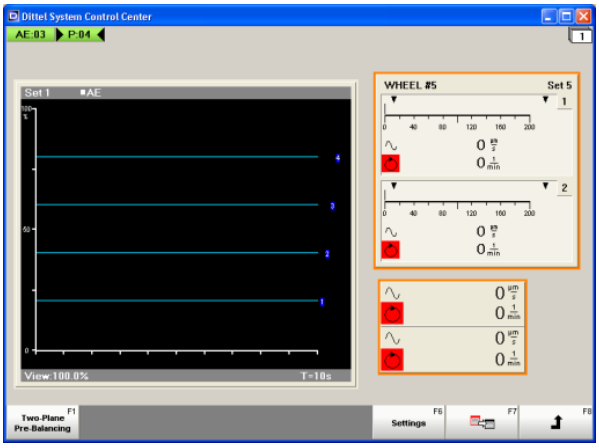


By pressing the [Save & back] or the [Re-Balancing] key you return to the tab **Settings**.
Try to improve the result by a second re-balancing run.

14 TWO PLANE PRE BALANCING USING ANGULAR METHOD AND FIXED POSITION METHOD

14.1 Setup and Pre-Balancing

N.B.
The following description of the Two-Plane (dynamic) Pre-Balancing uses in one plane the Pre-Balancing Method Fixed Position and in the other plane the Angular Method. The Fixed Position Method uses screws as correction masses with the weights from a predefined Mass Table, whereas the Angular Method uses two equal fixed mass balancing weights, which can be positioned and clamped at any specific angle on the wheel holder, as compensating masses.
Plane 1 is defined as described in tab **Settings →General Settings → Vibration Transducer Plane 1 → Input** ....
The equidistant **Fixed Positions** at the planes of the rotor must be numbered permanently.
During Setup, Pre-Balancing and Re-Balancing the Unbalance Limits 1 and 2 of both planes and the Speed Limits 1 and 2 of the rotor are monitored (see connector # 2 or # 13 of P6002).

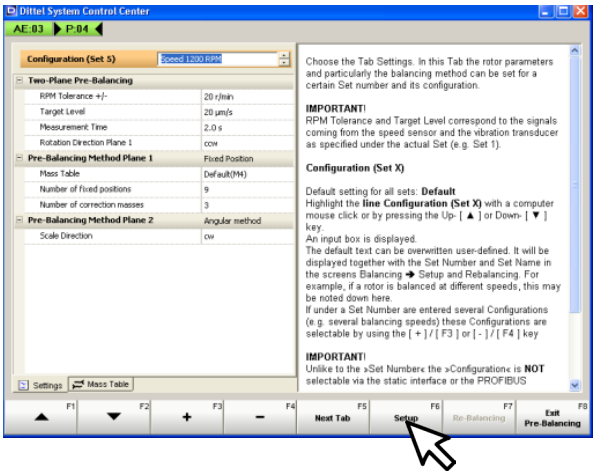


Make the P6002 UP line module available.
Select for the rotor to be pre-balanced dynamically the **Set Number** under which the desired operating mode and accompanying parameters were stored.

Manual: To select the Set Number open the tab **Settings**. Adjust the proper Set Number and leave the tab using soft key [Back].

External: Via hardwire interface connector # 2 or PROFIBUS the proper Set Number is set by the Automation System.

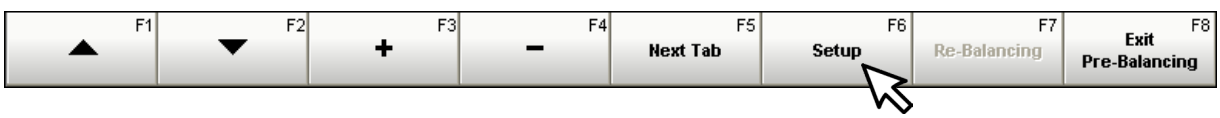
Depending on **Operating Mode**, stored under the selected Set Number, individual Module Views with its specific soft keys are displayed.
The opposite screen shows, for example, **Set Number 5** and the Operating Mode **Two-Plane** (recognizable by two bargraph indications marked (plane) **1** and (plane) **2**.
To pre-balance the rotor in two planes click or press the key [Two-Plane Pre-Balancing].



If available, select the desired **Configuration**.
Particularly check:

- the Pre-Balancing Method of both planes, e.g. Plane 1 = **Fixed Position**, Plane 2 = **Angular Method**,
- the Rotation Direction of **Plane 1** (here **ccw**),
- the Scale Direction for Angular Method = plane 2 (here **cw**),
- the Mass Table (all masses available?),
- the Number of fixed positions (here for Plane 1 = 9, and
- the Number of correction masses (here for Plane 1 = 3 correction masses).

Launch the function of the Setup by clicking on key [Setup] or pressing the function key [F6].

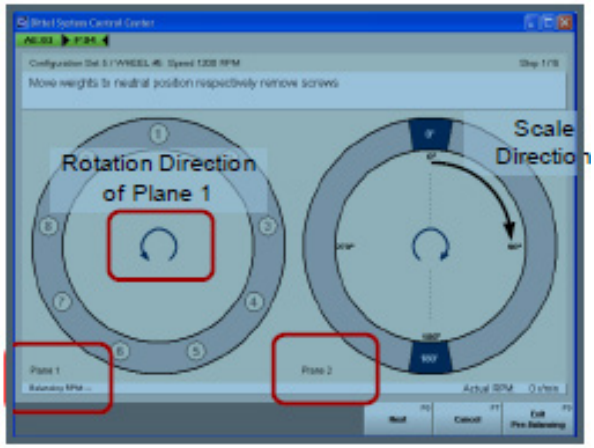


WARNING
Risk of injury from rotating parts!
Switch OFF the machine when replacing or changing the Correction Masses!
Ensure that the rotor has stopped, before working on it!
Protect the machine against unauthorized or accidental switching ON!
NEVER operate a machine tool without all proper safety guarding in place.
DO NOT suspend any Safety Facilities!

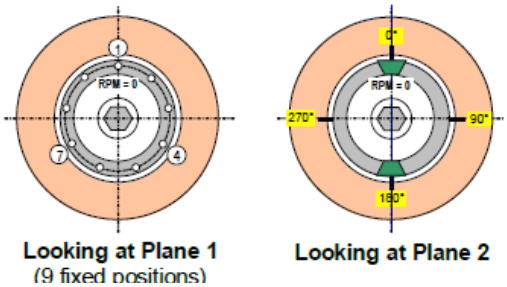
N.B.
Careful selection of the correction masses and precise setting of the balancing weights are very essential to successful operation of the balancing process!
Follow the display step by step what to do next.
The [Next] key will not be available until the “Run rotor at Balancing RPM” condition is met or the unbalance measurement is completed!
The [Exit Pre-Balancing] key will always abort the balancing process.
Correction masses, number of fixed positions, angles, speed, etc. shown below are examples! Follow the instructions as displayed!

14.1.1 *Setup*

N.B.
The Setup can be started either with a stopped or with a running rotor. If the Setup is started with a running rotor the Setup procedure is extended by one step (additional: → Stop rotor or confirm Neutral Position).

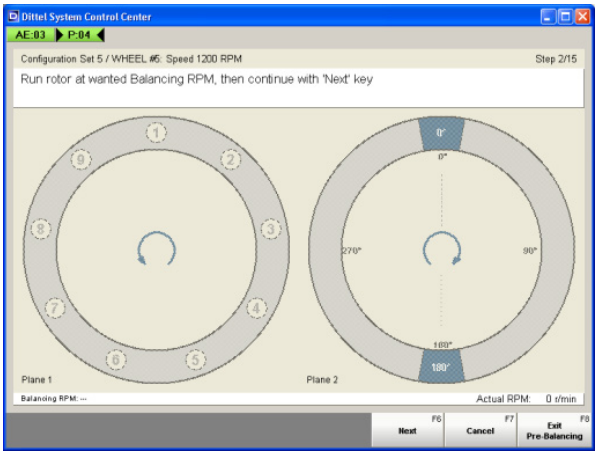


The following example shows the Setup procedure starting with a stopped rotor (Step 1/15).
Plane 1:
Remove all correction masses / screws from the fixing flange.
Plane 2:
Position the balancing weights precisely to the neutral position as indicated on the screen and clamp.
Continue by pressing or clicking the [Next] key.

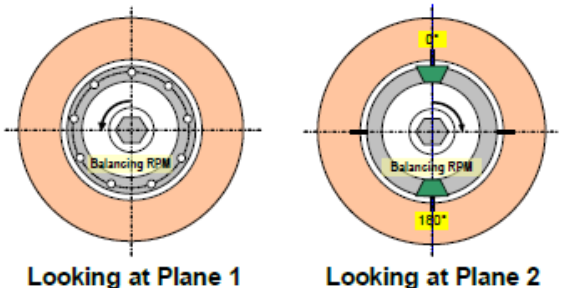


Looking at Plane 1
(9 fixed positions)

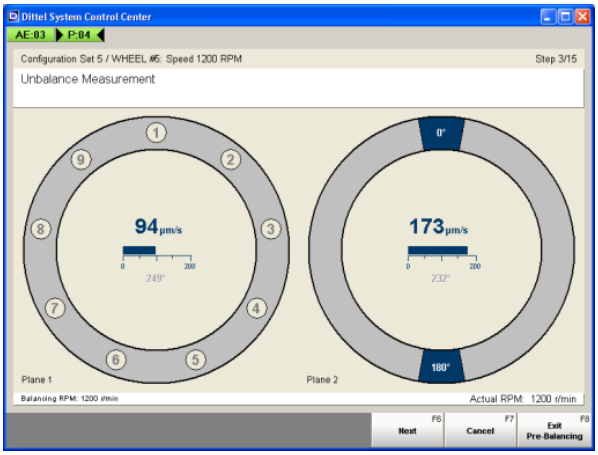
Looking at Plane 2



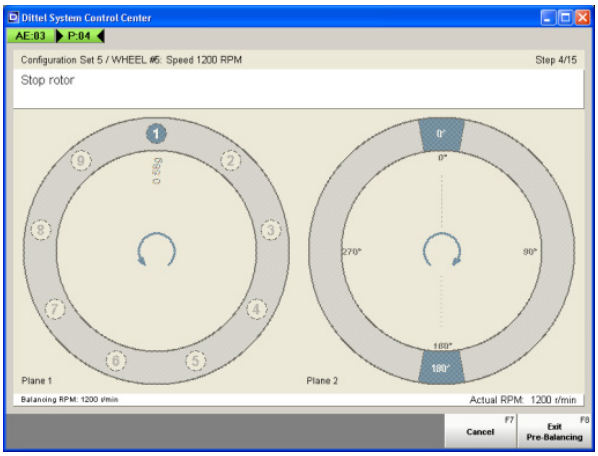
Run rotor at wanted Balancing RPM.
The example shows Rotational Direction of Plane 1: ccw.
After reaching the wanted Balancing Speed (indication in this example: Actual RPM: 1200 r/min) continue by pressing or clicking the [Next] key.



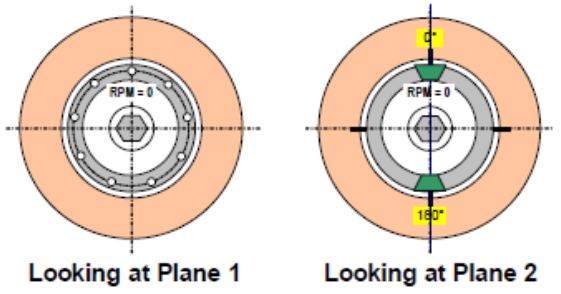
Looking at Plane 1 Looking at Plane 2



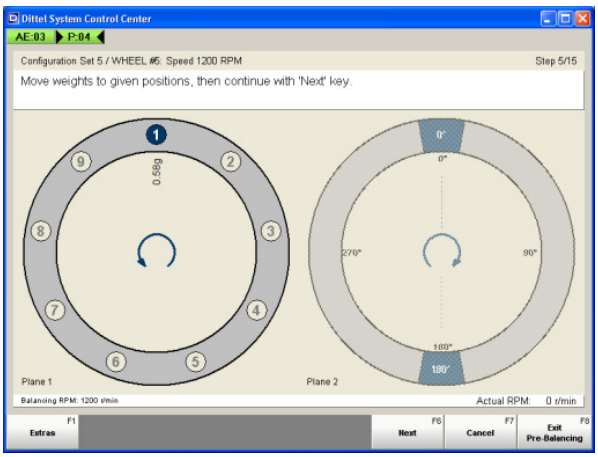
The P6002 UP line module starts its first measurement to determine the initial unbalance.
It is displayed the actual unbalance in units of µm/s and an internal measuring angle.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action the angular position and value of the initial unbalance, together with the Balancing Speed of the first test run are stored (= Display Balancing RPM: 1200 r/min).



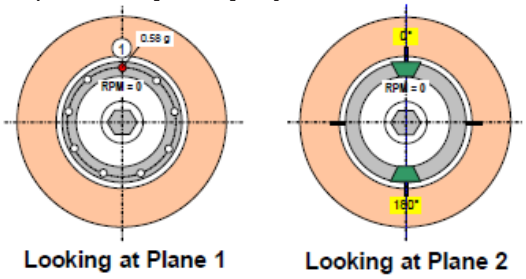
The screen already shows the new correction masses position of plane 1..
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



Looking at Plane 1 Looking at Plane 2

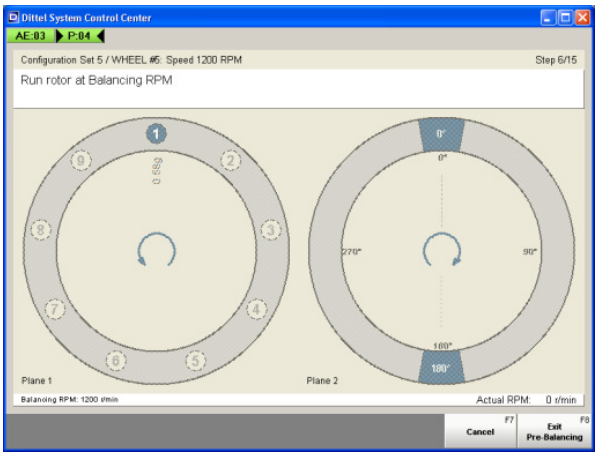


Plane 1:
To create a test unbalance in plane 1 add a correction mass (e.g. screw) of indicated weight (e.g. 0.58 g) to position 1 - as shown on the display.
To continue press the [Next] key.

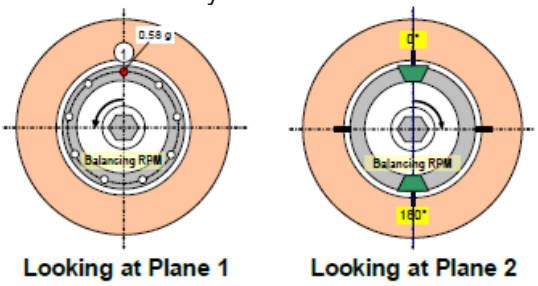


Looking at Plane 1 Looking at Plane 2

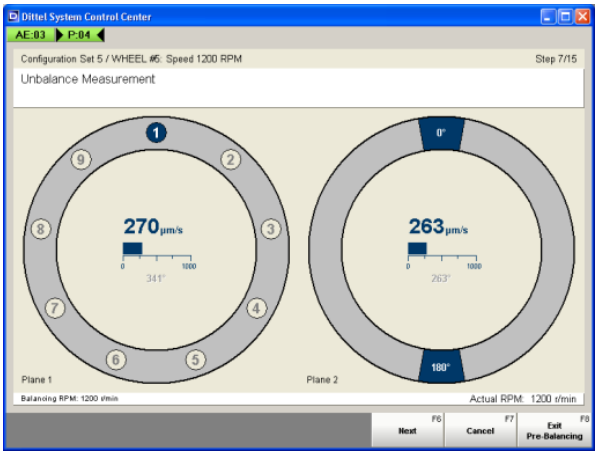
N.B.
The [Adjust positions] key is used to set an individual test unbalance of Plane 1 and should be used by experienced personnel only (see section “11.2 The Adjust positions Key” on page 135)!



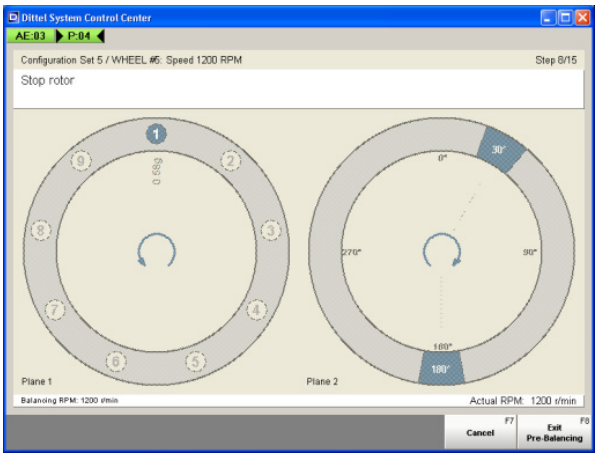
Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 1200 r/min) the Module starts automatically the next measurement run.



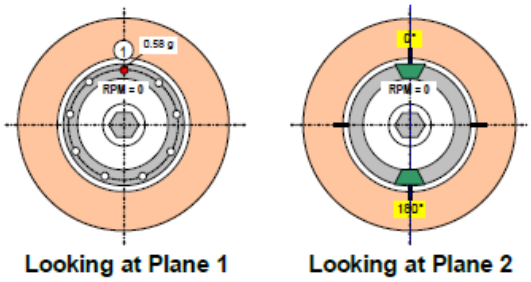
Looking at Plane 1 **Looking at Plane 2**



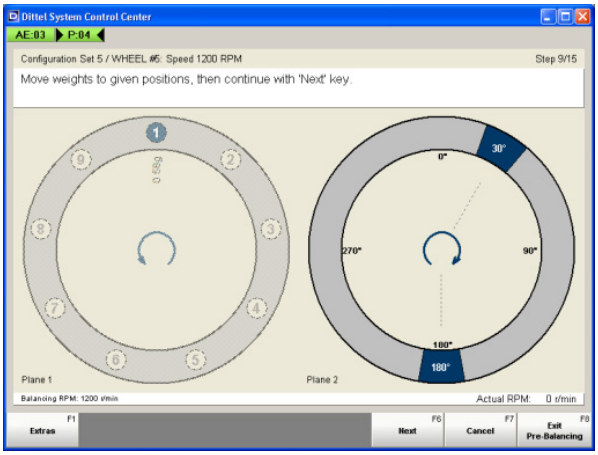
In the second run, the Module repeats its successive Setup unbalance measurements with a test unbalance of e.g. 0.58 g in plane 1.
During the unbalance measurements, the actual unbalance is displayed in units of µm/sec and an internal measuring angle for each plane is shown.
Watch the screen! When the key [Next] is available press the [Next] key.
With this action, the angular position and value of the “new” unbalance are stored for each plane.



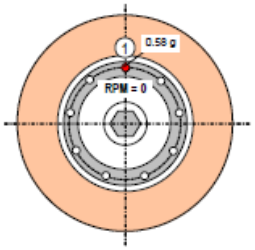
The screen shows already the new position of the balancing weights of plane 2.
Stop rotor.
After rotor standstill (Indication »Actual RPM: 0 r/min«) the Module changes automatically to the next balancing step.



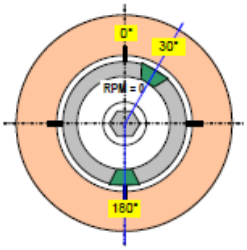
Looking at Plane 1 **Looking at Plane 2**



Plane 2:
To create a test unbalance in plane 2 position the 0° balancing weight to precisely 30° - as shown on the display - and clamp.
To continue press the [Next] key.

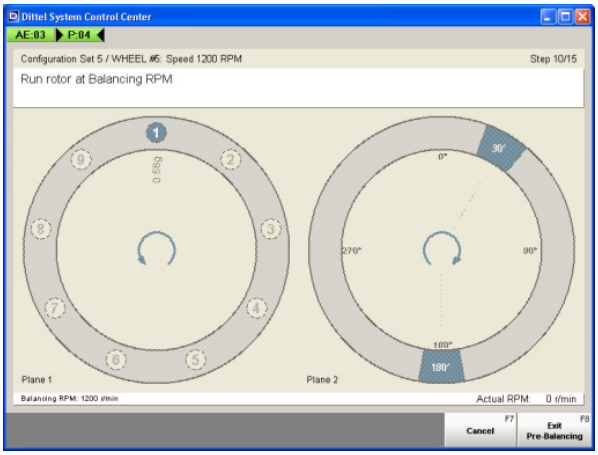


Looking at Plane 1

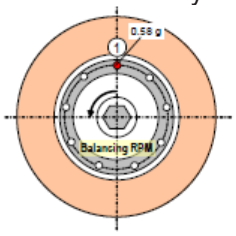


Looking at Plane 2

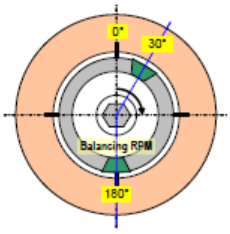
N.B.
The [Adjust positions] key is used to set an individual test unbalance of plane 2 and should be used by experienced personnel only (see section“14.2 The Adjust positions Key” on page 185).



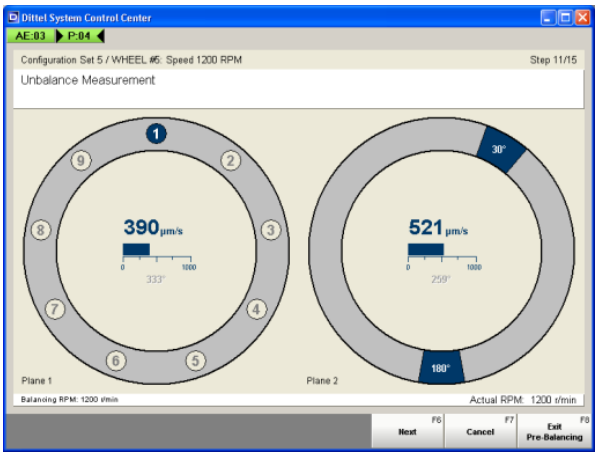
Run rotor at Balancing RPM.
After reaching the required Balancing Speed within the RPM Tolerance (indication in this example: Actual RPM: 1200 r/min) the Module starts automatically the next measurement run.



Looking at Plane 1

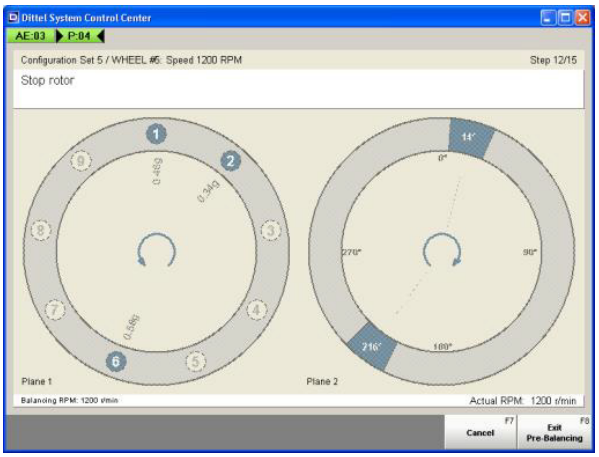


Looking at Plane 2

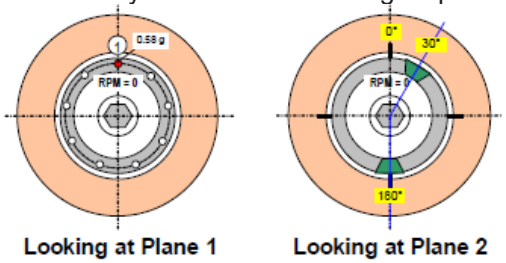


In the third run, the Module repeats its Setup unbalance measurements with a test unbalance in plane 1 and plane 2.
During the unbalance measurements the actual unbalance for each plane is displayed in units of µm/sec and an internal measuring angle is shown.
Watch the screen!
When the key [Next] is available press the [Next] key.
With this action the angular position and value of the “new” unbalance are stored for each plane.

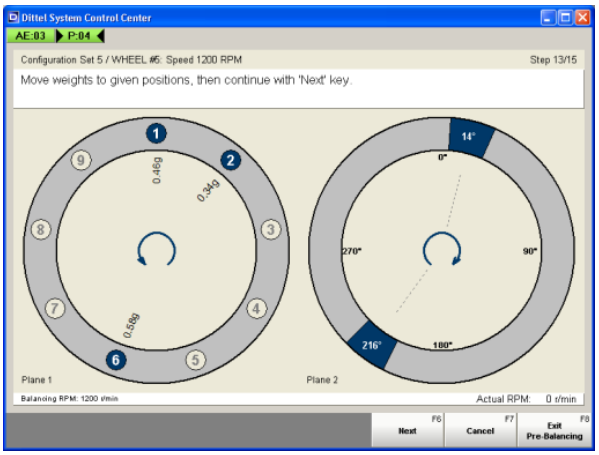
14.1.2 *Pre-Balancing*



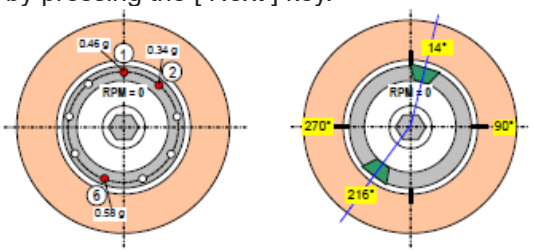
The screen shows already the new positions of the correction masses of plane 1 and the new balancing weight positions of plane 2.
Stop rotor.
After rotor standstill (Indication Actual RPM: 0 r/min) the Module changes automatically to the next balancing step.



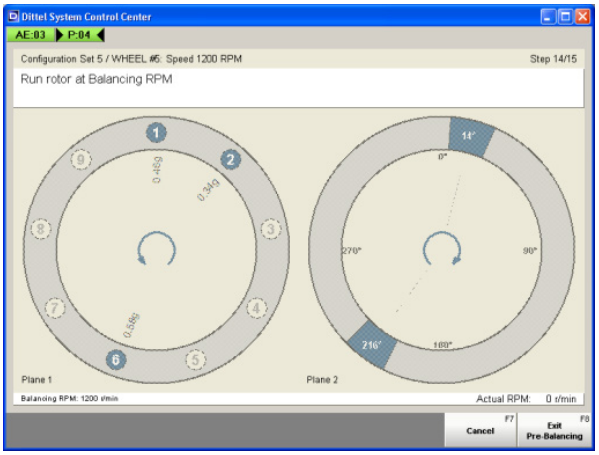
Looking at Plane 1 Looking at Plane 2



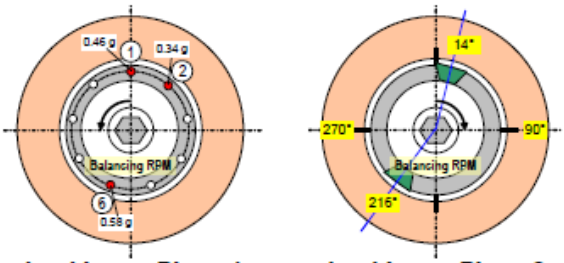
Plane 1:
Remove the test unbalance (e.g. screw) from position 1.
Example: add a correction mass of 0.46 g to position 1 and a second correction mass of 0.34 g to position 2 and a third correction mass of 0.58 to position 6..
Plane 2:
Position the balancing weights as shown in the location detail.
Example: move one balancing weight to the 14° position, move the other weight to the 216° position, and clamp both weights.
Continue by pressing the [Next] key.



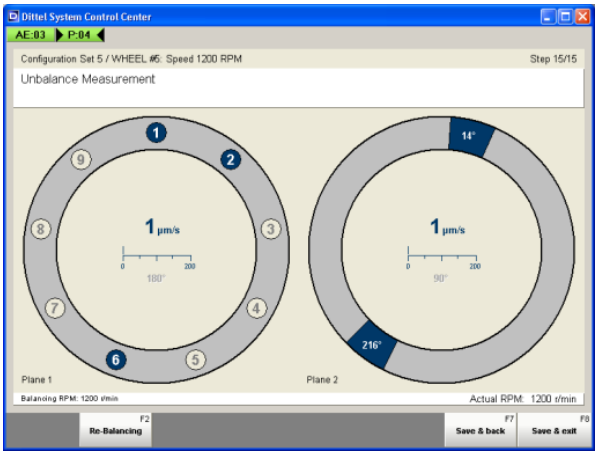
Looking at Plane 1 Looking at Plane 2



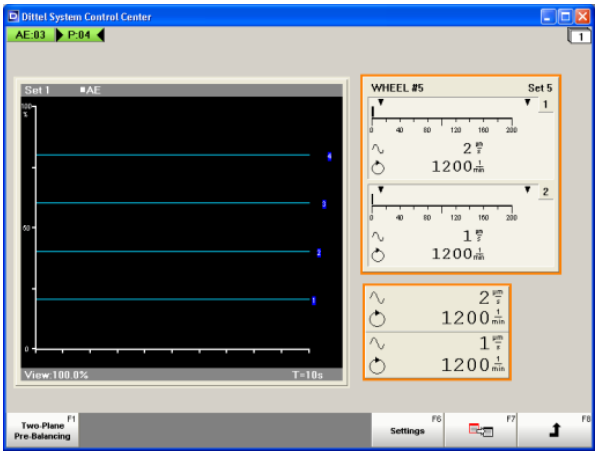
Run rotor at Balancing RPM
After reaching the required Balancing Speed within the RPM Tolerance the Module starts automatically its last measurement run.



Looking at Plane 1 Looking at Plane 2



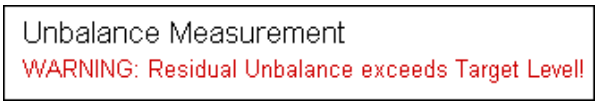
During the last measurement run (check run) the software of the Module checks the position of the correction masses and shows the residual unbalance in units of µm/s (here for Plane 1: 1 µm/s, for Plane 2: 1 µm/s).
If the result is OK, i.e. the displayed residual unbalance of each plane is below the **Target Level** set in the tab **Settings**, press the [Save & exit] key.



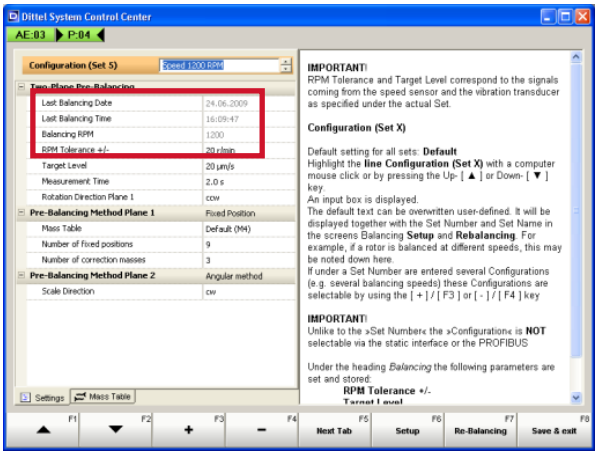
You return to the Monitoring screen.

THUS, THE FIRST TIME SETUP AND PREBALANCING PROCESS IS FINISHED SUCCESSFULLY!

If the first time Setup and Pre-Balancing Process is NOT finished successfully:



If the result does not correspond with the predefined parameter, i.e. the residual unbalance is higher than the **Target Level** set in the tab **Settings**, a Warning appears at the screen.
Continue by pressing the [Save & back] or [Re-Balancing] key and try to improve the result by using this function.



After pressing or clicking the [Save & back] key you return to the tab **Settings**.
Additionally it is indicated:

- the date of the last Pre-Balancing
- the time of the last Pre-Balancing, and
- the Pre-Balancing RPM.

N.B.
A restart of the Setup procedure of the same rotor (optionally under a new Configuration) is required
- when the operational speed has changed,
- when the Rotation Direction has changed..

14.2 *The Adjust positions Key*

For Angular Method refer to paragraph “12.2 The Adjust positions Key” on page 153.

For Fixed Position Method refer to paragraph“13.2 The Adjust positions Key” on page 168.

14.3 *Re-Balancing using Angular Method and Fixed Position Method*

For Angular Method refer to paragraph “12.3 Re-Balancing using Angular Method” on page 155.

For Fixed Position Method refer to paragraph “13.3 Re-Balancing using Fixed Position Method” on page 169.

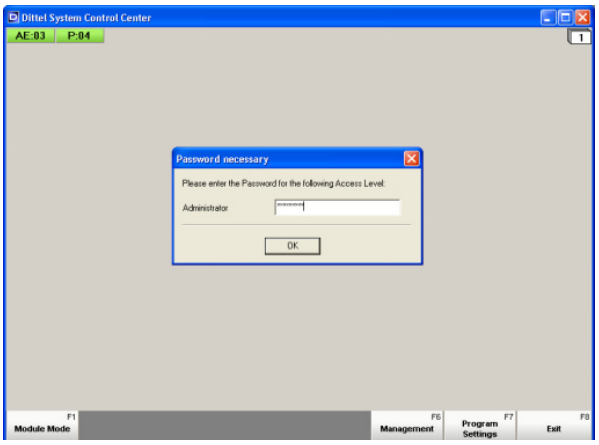
14.4 *Special Features*

14.4.1 *Placing the Access Rights*

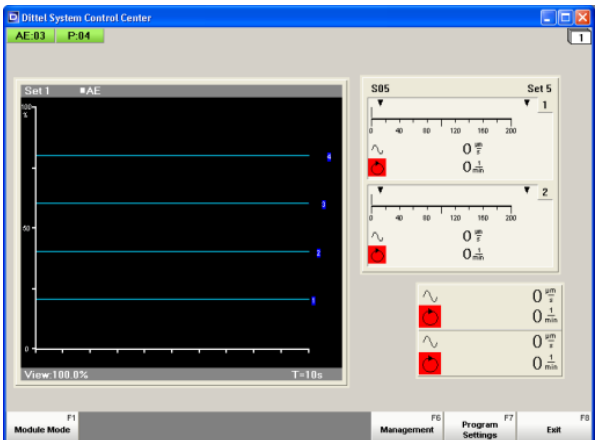
N.B.
Ex-factory, the DSCC Software is shipped with Access Level **Administrator** and without password, except for Access Level **Service**.
Passwords and access rights are valid for all DS6000 UP Modules connected to the Computer or Automation System.

After completion of all settings and the first successful operation attempts, the DS6000 UP Module(s) can be locked or unlocked for the respective user group.

14.4.1.1 *Placing a password the very first time*



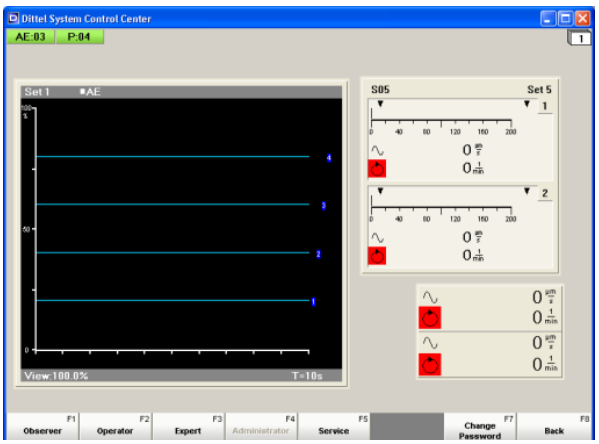
If you have activated “Ask for Password after Program Start” in the options menu **Access Rights** (see paragraph “8.2.4 General Settings: Access Rights” on page 65), the opposite screen opens on every program start.
Since you have not entered a password, click on the key [OK] or press the key [Enter] on your keyboard or [Input] on the SINUMERIK®.
The next screen opens.



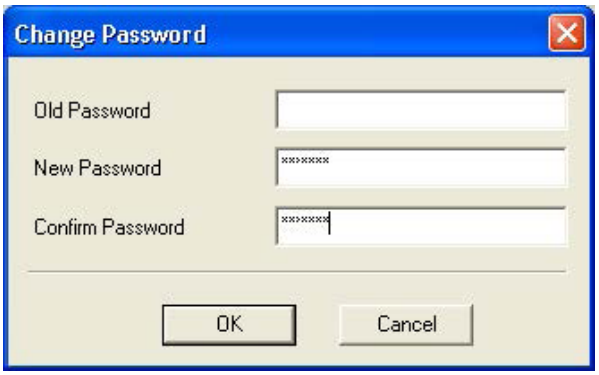
If you have **NOT** activated “Ask for Password after Program Start” in the options menu **Access Rights** (see paragraph “8.2.4 General Settings: Access Rights” on page 65) the opposite screen opens on every program start.
It opens always with Display Layer 1 (if not changed) and its view(s) which were created or active before last leaving the DSCC Program.
The Module View is just an example.

To enter a password press or click on key [Management] / [F6]

and then the key [Access Rights] / [F1]



The key assignments change to enter or to change a password, or to change the Access Level. The current Access Level is high-lighted
To enter a password the **very first time** – in this example for **Administrator** – click or press the [Change Password] key.



The DSCC Software is shipped ex works without Password.
Therefore, with the keyboard or keypad enter your password only in the “New Password” screen.
Enter again your Password in the “Confirm Password” screen and then click on the [OK] key or press the [Enter] / [Input] key.

Execute the entered Password by clicking on the [OK] key or pressing the [Enter] / [Input] key.

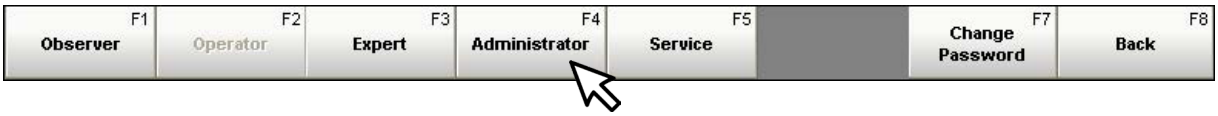
You can allocate a separate Password for every access level. Click or push on the desired access level and then again on the key [Change Password]. Repeat the procedure for the new password as described above.

14.4.1.2 *Change actual Access Level*

When the Access Level shall be changed from a **high** access level to a **lower** access level, e.g. from “Administrator” to “Operator” it is sufficed to click or to press on the softkey in question.

Confirm the new Access Level by clicking on the [OK] key or pressing the [Enter] / [Input] key.

When the Access Level shall be changed from a **low access** level **to a higher access level**, e.g. from “Operator” to “Administrator” click or press on the softkey in question.



With the keyboard or keypad, enter the Administrator Password. Confirm by clicking on the [OK] key or pressing the [Enter] / [Input] key.

Execute by clicking on the [OK] key or pressing the [Enter] / [Input] key.

From now on you have all access rights of an Administrator.

14.4.1.3 *Change your Password*

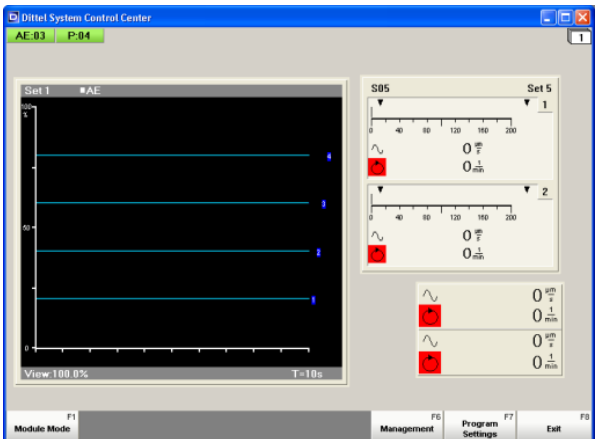
If you want to change your password of the current Access Level (highlighted, here Administrator) click or press on the softkey [Change Password]:

With the keyboard or keypad, enter your “Old Password” and then your “New Password” into the respective screen.
Repeat your “New Password” in the third line.
Confirm by clicking on the key [OK] or pressing the [Enter] / [Input] key.

Execute by clicking on the key [OK] or pressing the [Enter] / [Input] key.
From now on, the new password is valid.

14.4.2 *User-defined Function Keys*

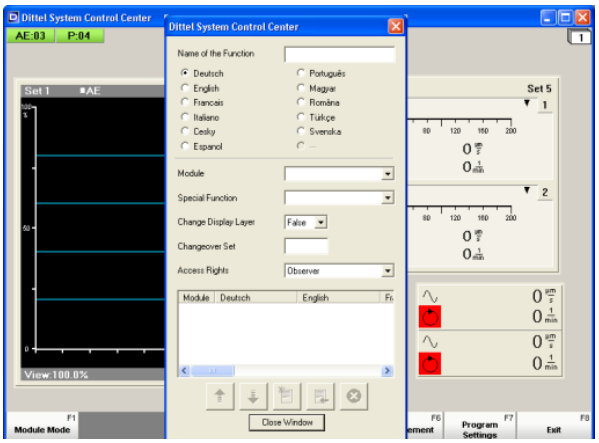
The DSCC Program gives you the opportunity to create user-defined Function Keys. This allows a fast access to the respective Module, the Display Layer or the Set number.



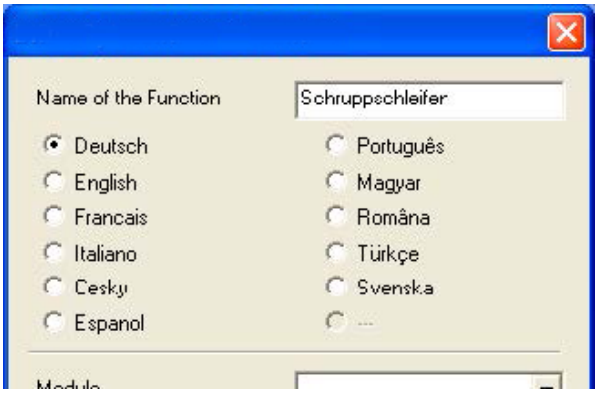
When restarting, the program opens always with Display Layer 1 (if not changed) and its view(s) which were created or active before last leaving the DSCC Program.
This Module View is just an example.

To create user-defined Function Keys press or click on key [Management] / [F6]

and then the key [Setup Functions] / [F2].



To create a user-defined Function Key a separate setup screen opens.

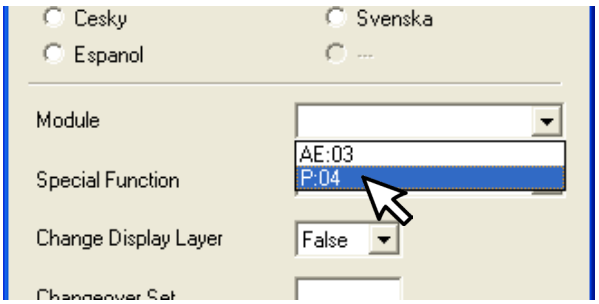


Name of the Function

With the keyboard, enter the desired name of the function, e.g. Schruppschleifen (rough grinding). This name of the function appears later on the user-defined Function Key, too.
If you enter only one name (no matter in which available language), then the user-defined Function Key shows the same name in every language.

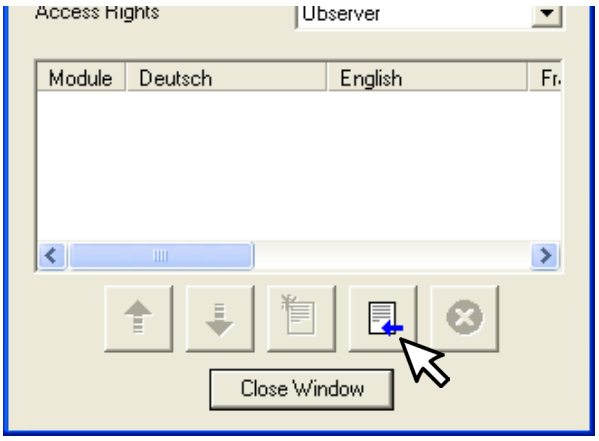
Language

You can assign a separate name of the Function in every available language by selecting a language.
If you enter the name in every language, then the user-defined Function Key shows the respective name of the Function when switching over the language.
Not filled names are displayed with the English name.

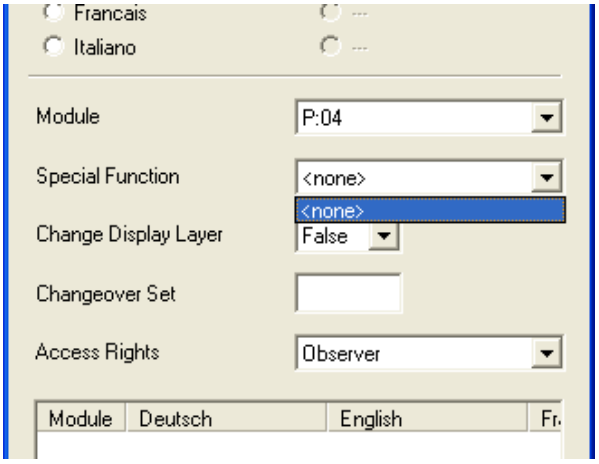


Module

In the context menu, select the wanted module, here e.g. the Pre-Balancing P6002 UP line module with the address 03.

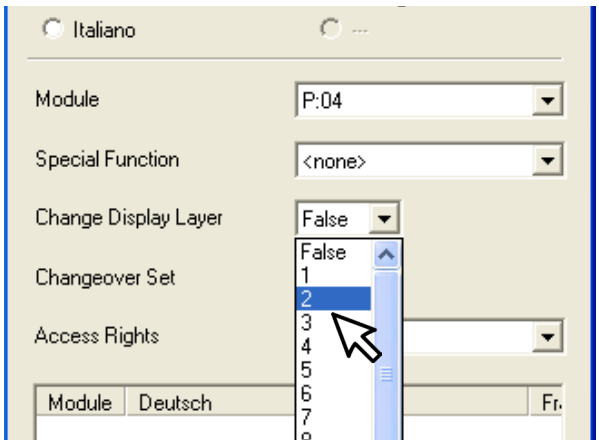


From now on the **Save** key is active. By clicking on the **Save** key the entered Function name is displayed in the screen below. Then any further setup of the user-defined Function Key is no longer possible.



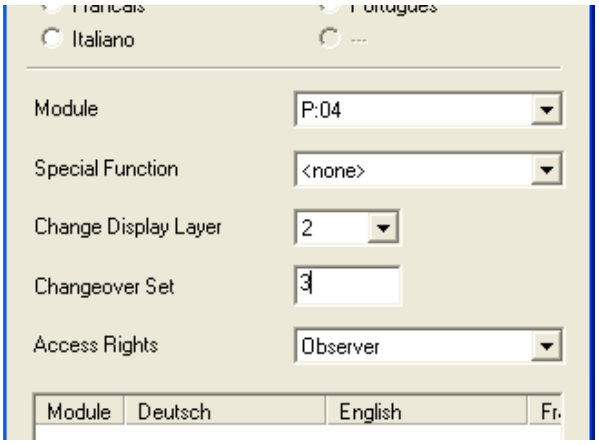
Special Function

Up to now, no Special Functions are available for the P6002 UP line module.
When the setting <none> is selected the Module starts with its activated Module View.



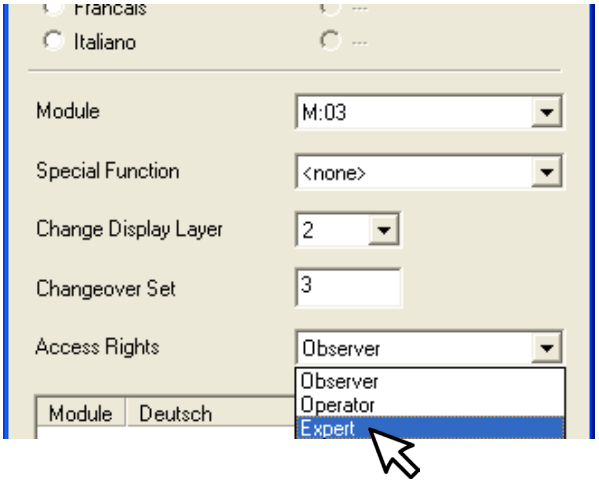
Change Display Layer

This setting is only available when **Special Function** is set to **<none>**!
In this context menu, select the Display Layer on which the Module – selected above – should start after pressing the user-defined Function Key. For this purpose, the Module must be activated (visible) on that Display Layer.
When the setting False is selected the Display Layer does not change.



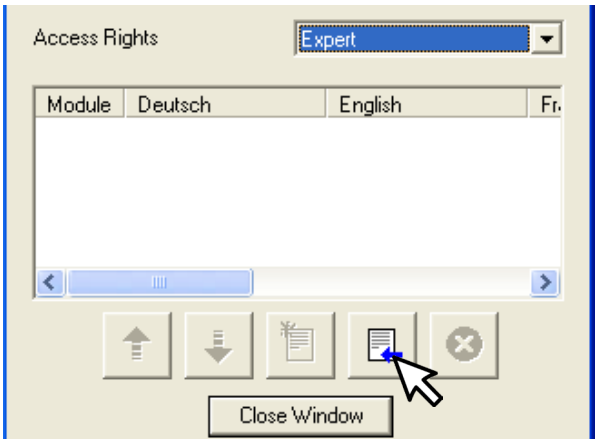
Changeover Set

With the keyboard, enter the Set Number in which the Module should start after pressing the user-defined Function Key.
At an empty screen, the actual Set Number does not change.

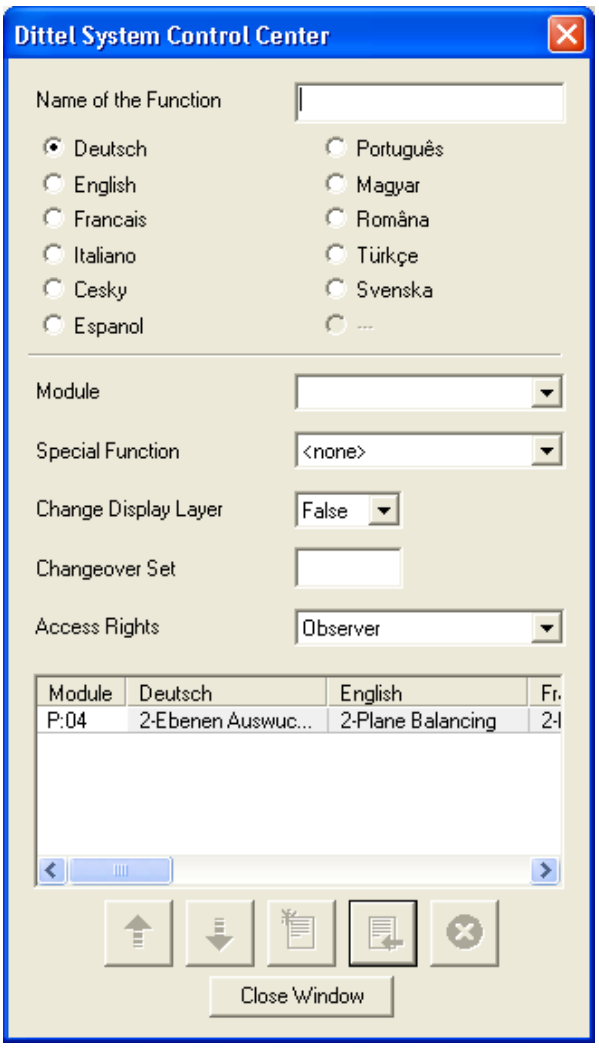


Access Rights

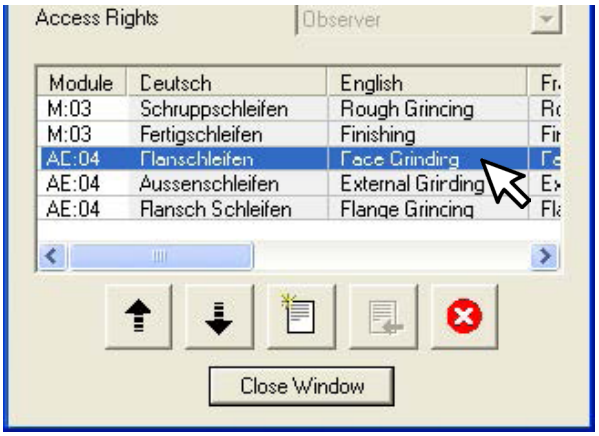
In this context menu, select the Access Right under which the user-defined Function Key may be operated.
Example:
When you choose **Observer**, then the Function Key can be operated in all Access Levels assigned to the Module(s).
When you choose **Administrator**, then the Function Key can be operated only when the Access Level **Administrator** is assigned to the Module(s) (see paragraph “14.4.1 Placing the Access Rights” on page 186).



With this setting, the setup of the user-defined Function Key is complete.
To save the settings click on the ‘**Save**’ key.



The setup is stored and the screens, to create another user-defined Function Key, are ready for a new input.



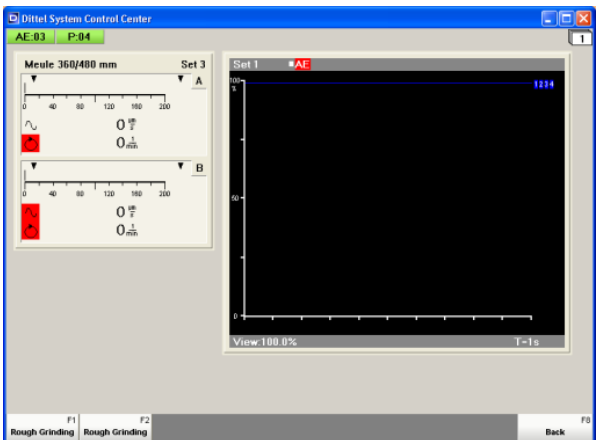
Create for every Module user-defined keys as many as you like. See example.

To organise the list the following keys are used:

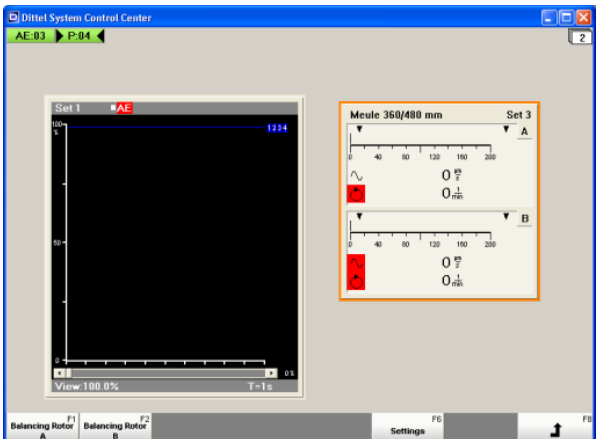
With the **Up** or **Down** arrows keys the lines and therefore the Function Keys are changed in their order.
Highlight the line in question and move it with the Up- or Down key.

With the **New** key, all input fields are cleared and ready to create a new user-defined Function Key.

With the **Delete** key, a user-defined Function Key can be deleted.
Highlight the line in question and then click on this key.



When you have selected **Functions** as **Starts with Menu** (**Program Settings - General Settings - Menu Bar - Starts with Menu**) the program starts with the opposite screen showing the user-defined Function Keys.



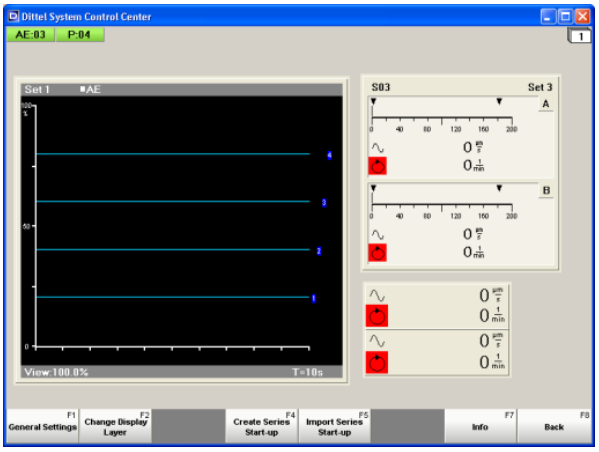
So if you press, for example, Function Key **Rough Grinding** the screen changes into Display Layer 2, and the Pre-Balancing Module **P:04** gets active with Set number 3 (refer to the settings above).

14.4.3 *Series Start-up*

14.4.3.1 *Creating a Series Start-up File*

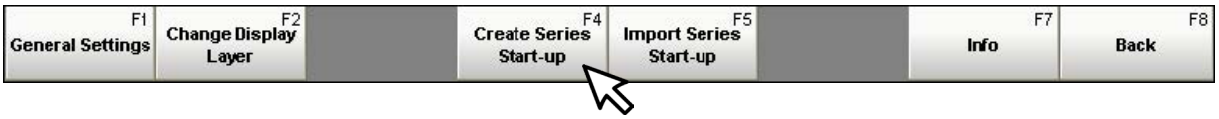
The DSCC Program gives you the opportunity to save all **stored** settings of all modules connected to the Automation System or Computer in a Series Start-up File, either as a backup file or to transfer it into other systems. For this purpose, the Automation System or Computer must be equipped with a removable data carrier, e.g. floppy disk drive or an USB Memory Stick, or you are using a Notebook computer.

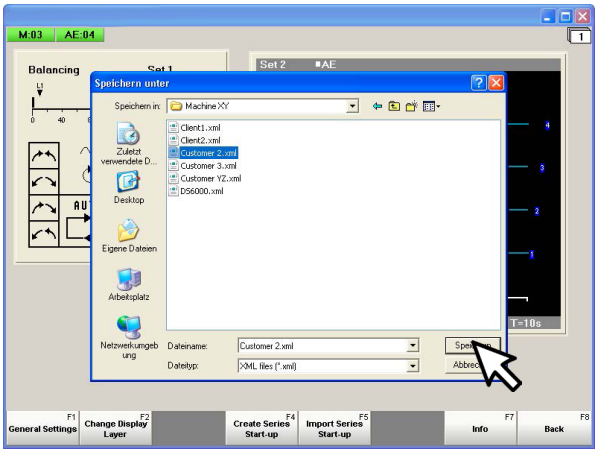
To create a Series Start-up File press or click on the key [Program Settings] or press the function key [F7].



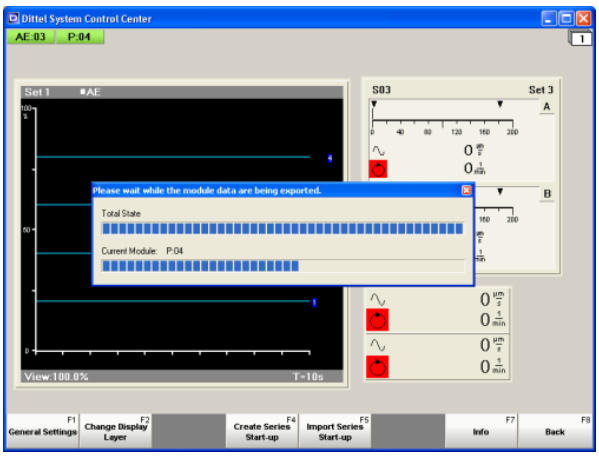
Example:
These settings like language, passwords, module views, display layers etc. should be transferred to a second or further machine(s).

Continue by pressing or clicking on key [Create Series Start-up] or press the function key [F4].





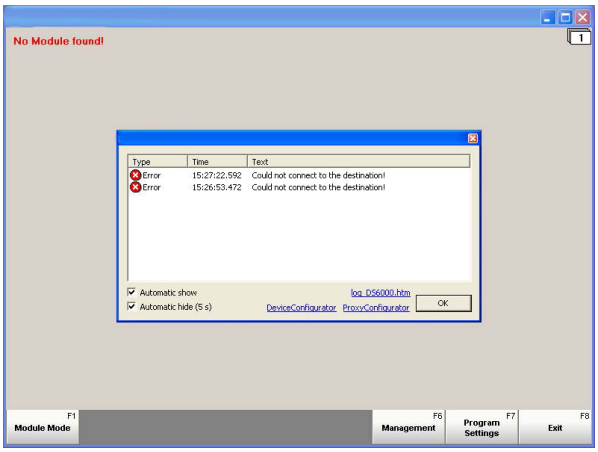
A Save as screen opens.
Open the directory **Save in** and click on **Network Environment** (when using a notebook), the disk drive or the folder in which the Series Start-up file shall be saved. Create a new folder if necessary.
Enter a suitable file name.
Click on **Save**.



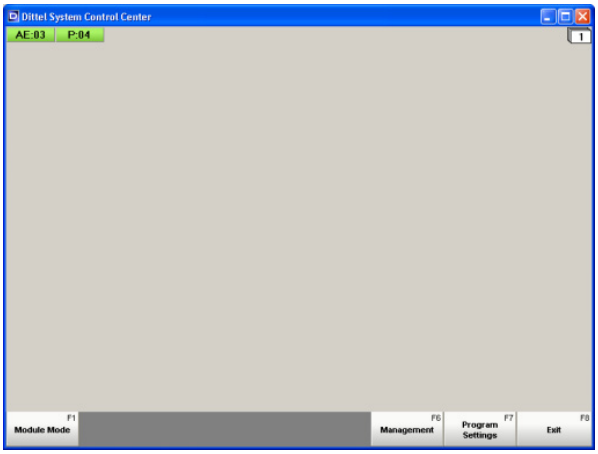
A *.xml file is created automatically. One by one the data of the Computer settings, the display layers and **stored** module settings are read out and stored.
Both the complete progress and the progress of the just current module are readable in an additional screen.
After a successful completion the additional screen closes.

14.4.3.2 *Importing the Series Start-up File*

Prerequisite:
• On your NEW computer or Automation System, the DSCC Software is installed and operational.
• All Modules are connected to the Computer or Automation System and operational (LED # 4 lights on each Module).
• The addresses of the respective Modules must be the same as in the case of the first machine (e.g. Pre-Balancing Module = P:04, Balancing Module = AE:03).
Start the DSCC program on your computer or Automation System.
If necessary, put the data carrier with the Series Start-up file in the disk drive.



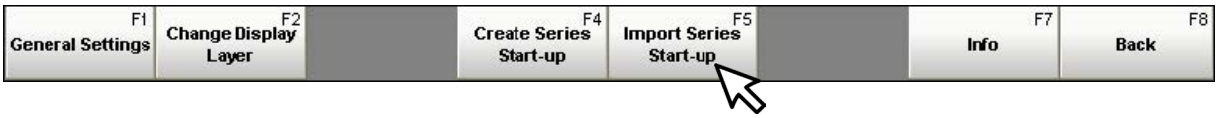
When starting the DSCC Program the very first time all messages will be in English.
If no Module is found by the Automation System or computer, for example due to wrong interface setting, the opposite screen will appear.
Confirm this message by clicking on the key [OK] or pressing the [Enter] key.

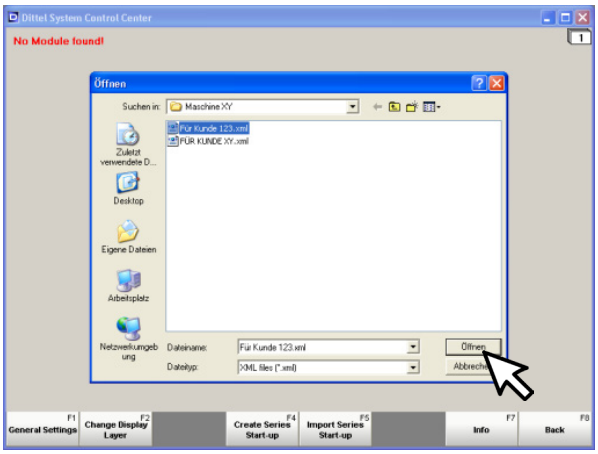


If the modules are recognized by the Automation System or Computer the opposite screen appears.

To get access to the Series Start-up File click or press the key [Program Settings] or the function key [F7].

Continue with pressing or clicking on key [Import Series Start-up] or the function key [F5].

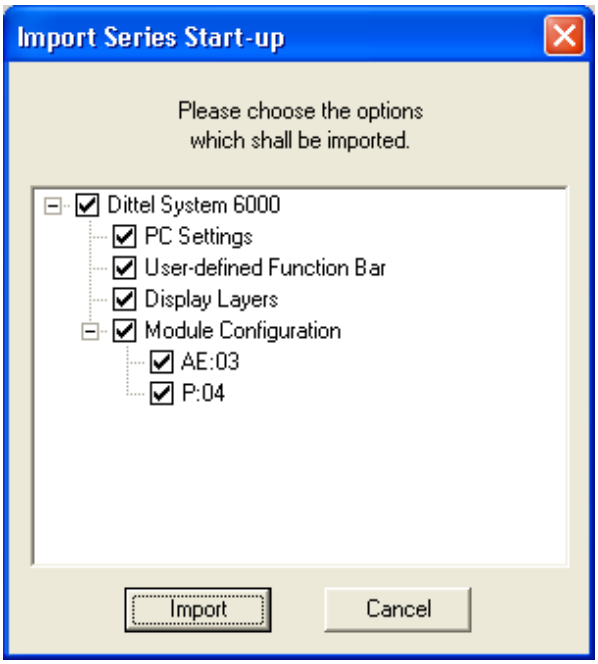




An additional screen opens.
Open the directory **Look in** and click on **Network Environment** (when using a notebook), the disk drive or the folder in which the Series Start-up File (*.xml) is contained.
Highlight the *.xml-file and then click on **Open**.

A new screen opens.

N.B.
If the Automation System or computer did NOT recognize the Modules, only the options **PC Settings**, **User-defined Function Bar** and **Display Layers** are available!

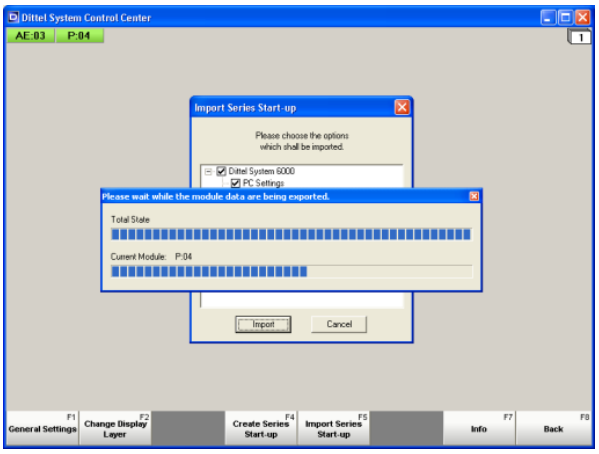


Click into the respective check box to activate or deactivate the desired options:

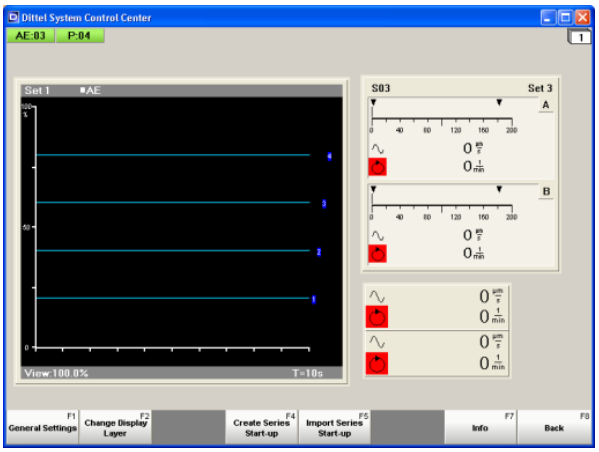
System 6000 UP	all shown options are activated, all stored settings are imported.
PC Settings	all PC/Automation System settings like language, interface and its setting, addresses etc are imported.
User-defined Function Bar	all user-defined Function Bars are imported.
Display Layers	all Display Layers are imported.
Module Configuration	the Module Configuration of all or only the selected Modules are imported.

N.B.
If the modules were **NOT** found by the Automation System or computer import only the **PC Settings** (and the **User-defined Function Bar** and **Display Layers**, if selected) by clicking on the key [Import] or pressing the [Enter] key. The PC settings are imported (see figure below). A screen with green module addresses should appear (see figure with green module addresses above). If not refer to Appendix B, Troubleshooting Guide.

Repeat the import of the Series Start-up file as described above. All options should now be available. Select the Module Configuration and click on the key [Import] or press the [Enter] key.



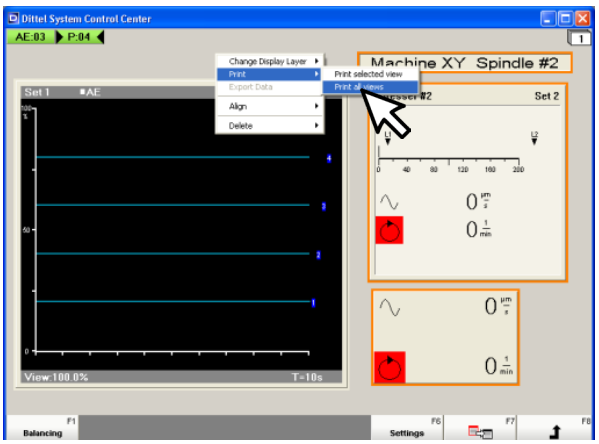
One by one the selected options are imported and saved.
Both the complete progress and the progress of the just current module are readable in an additional screen.
After a successful completion the additional screen closes.



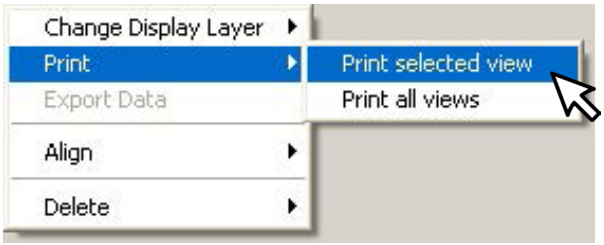
This completes the import of the Series Start-up data.
All views including all stored settings of the DS6000 UP Modules correspond exactly to the first installation.

14.4.4 *Hardcopy of the Module View or Display Layer*

For documentation or evaluation the Module View or Display Layer can be printed. A suitable printer must be connected and installed on your Automation System or Computer.

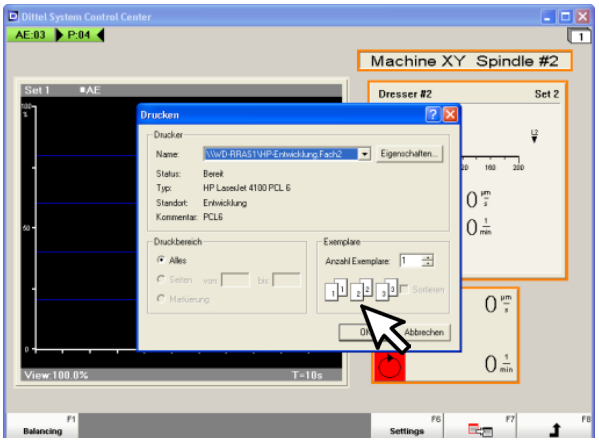


To print the Display Layer or a part of it move the mouse cursor outside a Module View and press the RIGHT mouse button. Select ‚**Print**' and a context menu opens:



Print selected view For that the Module View must be highlighted, see paragraph “9.2.3 Module View – highlighting, positioning and scaling” on page 77. Only a highlighted Module View is printed.

Print all views The print complies with the Display Layer view except the softkey bar.



The dialog box **Print** opens.
Print as usual.

Appendix A – MHIS SOFTWARE - MARPOSS HUMAN INTERFACE SW

A.1 Integration of MARPOSS MHIS Software

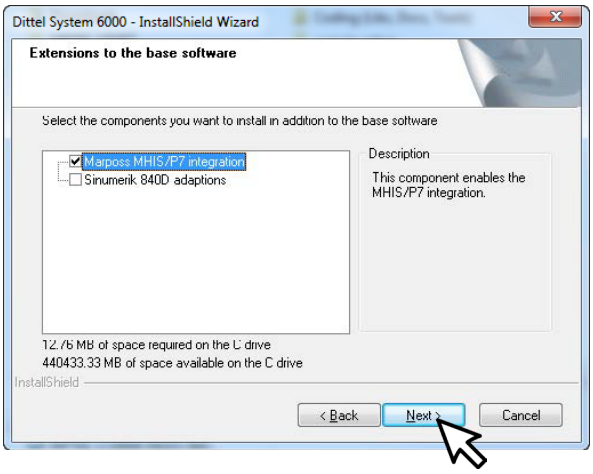
The purpose of the MHIS <-> DSCC integration is to have one single view for both software. This is realised by integrating the ActiveX control of the other application.
Starting from version 3.60 of the DSCC software, it is possible to integrate the MARPOSS software MHIS for the P7 in the DSCC software.

A.1.1 Requirement

The MARPOSS software MHIS (starting from 5.2G or 5.3C) must be installed on your Windows® computer or Automation System SINUMERIK©. However, the MARPOSS software can also be installed after the DSCC software.

A.1.2 DSCC Software Installation

During the DSCC installation process, there is an option to enable or disable the MHIS/P7 integration.

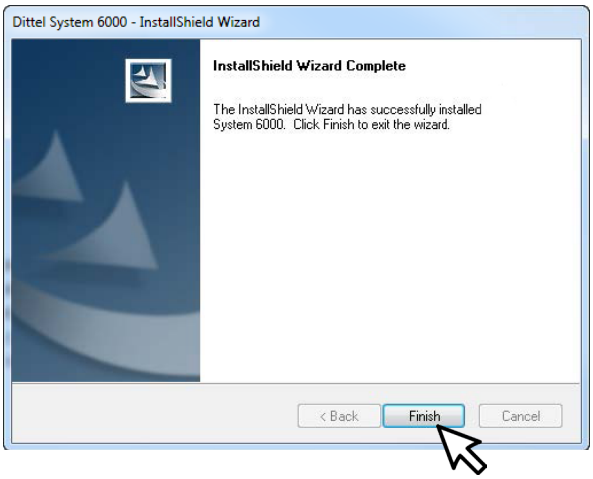


Additionally to the base software the following extensions may be installed:

- Marposs MHIS/P7 integration With this option the Marposs software MHIS is integrated and enabled.
- Sinumerik 840D adaptions

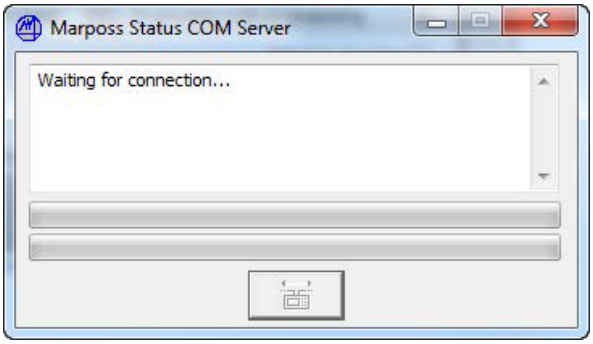
N.B.
Windows®-Installation:
The option **Sinumerik 840D adaptions** should **NOT** be selected when a standard Windows® installation is running.
SINUMERIK 840D Installation:
Make sure that the option **Sinumerik 840D adaptions** is selected!

Click on [Next >] to confirm the extension(s) and continue installation.

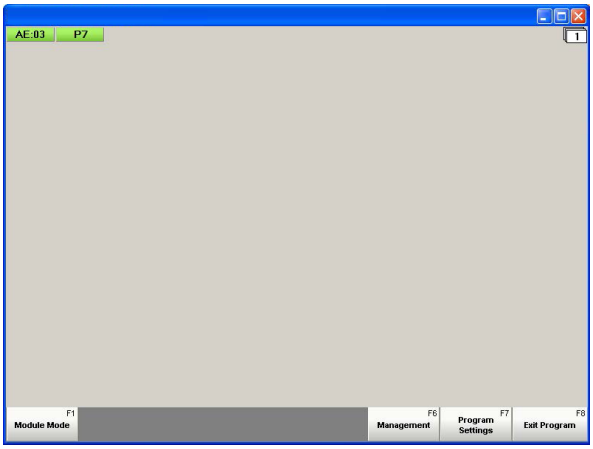


After successful installation the opposite screen is displayed:
Click on [Finish] to complete the installation of the DSCC Software together with Marposs MHIS/P7 integration.

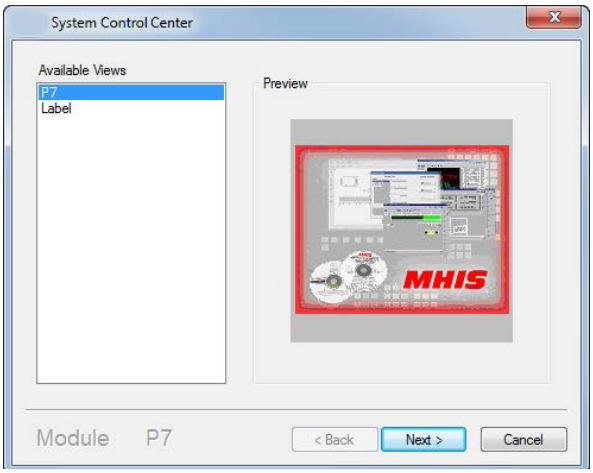
A.1.3 *Starting the Program*

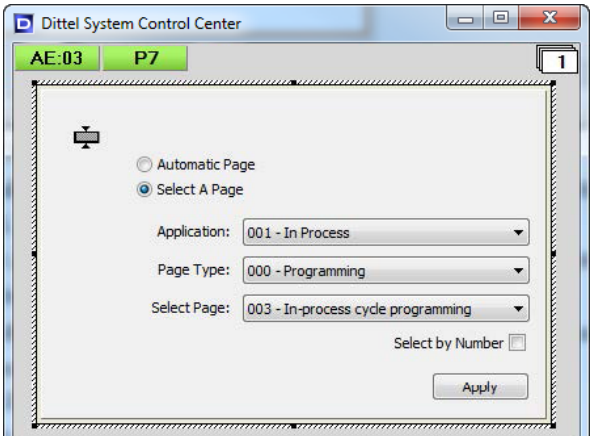


When the integration is enabled, on DSCC startup the “Marposs Status COM Server” dialog is shown and a green “P7” key is present on top of DSCC regardless of the connection between P7 and MHIS.



Double-clicking the P7 key opens a dialog where P7 views are listed that can be added to the DSCC user interface. Now a MHIS/P7 page can be selected.
It is possible to add multiple P7 widgets.





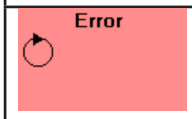
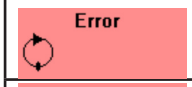
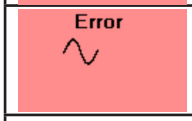
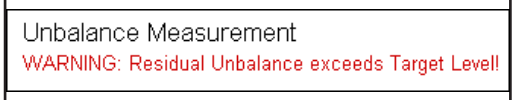
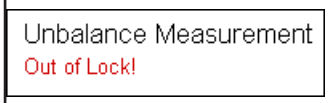
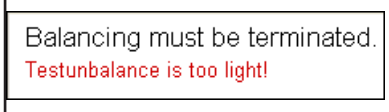
The opposite screenshot is the result of choosing the P7 view.
To continue refer to documentation regarding MARPOSS MHIS software and MARPOSS P7 hardware.

Appendix B – TROUBLESHOOTING GUIDE

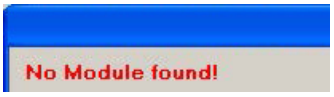
B.1 Hardware Troubleshooting

A System Control failure however is always indicated
• by a RED lighting System Control LED # 7
• and by a LOW signal at pin 2 of connector # 2, indicates a common error of Acceleration Sensor and RPM Input..

N.B.
When an **Error** message of the Speed Sensor or the Acceleration Sensor appears, the P6002 UP line module aborts itself the pre-balancing process..
The following errors are only displayed on the screen when the Module View **Monitoring Standard** or **Monitoring Reduced** is set; they may appear as single failure or in any combination.

Phenomenon	Malfunction	Solution
	Faulty speed sensor (Proximity Switch): Monitored rotor stands still (RPM = 0)	Check speed sensor, sensing distance, plugs, and cable. Error message disappears when spindle runs (> 450 rpm).
	Blinking vertical mark! Speed less than 240 rpm, Speed more than 30,000 rpm:	 Increase speed. Decrease speed
	No Acceleration Sensor signal:	Check Acceleration Sensor, plugs and cable.
	After pre-balancing the residual unbalance is higher than the permissible unbalance	Increase the value of the Target Level. See Tab **Settings** → Target Level or → **Re-Balancing**!
	This Warning appears at large changes in speed within short time	This warning disappears at constant speed of the rotor.
	Message when the actual speed of the rotor is out of tolerance of the balancing speed	Readjust the speed of the rotor.
	Message when trial masses are too light or when weights are in bad positions	• If possible, place two heavier balancing weights to the 30° and 180° position and clamp both weights, or • with the [Adjust positions] key adjust a spread angle and place the balancing weights accordingly (test unbalance increased), or • with the [Adjust positions] key adjust a heavier correction mass and replace the screw at position 1 accordingly.

Phenomenon	Malfunction	Solution
Balancing must be terminated. Changeover Set	During pre-balancing a value was altered or a set was changed	Repeat Setup and Pre-Balancing using the new values or the new set.



No Module found!
Error message after starting the DSCC Program.
SOLUTION:
Check power supply of the module(s) (fuse).
Check connection to the Automation System or Computer (# 5).
Check settings of the COM-Port used.
After correction, the DSCC Program should recognize the connected module(s) automatically.

No Module found!
Please check the serial plug connection!
Error message after starting the DSCCProgram.
SOLUTION:
Check the power supply of the module(s) (fuse).
Check the serial interface cable from connector # 5 of the module to the computer or Automation System. Does the interface cable correspond to our specifications (see paragraph “Connector # 5”).

No Module found!
Please check the Baud Rate setting!
Error message short time after starting the DSCC Program.
SOLUTION:
The RS-232 Baud Rate of the module and the Automation System or Computer, which are connected together via RS-232, must be equal..

Respective Module does not answer:
Error message **AFTER** first recognition of the Module by the program.
SOLUTION:
Check power supply of the respective Module (fuse, lights LED # 4?).
Check connection to other Modules (Connector # 9 and # 10).
Check connection to Automation System or Computer (connector # 5).
After successful troubleshooting, the respective module address gets green again!
For Ethernet Interface, refer to Supplementary Document “Ethernet Interface”.

The P6002 UP line module is not operable via keyboard of the Automation System or PC; no module related softkey is available.

SOLUTION:
Clear static HIGH Signal on connector # 2, pin 14, or via PROFIBUS connector # 13.
Check actual **Access Level**.

B.2 *Software Troubleshooting*

B.2.1 *General*

Message «New hardware found (serial mouse)»

When a DS6000 UP hardware is connected to the computer or automation system and you start your Windows® 7 / 10 the first time, the message «New hardware found (serial mouse)» appears.
CAUSE
Windows® recognizes the new hardware incorrect as a serial mouse.
SOLUTION
Open the file c:\boot.ini and add at the end of the start command the following option: /NoSerialMouse:COMx (x = COM-Port used).
Example for WIN XP
multi(0)disk(0)rdisk(0)partition(2)\WINDOWS=”Windows XP ... “ /fastdetect
Remove the option /fastdetect at the end of the line.
Or verify that the DS6000 hardware is switched on after system start.

Message «Could not connect to the destination»

After a program start the message «Could not connect to the destination» appears.
CAUSE
Another device driver (e.g. mouse driver) or another application uses the selected serial interface.
SOLUTION
Select a free COM port or make sure that another device driver or another application does not use this COM port.

Windows® 7 / 10 Management of Rights

In principle, the installation of the software must be carried out with administrator rights (see paragraph “7 DSCC Software” on page 47).
Under Windows® 7 / 10 the software needs at least Power User rights. If the software, which runs under Windows® 7 / 10, shall also be used by a “normal” user, then the access rights must be changed as follows:
FILE PERMISSION
Permit “fully access” for the user or for all users (“Everyone”) on the contents directory (default: C:\ProgramData\Dittel [Windows® 7 / 10].The software needs these rights to be able to access the databases and the configuration files.

B.2.2 *SINUMERIK®*

Pressing the softkey does not start the software, or when starting, an error message appears:

CAUSE
Various causes possible!
SOLUTION
Start the SINUMERIK® in the Service Mode (refer to paragraph “7.2.2 SINUMERIK® 840D” on page 51).
Check the installation path and the entries (path information) in file regie.ini (SINUMERIK® HMI Advanced) or systemconfiguration.ini (SINUMERIK® Operate).
If the problem could not be solved in that way proceed as follows:
Create a safety copy of the file f:\user\oemframe.ini.
Open the file f:\user\oemframe.ini.
Delete the following sections:

```
[sccviewer]
hOEMFrameWnd=30456
hOEMFrameTask=04E4
hOEMAppWnd=304BC
hOEMAppTask=0
hOEMAppWndRelatedOEMAppTask=01F8
hOEMAppThread=0001
[scc]
hOEMFrameWnd=604C0
hOEMFrameTask=061C
hOEMAppWnd=304CA
hOEMAppTask=0
hOEMAppWndRelatedOEMAppTask=0698
hOEMAppThread=0001
```

If you still have problems with the operation or function despite the instructions mentioned above, please consult your local MARPOSS service centre for assistance (see paragraph “1.3 Requesting technical assistance and maintenance” on page 8).

Appendix C – CLEANING, MAINTENANCE, ENVIRONMENTAL PROTECTION

C.1 Cleaning

Clean the outside surface - primarily the blue front panel - as soon as spots, grease or dirt are visible. Using a clean, lint-free cloth lightly moistened with a solution of standard household washing-up liquid, remove all foreign matter from the case and front panel. Make sure, that no solution is dripping into the housing or remains in the proximity of plugs or gaps. Wipe dry using a clean, lint-free cloth.

N.B.
Certain chemicals and its vapours can damage the front panel and its lettering. Therefore, avoid the use of aggressive cleaning agents, solvents and other chemicals.

C.2 Maintenance

Since the inside of the P6002 UP line module is largely insensitive against dirt and dust, the necessity for cleaning is only during repair. Isopropyl alcohol (75 Vol. %) is the only recommendable cleaning agent for printed circuit boards and the components. Apply the alcohol sparingly with a stiff, not metallic, short bristly brush. Wash the solved dirt to the edges. For quicker drying or removing dust from inaccessible areas a hand controlled dry air jet may be used. Take care to prevent damage by the air blast.

N.B.
The compressed air must be free of water, oil and other foreign matter and may not have any higher pressure than 15 psi/1 bar.
Use always fresh Isopropyl alcohol and a clean container to clean the printed circuit boards.

Appendix D – ABSTRACT PROFIBUS INTERFACE P6002 UP LINE MODULE

D.1 Data Format

N.B.
Project with “DS6000 UP 2 Byte In, 2 Byte Out” or “DS6000 UP 1 Word In, 1 Word Out”.

D.1.1 Automation System to P6002 UP line module (Inputs)

Pos. Word.Bit	Pos. Byte.Bit	Function	Signal/Action
0.0	1.0	Reserved	Static 0
0.1	1.1	Reserved	Static 0
0.2	1.2	Keyboard Operation inhibit	Static 1: Operator keyboard actions on the PC or Automation System are disabled
0.3	1.3	Selects Set Number 1	see Truth Table
0.4	1.4	Selects Set Number 2	see Truth Table
0.5	1.5	Selects Set Number 3	see Truth Table
0.6	1.6	Selects Set Number 4	see Truth Table
0.7	1.7	Reserved	Static 0
0.8	0.0	Reserved	Static 0
0.9	0.1	Reserved	Static 0
0.10	0.2	Reserved	Static 0
0.11	0.3	Reserved	Static 0
0.12	0.4	Reserved	Static 0
0.13	0.5	Reserved	Static 0
0.14	0.6	Reserved	Static 0
0.15	0.7	Reserved	Static 0

Parallel Operation PROFIBUS with the Hardwire Interface, connector # 2
In principle, parallel operation of the PROFIBUS interface with the Hardwire interface is possible. In this case, the last change is executed, both on the Hardwire Interface and on PROFIBUS word 0.
Exceptions is the signals ‘Keyboard Operation inhibit’, at which the static and the PROFIBUS signal is connected by logical OR.

D.1.2 *P6002 UP line module (Outputs) to Automation System*

Pos. Word.Bit	Pos. Byte.Bit	Function	Signal/Action
0.0	1.0	Reserved	Static 0
0.1	1.1	System Monitor 1: Acceleration sensor Input 18 and belonging Speed Sensor Input	Speed- and Vibration signal OK: 1
0.2	1.2	System Monitor 2: Acceleration sensor Input 28 and belonging Speed Sensor Input	Speed- and Vibration signal OK: 1
0.3	1.3	Unbalance Limit 1: signal coming from Acceleration sensor Input 18	Below Unbalance Limit 1: 1 Above Unbalance Limit 1: 0
0.4	1.4	Unbalance Limit 2: signal coming from Acceleration sensor Input 18	Below Unbalance Limit 2: 1 Above Unbalance Limit 2: 0
0.5	1.5	Speed signal coming from Speed Sensor which belongs to Acceleration sensor Input 18	Speed below Speed Limit 1: 1 Speed above Speed Limit 1: 0
0.6	1.6	Speed signal coming from Speed Sensor which belongs to Acceleration sensor Input 28	Speed below Speed Limit 1: 1 Speed above Speed Limit 1: 0
0.7	1.7	Unbalance Limit 1: signal coming from Acceleration sensor Input 28	Below Unbalance Limit 1: 1 Above Unbalance Limit 1: 0
0.8	0.0	Reserved	Static 0
0.9	0.1	Unbalance Limit 2: signal coming from Acceleration sensor Input 28	Below Unbalance Limit 2: 1 Above Unbalance Limit 2: 0
0.10	0.2	Reserved	Static 0
0.11	0.3	Confirms Set Number 1	see following Truth Table
0.12	0.4	Confirms Set Number 2	see following Truth Table
0.13	0.5	Confirms Set Number 3	see following Truth Table
0.14	0.6	Confirms Set Number 4	see following Truth Table
0.15	0.7	Reserved	Static 0

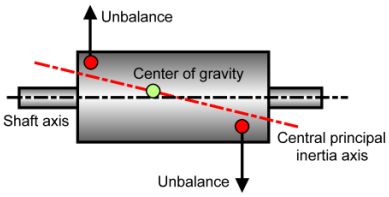
D.1.3 *Truth Table to select or confirm the appropriate Memory Sets*

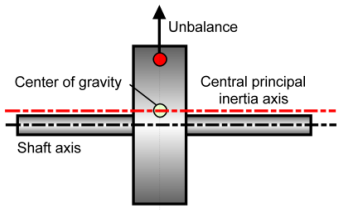
N.B.
During Pre-Balancing NO change of the Set Number is permitted. Changing the Set Number will abort the Pre-Balancing Function.

Selects Set-No. / confirms Set-No	Binary coded Set-Numbers			
	4	**3**	**2**	**1**
No change	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Appendix E – GLOSSARY – ABBREVIATIONS

E.1 Data Format

Access rights	Programs and other files are protected by a 5-level system of access restrictions: Five password levels for Service, Administrator, Expert, Operator and Observer.
Balancing Speed	Rotational speed, at which a rotor, e.g. a grinding wheel, is balanced.
Balancing weight	Special shaped weights, which can be positioned at any specific angle on a wheel clamping flange. They are fixed or clamped by set screws. Balancing weights are in the range of ca. 14 g to 298 g.
Baud	Baud is a unit of computer etc. signalling speed. The speed in Baud is the number of discrete conditions or signal elements per second. If each signal event represents only one bit condition, then Baud is the same as bits per second. Baud does not equal bits per second.
CENELEC	Comité Européen de Normalisation Electrotechnique. CENELEC is the European committee for electrical standardization.
CNC	Computerized Numerical Control for machine tools (for example SINUMERIK®, Siemens AG).
Dynamic Balancing	see → Two-Plane Balancing
Dynamic Unbalance	Dynamic Unbalance results when the central principal inertia axis has any position relative to the shaft axis. Dynamic Unbalance appears only while operating. 
ETHERNET	A local-area network (LAN) architecture developed by Xerox Corporation in cooperation with DEC and Intel in 1976. Ethernet uses a bus or star topology and supports data transfer rates of 10 Mbps. The Ethernet specification served as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers. Ethernet uses the CSMA/CD access method to handle simultaneous demands. It is one of the most widely implemented LAN standards.
Field Balancing Pre-Balancing	Process of balancing a rotor in its own bearings and supporting structure rather than in a balancing machine.
IP Address	An identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 138.57.7.27 could be an IP address.
Principal inertia axis	Coordinate directions corresponding to the principal moments of inertia.
PROFIBUS®	Process Field Bus is a fast, open field bus system widely used in automation technology. It is internationally standardised.
Re-Balancing	Correction of residual unbalances; may only be launched after a successful Setup run.
Residual Unbalance Final Unbalance	Unbalance of any kind that remains after balancing (for limits refer to ISO 1940).
RS-232 Interface	Short for Recommended Standard-232C, a standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices. In 1987, the EIA released a new version of the standard and changed the name to EIA-232-D. And in 1991, the EIA teamed up with Telecommunications Industry Association (TIA) and issued a new version of the standard called EIA/TIA-232-E. Many people, however, still refer to the standard as RS-232C, or just RS 232. The EIA-232 standard supports two types of connectors - a 25-pin D type connector (DB-25) and a 9-pin D-type connector (DB-9). The type of serial communications used by PCs requires only 9 pins so either type of connector will work equally well.

RS-422 Interface	Standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices. The RS-422 standard is designed to replace the older RS-232 standard because it supports higher data rates and greater immunity to electrical interference. This standard is backward compatible so that RS-232 devices can connect to an RS 422 port.
Setup	Balancing a spindle the very first time. During the Setup run, important parameters are evaluated and stored. Therefore, the time for Re-Balancing is substantially shortened.
Shaft (rotor) axis	Straight line joining the journal centres
Single-Plane Balancing	Procedure by which the mass distribution of a rigid rotor, e.g. a grinding wheel, is adjusted to ensure that the residual static unbalance is within specified limits.
SINUMERIK®	SINUMERIK® is a Computerized Numerical Control for Processing Machines, e.g. Machine Tools, made by Siemens AG.
Softkey	A key whose name appears on an area of the screen. The choice of softkeys displayed is adapted dynamically to the operating situation. Freely assignable function keys (softkeys) are assigned to functions defined in the software.
Static Balancing	see → Single-Plane Balancing
Static Unbalance	Condition of unbalance for which the central principal inertia axis is only displaced parallel to the shaft axis. 
Target Level	The amount of unbalance, which is specified as the maximum below which the state of unbalance is considered to be acceptable.
TCP/IP	Abbreviation of Transmission Control Protocol/Internet Protocol, and pronounced as separate letters. TCP is one of the main protocols in TCP/IP networks. Whereas the IP protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.
Termination	Electrical termination of a signal involves providing a terminator at the end of a wire or cable to prevent an RF signal from being reflected back from the end, causing interference. The terminator is placed at the end of a transmission line or daisy chain bus, designed to match impedance and hence minimize signal reflections.
Two-Plane Balancing	Procedure by which the mass distribution of a rigid rotor, e.g. a spindle, is adjusted to ensure that the residual dynamic unbalance is within specified limits.

E.2 *Abbreviations*

µm/s	Unbalance velocity
1/min	Speed, revolutions per minute
AE	Acoustic Emission
A/N	Article Number MARPOSS
AWG	Wire gauge (US)
BNC	Bayonet mount locking mechanism, RF coaxial connector
CAN	Controller Area Network
CAN-H	Data Line CAN
CAN-L	Data Line CAN
CNC	Computerized Numerical Control
CNTR-P	Data Line PROFIBUS
CSV	Short for comma-separated values, another name for the comma-delimited format of data representation
Ctrl	Control Key (keyboard)
CTS	Clear To Send (serial Interface)
DCD	Data Carrier Detected (serial Interface)
DGND	Digital Ground PROFIBUS
DIN	Deutsche Industrie Norm (German Industry Standard)
DIP	Dual In-Line Package
DSCC	Dittel System Control Center
DSR	Dataset Ready (serial Interface)
DTR	Data Terminal Ready (serial Interface)
EIA	Electronic Industries Association (US)
ESD	Electrostatic Discharge
g	Acceleration due to gravity, 9.80665 m/s²
GND	Ground
HMI	Human Machine Interface: SINUMERIK® operator functionality for operation, programming and simulation: HMI has the same meaning as MMC
LED	Light Emitting Diode
MHIS	MARPOSS Human Interface Software
MMC	Man Machine Communication: see HMI
nm	Displacement in Nanometre
PC	Personal computer
pC	Pico Coulomb, 10-12 Coulomb, SI unit of electric charge
PROX	Proximity Switch (Speed Sensor)
r/min RPM	Revolution per minute
RS-232	Standard of a serial Interface
RS-422	Standard of a serial Interface
RTS	Request To Send (serial Interface)
RxD	Receive Data (serial Interface)
RxD/TxD-N	Data Line PROFIBUS
RxD/TxD-P	Data Line PROFIBUS
SELV	Safety Extra Low Voltage, SELV circuits are isolated from the input voltage (line voltage) by double insulation or reinforced insulation. The voltage must not exceed 60 VDC (or 42.4 VAC)
TNC	Threaded version of a BNC connector, RF coaxial connector
TxD	Transmit Data (serial Interface)
U	Voltage

USB	Universal Serial Bus; serial bus system to connect peripheral equipment to the computer
Vdc	Voltage, direct current
VP	Supply voltage of the terminator (5 V), PROFIBUS
XML	Extensible Markup Language, is a W3C recommendation for creating special-purpose markup languages

MARPOSS

End of Installation, User and Programming Manual

P6002 UP