
INTACT® 1200

INTACT® 1600

Operating Instructions

Original Operating Instructions

INTACT® V6.1R

Carl Zeiss Optotechnik GmbH

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1 Introduction

1.1 General

Thank you for your confidence in our products!

Our INTACT software and the tire testing machine form the most recent generation of a modern, user-friendly system which represents the most advanced technology available.

INTACT is a system which facilitates all applications as far as possible. The simple and self-explaining user interface, the context-sensitive help system and the object-oriented software design are the main advantages you can make use of. The software can easily be customized for the customer's specific requirements, for example, with additional functions.

INTACT is due to its stable run time behavior especially suitable for industrial applications. As a result of the consistent use of drivers, INTACT is software-independent. The image processing has been designed as a single monitor system. Through selection of the corresponding hardware, the performance can be scaled freely. Thus, the software remains fully transparent for the operator.

The tire testing machine is only suitable for the testing of tires. The testing technique is called shearography.

If the machine is used for other purposes than those it was designed for, the right to claim under guarantee is invalidated. The manufacturer is not liable for damage.

1.2 About the Manual

In this manual, the installation, user interface and functions of the software are explained and you get a description of the hardware handling. An additional Service manual includes a chapter about service and maintenance of the individual devices of the system.

The manual might also describe functions that are not available on your machine. These functions are marked with a footnote.

When you click the **Help** button in INTACT software error messages, the User Manual opens automatically.

Please note:

- The operating instructions are part of the documentation of a tire testing machine.
- The operating instructions address operators and users of the tire testing machine.
- The operating instructions must always be accessible to operators and users.

The operating instructions are part of the product and must be delivered with the product when passing it on. Lost or incomplete operating instructions must be replaced in order to ensure safe continuous operation.

1.3 CE Marking

The CE marking confirms the system's conformity with the basic requirements of the 2006/42/EG (machinery directive).

1.4 Declaration of Conformity

CE – Declaration of Conformity (English Copy)

(in accordance with Machinery Directive 2006/42/EC, Annex II A)

We hereby declare that the machine specified below – due to its design and construction, and in the version placed on the market by us – complies with the provisions of the stated directives, including any amendments to these directives that are in effect at the time of the declaration.

Manufacturer / Authorized
representative:

Carl Zeiss Optotechnik GmbH
Georg-Wiesböck-Ring 12-14
83115 Neubeuern

Description of the machine:

Tire Testing System

System for testing of tires with an outside
diameter of up to 1.25 m

Functionality:

Intact 1200

Type / Model:

Machine No.:

Serial No.:

Year of manufacture:



Directives, standards and specifications applied:

1. EC Directives

- Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 “Machinery Directive” on the harmonized standards for machinery
- Directive 2014/30/EC of the European Parliament and of the Council of 26 February 2014 on the harmonized standards for electromagnetic compatibility.
- The safety objectives of the Low Voltage Directive 2014/35/EC have been complied with in accordance with Annex I, No. 1.5.1 of the Machinery Directive 2006/42/EC.
- This document serves as a declaration by the manufacturer that no asbestos-based materials have been used for the components of this machinery.

2. Harmonized standards applied, in particular

(A complete list of the applied standards is provided in the documentation of the risk assessment)

DIN EN ISO 12100:2011-03 Safety of machinery -- General principles for design -- Risk assessment and risk reduction

DIN EN ISO 13849-1:2016-06 Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

DIN EN ISO 13849-2:2013-02: Safety of machinery - Safety-related parts of control systems - Part 2: Validation

DIN EN ISO 13850:2016-05 Safety of machinery - Emergency stop function - Principles for design

DIN EN ISO 13857:2020-04 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs

DIN EN 60204-1:2019-06: Safety of machinery - Electrical equipment of machines - Part 1: General requirements

DIN EN ISO 14120:2016-05: Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards

DIN EN ISO 13854: 2020-01: Safety of machinery - Minimum gaps to avoid crushing of parts of the human body

3. Other technical standards and specifications applied:
Regulations laid down by the German Employer's Liability Insurance Association

Neubeuern,
(place and date of issue)

Florian Linder
Chief Executive Officer (CEO)
Name, Position, Signature

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of the technical documentation:

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Department, Address

1.5 Standards and Regulations

The INTACT tire testing machine has been designed, manufactured, and tested according to national and international safety standards as well as to ZEISS safety standards.

The following standards apply:

- DIN EN ISO 12100
- DIN EN ISO 13857
- DIN EN ISO 13854
- DIN EN ISO 13850
- DIN EN ISO 13732-1
- DIN EN 614-1
- DIN EN 614-2
- DIN EN 894-1
- DIN EN 894-2
- DIN EN 894-3
- DIN EN ISO 14119
- DIN EN ISO 14120
- DIN EN 12464-1
- DIN EN 1837
- DIN EN ISO 11200
- DIN EN ISO 13849-1
- DIN EN ISO 13849-2
- DIN EN ISO 4414
- DIN EN ISO 14118
- DIN EN 60204-1
- DIN EN 60825-1
- DIN EN 61000-6-2
- DIN EN 61000-6-4
- DIN EN 61310-3

The INTACT tire testing system has been designed for industrial use. Regulations must be adhered to when using the INTACT tire testing system. The relevant regulations vary depending on the country.

1.6 Applicable Documents

This manual refers to components for which separate publications are available.

The following documents are supplied with each INTACT tire testing machine:

The separate publications are available physical or digital on the computer under the following file paths:

- Operating instructions and service instructions:
E:\Manuals\Intact Manual\6.0
- Suppliers documentation and additional service instructions:
E:\Manuals\TechnicalDocumentation
- Wiring diagram:
E:\Manuals\Intact Diagram

In addition to these operating instructions, further documents apply, e.g.:

- Electric circuit diagram
- Pneumatic plan
- General layout drawing
- Spare parts list
- Copy of the CE declaration of conformity
- Service manual and safety manual
- Manuals of purchased parts such as air conditioning unit Rittal type K3303500 (in control cabinet), Riedel_Trafo_URST2500

These documents are an integral part of the operating instructions in the sense of the EU Directive 2006/42/EC.

1.7 Manufacturer

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Georg-Wiesböck-Ring 12-14

83115 Neubeuern

Deutschland

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Web: <https://optotechnik.zeiss.com>

2 Safety

2.1 Intended Use

The INTACT is a high-tech tire testing machine which may only be used only for its intended purpose.

Using the system in accordance with the intended use also includes observing all information in this user manual as well as complying with the approved ambient conditions and the specified care measures. Any other use that runs contrary to these instructions, e.g. any deviation from the permissible operating values, is not regarded as intended use.

Appropriate protective equipment must be available, properly installed and fully operational. It must not be moved, bypassed or rendered nonfunctional.

The machine must not be used in rooms where a potentially explosive atmosphere occurs or could occur under certain circumstances.

The operating company must not make any changes to the program code on programmable control systems.

INTACT is foreseen for a 10 years period of use.

In case of malfunctions of and/or damage to the electrical equipment, the INTACT tire testing machine must be switched off immediately and protected against unintentional restart. All disruptions and damage automatically indicated by the system or otherwise identified must be reported to the manufacturer of the tire testing machine immediately.

The INTACT tire testing machine serves the following purposes:

- Inbound inspection of used tires before retreading.
- Quality control of new tires.
- Testing of tires for trapped air, structural damage, separations and production-related damage.

The INTACT tire testing machine has been designed to be operated as a stand-alone unit. Make sure to follow the instructions below:

- The system may only be used in a technically flawless condition by trained operating personnel observing the applicable safety and accident prevention regulations.
- Operate only in compliance with the technical specifications.
- For indoor use only.
- Transport only with applied safety bolts.
- Do not operate outside the specified scope of application.
- Do not operate when wet.
- Do not make modifications and/or conversions.

2.1.1

Reasonably Foreseeable Misuse

The INTACT tire testing machine must not be used for purposes contrary to the information given in these operating instructions.

Examples for reasonably foreseeable misuse:

- Carrying out test procedures with living objects.
- Operation and/or performance of care measures by persons who are under the influence of alcohol or other drugs or medication that impairs reaction times.
- Incorrect assembly of the machine.
- Operation of the machine by untrained personnel.

2.1.2

Consequences of Non-Compliance with the Intended Use

Non-compliance with the intended use may void the warranty.

The operator is solely responsible for any personnel injury and property damage resulting from non-compliance with the intended use.

2.2 Basic Safety Instructions



Electric voltage

Warning

Risk to life and limb due to electrical voltage.

Burns, cardiac arrest, death.

- Do not open the machine housing until it is tension-free.
- Do not disconnect cables until the machine is tension-free.
- Do not operate or perform maintenance with untrained personnel.



Laser radiation

Caution

Health hazard due to laser radiation.

Looking directly into the laser beam or through an optical device can damage the eyes.

- Do not look into the laser beam. Distance 15 cm.
- Do not look into the laser beam through an optical device.



Movable parts

Caution

Health hazard due to movable parts.

Burns, cardiac arrest, death.

- Do not stand under the loader / unloader during operation.
- Do not touch parts of the loader / unloader during operation.
- Do not touch parts of the tire flip during operation.
- Secure the lids at the loader / unloader side with transport bolts during maintenance and repair measures.

2.3 General Safety Measures

- Wear safety shoes and gloves during machine operation.
- Do not enter pressure chamber or optional tire flipper via loader and unloader or tilting table. Do not climb on the tilting table. It is forbidden for persons to stay around while the tilting table is in motion and operating. Before operating the tilting table, the operator must ensure that no persons are present in the danger zone. (Severe injuries!)
- Unauthorized persons must not have access to danger zones.
- The tire testing machine must not be subjected to shocks. Otherwise, it can be damaged.
- The tire testing machine must not be subjected to significant temperature fluctuations.
- The tire testing machine must not be operated:
Temperatur: over +40 °C or below +10 °C.
Air pressure (sea level): <1000 m.
Relative humidity: 10%-85 %.
- Danger of mortal electrical shock. Do not remove protective measures as isolation and shields.
- All work on the electrical equipment of the machine / system may only be performed by a qualified electrician according to electrical engineering regulations and with the main switch switched off and secured against being switched on again.
- All protective and safety-related devices, such as removable protective devices and EMERGENCY STOP devices, must be installed in correct position and enabled and fully functional.
- The company using this machine has to assure that safety measures as safety switches and safety light barriers of the machine are checked on regular base (function and mechanical stability).
- The company using this machine has to assure that personell in laser areas must be conversant with the procedures to be observed with respect to the laser accident prevention regulations.
- To prevent unauthorized persons from operating the machine PC login requires password. Keep it secret!
- The housing of the tire testing machine must not be opened during operation.

2.4 Additional Safety Measures during installation

The additional instructions below must be followed during transport / installation of the INTACT tire testing machine:

- Please use only adequately rated means of transport!
- The presence of persons under suspended loads/machine parts or between suspended parts and fixed objects is prohibited.
- Wear personal safety equipment (safety gloves, safety shoes and safety helmet) during transport!
- Pay attention to centre of gravity of the machine parts!
- In combination with customer owned conveyor: close gaps <120 mm between single conveyor belts! Remaining gap between conveyor belt and fixed object <= 5 mm. Compliance with these specifications must be ensured by the integrator or customer if customer owned conveyor technology (loader and unloader) is used.
- For operation with tilting table: Indicate area below tilting table as danger zone!
- Refer to instructions for transport of the machine in operator and service manuals.
- Use suitable aids for support.
- Secure components against falling over, e.g. by a second person.
- Secure the components immediately after installation.
- Seal off danger zone.

2.5 Additional Safety Measures during operation

The additional instructions below must be followed during operation of the INTACT tire testing machine:

- The housing of the tire testing machine must not be opened during operation.
- During automatic operation there is danger of being crushed at pneumatic lids of the pressure chamber.
- Inspecting very large tire dimensions there is danger of being crushed during tire loading. Do not put your fingers through the safety fence!
- Tires must not exceed min / max dimensions!
- There is danger of being crushed during tire unloading at gravity roller conveyors.
- The presence of persons in the danger zone of the tilting table is prohibited while it is moving. Make sure that no one is in the danger zone before operating the tilting table.
- For machines with tilting table mounted at the pressure chamber: Do not reach at the danger zone of the pneumatic cylinder below the tilting table during tire loading! There is residual risk of being crushed at hand and arms.
- Do not climb the tilting table! May cause severe personal injury.
- Do not enter the pressure chamber!

- When the tilting table is raised, it is forbidden to reach into the danger zone of the lifting cylinder under the tilting table. Crushing hazard!

Eliminating blockades/ disturbances in the work process

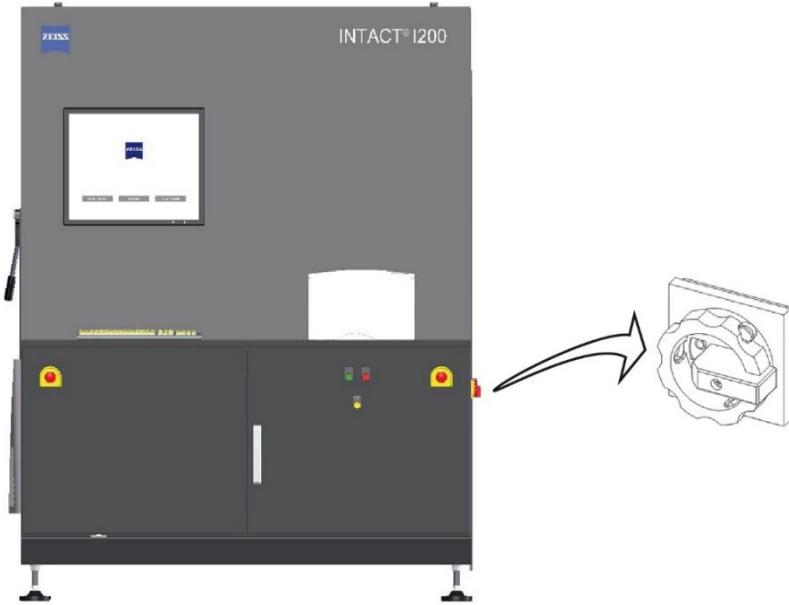
See chapter Trouble Shooting, see page 162 .

2.6 Additional Safety Measures for maintenance

The additional instructions below must be followed during maintenance of the INTACT tire testing machine:

- Maintenance services and alignment work must be performed only by trained personell using personal protection equipment and observing the regulations regarding work safety.
- Wear personal safety equipment (safety gloves, safety shoes) during maintenance!
- During maintenance services combinations of riks and multiple consequences may occur.
- Before starting any maintenance and service work, disconnect the instrument from the electrical supply and secure it against unauthorised restart (LOTO: Lock Out - Tag Out). When the power supply is switched off, the pneumatic supply is automatically switched off as well. The operating company must ensure that there is a main shut-off device in the compressed air supply line and that there is a lock so that it can be secured against being switched on again.
- During maintenance work, the machine must be depressurised and secured against being switched on again using a lock on this main shut-off device.
- Caution!
Dangerous movements caused by inherent energy (compressed air) possible.
- Perform any work inside the pressure chamber only when machine is switched off and and secured against unauthorised restart!
- Do not enter the pressure chamber!
- Alignment work may require supplementary lighting. Use hand lamp!
- Only use original spare parts as only original spare parts meet the specified technical requirements.

Disconnecting the machine from voltage/pressure



1. Switch off the main switch (1) on the INTACT and secure it with a padlock against being switched on again.
2. Put up a sign reading "Attention, working on the machine. Do not start the machine".

2.7 Requirements to operating company and personnel

The system may only be used, repaired and maintained by trained operating staff.

The company using this machine has to assure that personnel is trained on regular base. Applicable safety and accident prevention regulations must be observed at any time.

Operating company

The operating company must ensure that:

- all requirements regarding the installation site are met.
- the components and the complete machine are used as intended.
- all safety elements function as intended and comply with the provisions of the Ordinance on Industrial Safety and Health.
- all safety devices are properly installed and functional before each start-up of individual components and the complete machine.
- a person responsible for safety is appointed.
- only trained and qualified personnel work on the components and the complete machine.

- trained and qualified personnel working on the components and the complete machine have the appropriate training and experience.
- personal protective equipment is available to the trained and qualified personnel.
- the operating instructions / manual for the components and the complete machine are available at all times at the place of use.
- the industrial safety regulations are observed. This includes, for instance that:
 - the operating company must comply with their monitoring and supervision duties.
 - the operating company must carry out trainings to train instruct personnel on the individual components and the complete machine at fixed intervals.

Trained and qualified personnel

Only trained and qualified personnel is allowed to work on the components and the complete machine (machine / product).

Persons under the age of 18 may only work on the machine under the supervision of a trained and qualified specialist.

A trained and qualified specialist is a person who, due to his training and experience, can safely carry out the required work and is able to recognise and avoid possible risks and dangers.

The following conditions apply to trained and qualified personnel:

- trained and qualified personnel must have been appointed to perform the required work by a person responsible for safety.
- trained and qualified personnel must have the appropriate training and experience required for performing the work to be done.
- trained and qualified personnel must have received instruction on the components and the complete machine.
- trained and qualified personnel must have knowledge of the relevant standards, regulations, accident prevention rules and the respective operating conditions.

Qualified personnel (for assembly)

(Assembler, manufacturer's designing engineers, forwarding agents, transport personnel)

In the position to carry out the assigned tasks and to recognize dangers independently due to appropriate technical training, knowledge and experience Measures for hazard avoidance are known.

Machine Operator

Machine operator instructed by the operating company. Tasks and operating steps that go beyond operation in normal mode (measuring tires) may only be carried out by the machine operator after the operating company has expressly instructed him to do so.

Service personnel / qualified personnel

Includes (maintenance staff) and qualified and trained electricians

Supervisor appointed by the operating company

In the position to carry out the assigned tasks and to recognize dangers independently due to appropriate technical training, knowledge and experience Measures for hazard avoidance are known.

The supervisor (employee of the operating company) is trained and instructed by the manufacturer and able to carry out extended tasks on the machine. These tasks are specified in the operating instructions.

2.8 Product Safety Labels

The following warning signs are attached to the INTACT tire testing machine and its components:

 <p>Warning hazardous voltage</p> 	<p>These symbols indicate danger due to high voltage (380 V - 500 V) especially inside electrical cabinets. Work may only be carried out by skilled personnel.</p>
<p>Warning hazardous voltage (Attention! Only open after interrupting the man switch.)</p>	
 <p>Warning laser radiation hazard</p>  <p>Note class 1 laser product</p> 	<p>These symbols indicate the special danger implied in working with lasers. Work on the measuring head may be done by trained personnel only!</p>
<p>Note class 3B laser product</p>	
 <p>Warning of hand injuries</p>	<p>This symbol indicates danger due to moveable parts. Work may only be carried out by skilled personnel.</p>
 <p>No Access</p>	<p>This symbol indicates access is prohibited because of severe risks in pressure chamber or flipper.</p>
 <p>No stepping on surface</p>	<p>This symbol indicates stepping on conveyor surface is prohibited because of severe risks on surface and in pressure chamber or flipper.</p>
 <p>No fork lift trucks beyond this point</p>	<p>This symbol indicates risk of damage for machine parts when supported by fork lift in this areas.</p>
 <p>Danger zone</p>	<p>These hatched areas mark the danger zone around the tilting table.</p>
 <p>Do not reach into this area</p>	<p>This symbol indicates areas that must not be reached into.</p>

2.9 Procedure in the event of dangerous incidents and accidents

Rescue of injured persons

1. Press the emergency stop button immediately.
2. Clamping cylinders and tilting table can be moved slightly by hand to free persons.

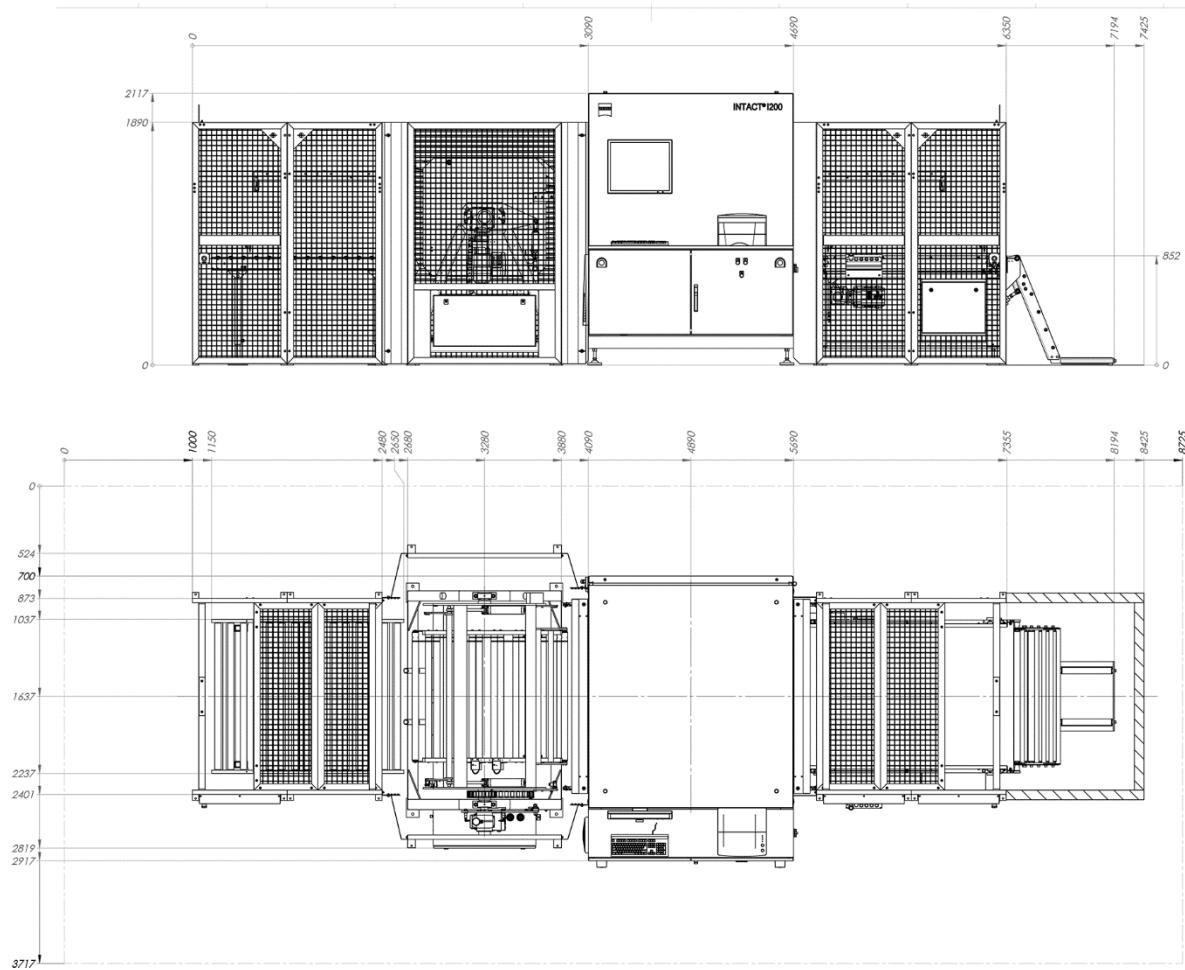
Fire

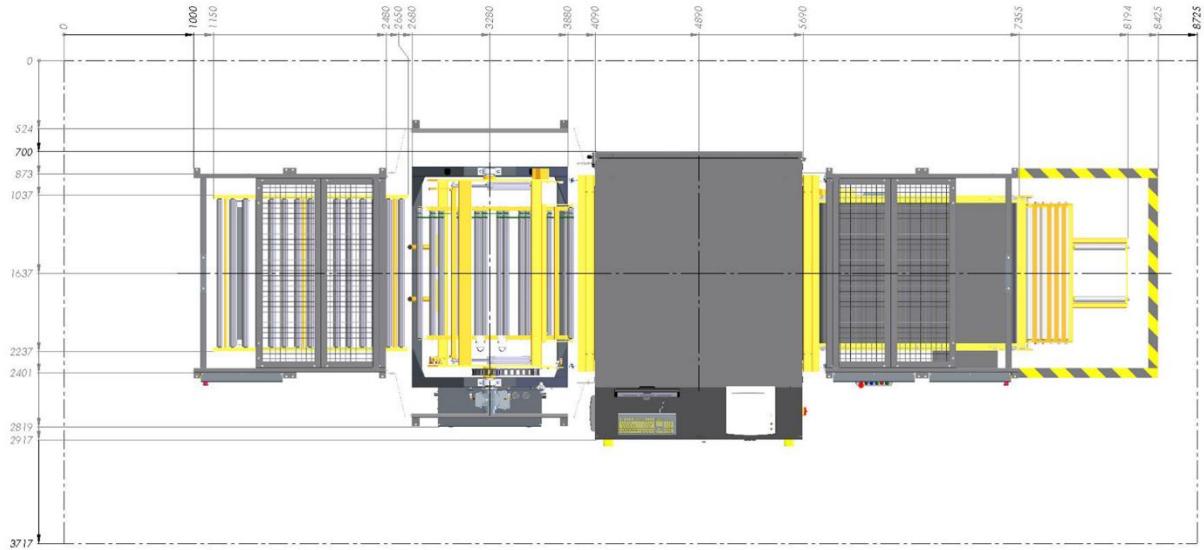
1. Switch off the machine at the main switch.
2. If necessary, switch off the turning station at the main switch.

3 Technical Data

3.1 INTACT 1200 Bead to Bead Inline

Max. Configuration





All data in mm.

Installation surface area	:	4900 x 3055 mm
Total weight	:	3900 kg

Tire Sizes:

Outside Ø	(max.)	:	1230 mm
Outside Ø	(min.)	:	500 mm
Inside Ø	(max.)	:	---
Inside Ø	(min.)	:	13“ / 330 mm, opt. 12“ / 294 mm
Width	(max.)	:	500 mm
Width	(min.)	:	120 mm
Weight	(max.)	:	80 kg, opt. 120 kg

Paths of Traverse for measuring head axes:

Tilt Achse	:	17° upward; (89°) downward
------------	---	----------------------------

Transmissions for measuring head axes:

Lift axis	:	47,32 :1 320 mm	(Worm gear box) (Path of traverse per crown gear revolution) (z=32 /t=10)
Rotary axes	:	5 : 1 10,7 : 1	(Step motor gear box) (z1=20/ swivel Ø=618 mm)
Shift axis	:	5 : 1 100 mm	(Schrittmotor-Getriebe) (Path of traverse per crown gear revolution) (z=20 /t=5)
Tilt axis	:	5 : 1 1,8 : 1	(Step motor gear box) (z1=20 / z2=36)

Belt Drive: (external /internal)

Rotational speeds	:	2900 min -1 (Motor) 232 min -1 (Gear box output) 204 min -1 (Driving roller)
Transmissions	:	12,48 : 1 (Worm gear box) 1,14 : 1 (z1=22 / z2=25) 314 mm (Belt movement per roller revolution) (Ø=100 mm of driving roller)
Conveying speed of the tire	:	(max.) 1134 mm/s

Conveying speed of the tire	(min.)	:	77 mm/s
Acceleration of the tire	(max.)	:	approx. 2 m/s ²

Vacuum Chamber:

Volume	:	4,1 m ³
Volume Δ (at 50 mbar)	:	0.20 m ³

Vacuum Pump:

Volume flow (at 50 mbar)	:	4.5 m ³ / min
Δ p (max.)	:	-200 mbar
Electrical power	:	1,5 kW

Pneumatic Data:

Compressed-air supply	:	6 bar
Compressed-air consumption	:	approx. 30 L/min

Electrical Data:

Operating voltage	:	360 - 480 V 50 /60 Hz
Control voltage	:	115 V / 230 V AC, 24 V DC
Connected load	:	ca. 6,5 kW
Rated current	:	3 Phasen + Nullleiter + Erdung, 25 A

Sound emission:

< 70 dB (A)

The operating company is responsible for the operation of the machine at the operating company's site. The operating company is also responsible for the actual noise exposure of the machine operator. The operating company must measure the noise emission, evaluate the results and take appropriate measures if required.

Installation area

Requirements for installation area:

Ground height (concrete)	:	min. 220 mm
Evenness of the floor	:	max. 5 mm/m
Concrete strength	:	min. C12/15, max. C50/60 uncracked
Free floor space	:	min. 8.7 x 3.7 m] for Intact1200InlineFlipWippe
Free height:	:	min. 2, m

Anchor bolt:

Fischer FBN II 12 / 20		
Drill hole-Ø	:	12 mm
Borehole depth:	:	>105 mm
Tightening torque:	:	50 Nm

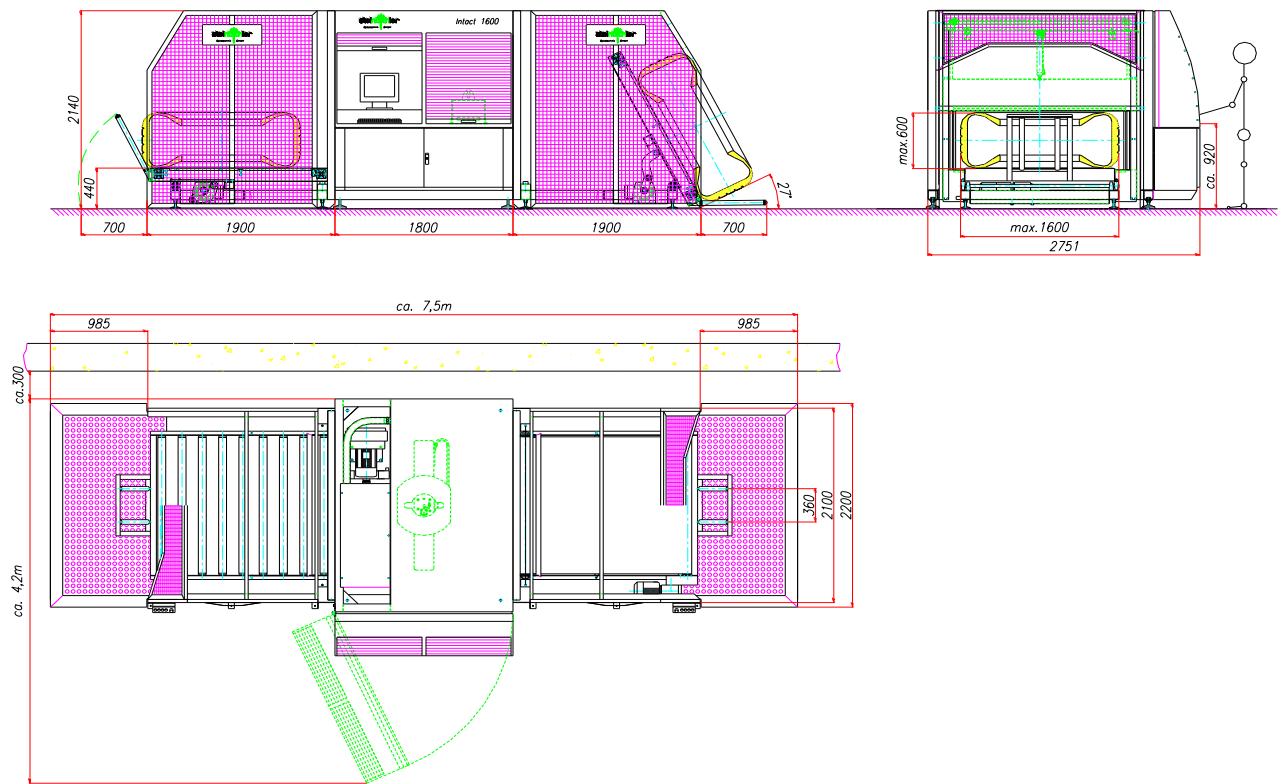
Use these bolt anchors to anchor the machine and the safety fence to the ground after setting up.

Repeat the electrical test before making the electrical connection.

Before making the electrical connection, check the setting on the installed transformer and adjust it according to the available mains voltage (if necessary). Please find further details in the electrical circuit diagram (the data sheet of the transformer is part of applicable documents)

3.2 INTACT 1600 Bead to Bead Inline

Max. Configuration



All data in mm.

Installation surface area	:	7500 x 3000 mm
Total weight	:	5200 kg

Tire Sizes:

Outside Ø (max.)	:	1600 mm
Outside Ø (min.)	:	500 mm
Inside Ø (max.)	:	---
Inside Ø (min.)	:	13" / 330 mm; (12" / 294 mm)
Width (max.)	:	600 mm
Width (min.)	:	120 mm
Weight (max.)	:	160 kg

Paths of Traverse for measuring head axes:

Lift axis	:	780 mm
Rotary axis	:	352°
Shift axis	:	551 mm
Tilt axis	:	45° upward / 89° downward; (180°) downward

Transmissions for measuring head axes:

Lift axis	:	47.32 : 1 (Worm gear box) 320 mm (Path of traverse per crown gear revolution) (z=32 /t=10)
Rotary axis	:	5 : 1 (Step motor gear box) 10.7 : 1 (z1=20 / z2=214)
Shift axis	:	5 : 1 (Step motor gear box) 100 mm (Path of traverse per crown gear revolution) (z=20 /t=5)
Tilt axis	:	5 : 1 (Step motor gear box) 1.8 : 1 (z1=20 / z2=36)

Belt Drive: (external / internal)

Rotational speeds	:	2900 rpm (Motor) 204 rpm (Gear box output) 150 rpm (Driving roller)
Transmissions	:	14.14 : 1 (Worm gear box) 1.36 : 1 (z1=22 / z2=30) 377 mm (Belt movement per roller revolution) (Ø 120 mm of driving roller)
Conveying speed of the tire	(max.)	: 950 mm/s
Conveying speed of the tire	(min.)	: 67 mm/s
Acceleration of the tire	(max.)	: approx. 2 m/s ²

Vacuum Chamber:

Volume	:	6.8 m ³
Volume Δ (at 50 mbar)	:	0.35 m ³

Vacuum Pump:

Volume flow (at 50 mbar)	:	7.5 m ³ / min
Δp (max.)	:	-200 mbar
Electrical power	:	4 kW

Pneumatic Data:

Compressed-air supply	:	6 bar
Compressed-air consumption	:	approx. 20 l / min

Electrical Data:

Operating voltage	:	360 - 480 V 50 /60 Hz
Control voltage	:	230 V AC, 24 V DC
Connected load	:	approx. 8 kW
Rated current	:	2 A

Sound emission:

< 70 dB (A)

The operating company is responsible for the operation of the machine at the operating company's site. The operating company is also responsible for the actual noise exposure of the machine operator. The operating company must measure the noise emission, evaluate the results and take appropriate measures if required.

Installation area

Requirements for installation area:

Ground height (concrete)	:	min. 220 mm
Evenness of the floor		max. 5 mm/m
Concrete strength	:	min. C20/25, max. C50/60 uncracked
Free floor space		min. 8.7 x 3.7 m for Intact1200InlineFlipWippe
Free height:		min. 2.2 m

Anchor bolt:

Fischer FBN II 12 / 20

Drill hole-Ø	:	12 mm
Borehole depth:	:	>105 mm
Tightening torque:	:	50 Nm

Use these bolt anchors to anchor the machine and the safety fence to the ground after setting up.

Repeat the electrical test before making the electrical connection.

Before making the electrical connection, check the setting on the installed transformer and adjust it according to the available mains voltage (if necessary). Please find further details in the electrical circuit diagram (the data sheet of the transformer is part of applicable documents)

4 Transportation and Storage

4.1 Transport

The INTACT tire testing machine is packed in vacuum foil and is put on wooden beams if it is transported by truck. When the tire testing machine is shipped by airplane or by boat, it is packed in an extra wooden box.

The machine is not pressurized during transport.

Components and machine parts to be transported are equipped with attachment points and transport hooks. The transport and lifting points are shown in the design data and are marked on the components. Points where lifting with a forklift truck is prohibited are also marked.

The measuring heads and rotation axis are secured with tie-down straps and cable ties.

The objective lenses of the measuring heads are fitted with protective covers.

The lids at the loader and the unloader side of the INTACT tire testing machine are secured with transport bolts.

The base plate for the internal conveyor belt is locked by 4 security angles (coated red) for the transport.



All parts intended solely for transport must be removed before commissioning.

Inspection on acceptance:

- The goods should be checked for damage immediately upon receipt.
- Damages and defects should be reported to the transportation company



Do not commission the INTACT tire testing machine in case the goods are damaged.

Transport information

Use a forklift truck to transport machine components.

- Fork length min. 2.3 m

Weights and dimensions Truck/aircraft tire testing machine: INTACT 1200 (S/N 022-036; 038-041; 043)

Designation	Dimensions (LxWxH)	Weight
1x tire testing machine	2450x1865x2100 mm	3850 kg
1x loader with tilting table	2250x1500x950 mm	400 kg
1x loader without tilting table	1650x1500x950 mm	310 kg
1x unloader	1200x600x810 mm	130 kg
1x protective grid set (complete)	1890x740x150 mm	112 kg
Tire testing machine	2750x2200x2200 mm	4520 kg
1x loader with tilting table, 1x unloader 2x protective grid (set), accessories		
2x loader without tilting table, 2x protective grids (set), accessories		
Tire testing machine		
Tire testing machine	2750x2200x2150 mm	4000kg
1x loader with tilting table, 1x unloader 2x protective grid (set), accessories		
2x loader without tilting table, 2x protective grids (set), accessories		
Tire testing machine		

Weights and dimensions Truck/aircraft tire testing machine: INTACT 1200 inline

Designation	Dimensions (LxWxH)	Weight
1x tire testing machine	2300x1865x2100 mm	3200 kg
1x loader with tilting table	2250x1500x950 mm	400 kg
1x loader without tilting table	1650x1500x950 mm	310 kg
1x unloader	1200x600x810 mm	130 kg
1x protective grid set (complete)	1890x740x150mm	112 kg
Tire testing machine	2750x2200x2200 mm	3870 kg
1x loader with tilting table, 1x unloader 2x protective grid (set), accessories		
2x loader without tilting table, 2x protective grids (set), accessories		
Tire testing machine	2750x2200x2150 mm	2250 kg
1x loader with tilting table, 1x unloader 2x protective grid (set), accessories		
2x loader without tilting table, 2x protective grids (set), accessories		

Weights and dimensions Truck/aircraft tire testing machine: INTACT 1200 offline

Designation	Dimensions (LxWxH)	Weight
Tire testing machine	2300x1865x2100mm	2700 kg
Tilting table with protective grid	1650x1150x1660mm	200 kg
Tire testing machine with attached tilting table and accessories		
Tire testing machine with attached tilting table and accessories		

Weights and dimensions Truck/aircraft tire testing machine: INTACT 1600

Designation	Dimensions (LxWxH)	Weight
Tire testing machine	2850 x 2000 x 2150mm	3450 kg
Tire testing machine	3000 x 2200 x 2200mm	3600 kg
Tire testing machine	3080 x 2300 x 2450mm	4040 kg
Loader with tilting table	2150 x 1880 x 900mm	800 kg
Loader without tilting table	1800 x 1880 x 450mm	550 kg
Unloader with tilting table	2150 x 1680 x 900mm	650 kg
Protective grid set (complete)	2150 x 1900 x 200mm	260 kg
1x loader with tilting table, 1x unloader with tilting table 1x protective grid (set), accessories	2550 x 2200 x 1500mm	1500 kg
1x loader with tilting table, 1x loader without tilting table, 1x unloader with tilting table, 1x protective grid (set), accessories	2830 x 2300 x 2280mm	2690 kg
Tyre-Flipper	3360 x 2100 x 3060mm	1500 kg
Tyre-Flipper	3610 x 3310 x 2500mm	2630 kg

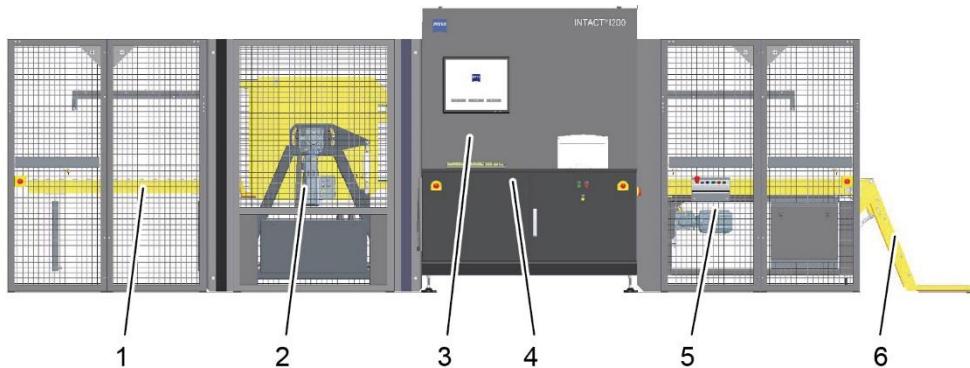
4.2 Storage

Store the INTACT tire testing machine only at room temperature in the original packaging materials for Transport or equivalent packaging. The storage location must be dry, free of dust and protected from direct sunlight. There is no limit to the duration of storage.

5 Description

5.1 Overview

Plant configuration (example)



Item	Designation
1	Unloader conveyor belt - optional
2	Tire flipper - optional
3	Pressure chamber
4	Switch cabinet, machine control / printer
5	Loader conveyor belt with attached tilting table - optional or Loader conveyor belt with conveying system provided and installed by the customer - optional
6	Tilting table - optional

Pressure chamber

The pressure chamber is closed and sealed with loading/unloading lids (pneumatic doors).

With the loading/unloading lids open, the tire can be transported into the pressure chamber on a roller conveyor or using a tilting table, depending on the system configuration.

When the tire is in the pressure chamber, the loading/unloading lids close and a low vacuum (about 50 mbar below ambient pressure) is created in the pressure chamber.

At least one shearographic measuring head is positioned fully automatically to monitor the tire surface.

The pressure chamber tests tires:

- Inbound inspection of used tires before retreading.
- Quality control of new tires.
- Testing of tires for trapped air, structural damage, separations and production-related damage.

After the test, the loading/unloading lids open. Depending on the machine configuration, the tire can either be removed at the loader (offline version) or be transported to an unloader.

As an option, the following modules can be attached to the pressure chamber for loading and unloading and for flipping the tire.

Switch cabinet, machine control / printer

The machine is operated from the control cabinet.

Tilting table

Using the tilting table, the tire can be ergonomically transported onto the loader or directly into the pressure chamber.

Loader

The loader transports the tire on a roller conveyor into the pressure chamber. Apart from Zeiss loaders, it is possible to have loaders provided and installed by the customer attached to the Zeiss loader.

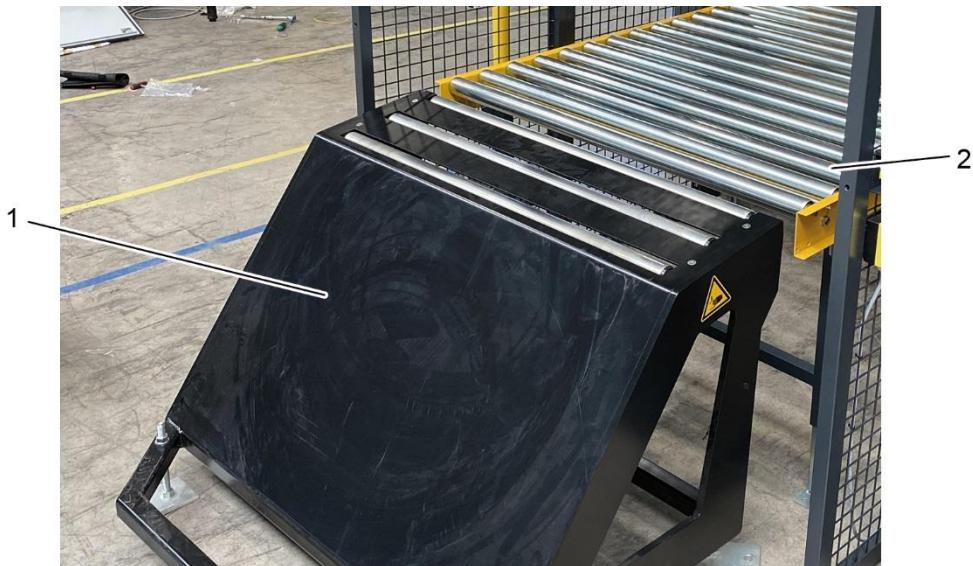
Tire flipper

The tire flipper turns the tire by 180° and transports it back into the pressure chamber. In this way both sides of the tire can be inspected.

After testing, the tire flipper transports the tire on a roller conveyor to the unloader.

Unloader

The tested tire can be removed from the unloader.



Item	Designation
1	Tire support (option)
2	Brake roller at the unloader

Procedure, variant 1: Machine configuration without tire support / passive unloader support

The brake roller (2) brakes the tire and brings it to a halt on the roller conveyor. The operator must manually remove the tire from the roller conveyor or tilt it.

The operator must ensure not to injure himself (tire falling on the operator) and the operating company must, if necessary, provide lifting aids.

In addition, the operating company must ensure that the operators are provided with personal protective equipment (gloves and safety shoes) and that the operators wear the personal protective equipment.

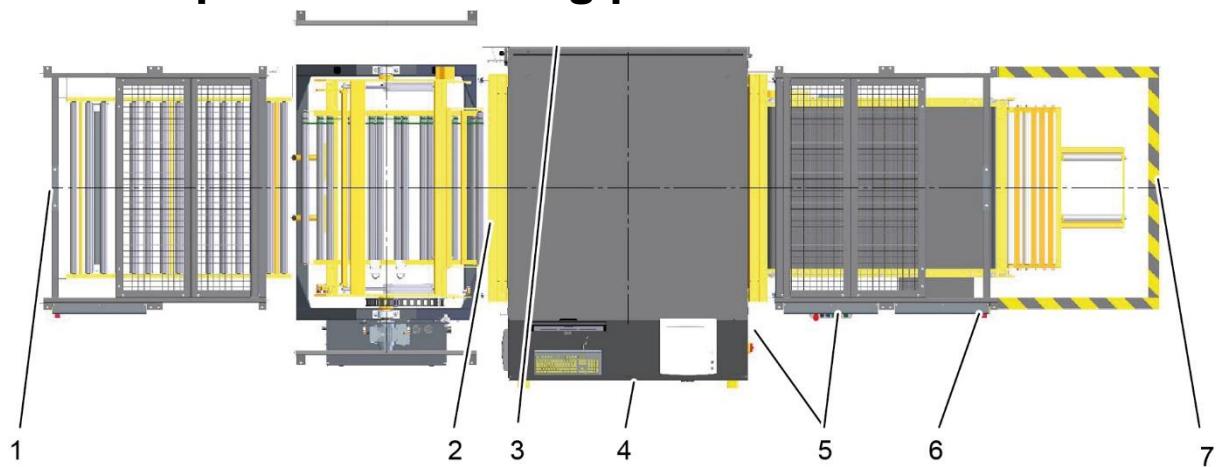
Procedure, variant 2: Machine configuration with tire support / passive unloader support

The brake roller brakes the tire and brings it to a halt on the roller conveyor. The operator must manually tilt the tire and put it on the passive tire support. The tilting must be done from the side so that the tire does not fall on the operator's feet.

The operator must ensure not to injure himself (tire falling on the operator) and the operating company must, if necessary, provide lifting aids.

In addition, the operating company must ensure that the operators are given and wear personal protective equipment (gloves and safety shoes).

5.2 Operator's working positions



During loading

- Loading area of the tilting table (option) (7)
- Loading area of the loader (option) (6) (Unloading area offline version)
- Operating elements of the tilting table (option) (5)

During testing

- Switch cabinet/machine control (4)

During unloading

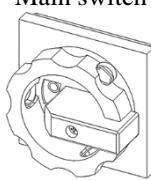
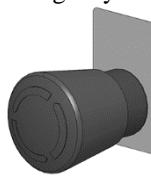
- Unloading area of the pressure chamber (2)
- Unloading area of the unloader (option) (1)

During maintenance

- service door (3)

5.3 Control and display elements

Pressure chamber

Control elements	Function
Main switch 	<ul style="list-style-type: none"> - disconnects the machine from power supply. - protect with a padlock while the machine is switched off against unauthorised or accidental switching on of the machine. <p>Clamping points at the main switch are partially live even after the main switch has been switched off!</p>
Monitor and keyboard 	<ul style="list-style-type: none"> - user interface - informs the operator about machine and system data - input of parameters - selection of program sequences
Emergency stop 	<ul style="list-style-type: none"> - actuating the emergency stop button stops all hazardous movements of the machine - restart possible only after unlocking all actuated emergency stop elements and acknowledgement at the operating station.
Illuminated "Stop" pushbutton 	<ul style="list-style-type: none"> - switches off control - lights up red when any safety function has been triggered. (Machine is stopped safely and all drives are off.) Reset safety function (i.e. unlock emergency stop, close safety door), then press the illuminated "Start" pushbutton once to restart the machine. - is off when the machine is ready (all safety functions and components are active and the machine is ready in automatic mode). <p>- Press to stop the machine (the machine is stopped in the way it is stopped in the event of an emergency stop and all drives are switched off).</p>
Illuminated "Start" pushbutton 	<ul style="list-style-type: none"> - starts the machine in automatic mode (see description at Illuminated "Stop" pushbutton). Reset the safety function (i.e. unlock the emergency stop, close the service door), then press the illuminated "Start" pushbutton once to restart the machine) (= simultaneous reset for safety). - lights up green when the machine is switched on.

Control elements	Function
<p>“Laser On” indicator</p> 	<ul style="list-style-type: none"> - lights up yellow, when laser diods at the measuring head are active.
<p>Pushbutton "Flipper active" (unlit – green) (Only for INTACT 1200, in version with flipper it is installed in the main control cabinet at the operator's workplace)</p> 	<ul style="list-style-type: none"> - Press if overload protection has been triggered on the flipper / tire flipper to reactivate motor voltage (required after special troubleshooting to get the flipper ready for operation again).
<p>“Normal mode” indicator (only INTACT 1600)</p> 	<ul style="list-style-type: none"> -lights up yellow when the machine is running in automatic mode
<p>"Laser operating mode" key switch (only INTACT 1600)</p> 	<p>Active Laser diode is switched on (independent of process control).</p> <p>Service mode Operate the machine in service mode (laser diode in pressure chamber is always switched off).</p> <p>Normal Operate the machine in normal automatic mode (laser diode always active and switched on/off by process control).</p>
<p>"Service mode" indicator (only INTACT1600)</p> 	<ul style="list-style-type: none"> - lights up blue when the machine is in service mode

Control elements	Function
<p>"Light on" rotary switch (only INTACT1600)</p> 	<ul style="list-style-type: none"> - switches on the lighting in pressure chamber.
<p>Illuminated "Up" pushbutton (only INTACT1200 with directly mounted tilting table)</p> 	<ul style="list-style-type: none"> - hold down permanently to raise the tilting table (= jog button for raising the tilting table in jogging mode). - lights up green when illuminated pushbutton is ready for actuation. - flashes green when tilting table is in upward motion. - is off if the pushbutton is not ready for operation (e.g. if a safety function has been triggered).
<p>Illuminated "Down" pushbutton (only INTACT1200 with directly mounted tilting table)</p> 	<ul style="list-style-type: none"> - press and hold down permanently to lower the tilting table (= jog button, for lowering the tilting table in jogging mode). - lights up green when illuminated pushbutton is ready for actuation. - flashes green when tilting table is in downward motion. - is off when the pushbutton is not ready for operation (e.g. if a safety function has been triggered).

Tilting table

Control elements	Function
<p>Emergency stop</p> 	<p>Actuating the emergency stop button stops all hazardous movements of the machine Restart possible only after unlocking all actuated emergency stop elements and acknowledgement at the operating station.</p>

Control elements	Function
	For scanning of tires.

Loader

Control elements	Function
	<p>Actuating the emergency stop button stops all hazardous movements of the machine</p> <p>Restart only possible after unlocking the actuated emergency stop element and acknowledgement at the operating station.</p>
	<ul style="list-style-type: none"> - Press to raise the tilting table. - lights up green when illuminated pushbutton is ready for actuation - flashes green when tilting table is in upward motion. - is off when the illuminated pushbutton is not ready for operation (e.g. if a safety function has been triggered).
	<ul style="list-style-type: none"> - press and hold down permanently to lower the tilting table (= jog button, for lowering the tilting table in jogging mode). - lights up green when illuminated pushbutton is ready for actuation - flashes green when tilting table is in downward motion - is off when the illuminated pushbutton is not ready for operation (e.g. if a safety function has been triggered).

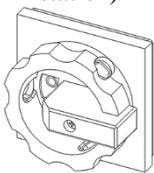
Control elements	Function
Illuminated "Stop" pushbutton (only with INTACT 1200 – with Feeder, i.e. loading belt + tilting table in front) 	<ul style="list-style-type: none"> - press to stop motion of tilting table (in particular upward motion, as downward motion is controlled by a jog button). - lights up red when motion of tilting table is active (i.e. when tilting table is moved upwards / downwards). - flashes when the machine has been restarted, or when the safety shutdown board!
Illuminated "Reset" pushbutton (only with INTACT 1200 – with Feeder, i.e. loading belt + tilting table in front) 	<ul style="list-style-type: none"> - lights up permanently in blue when safety function has been triggered. - if permanently illuminated in blue: press to reset tilting table control (i.e. if a safety function has been triggered, it must be reset via the illuminated pushbutton "Start"). Only after pressing the illuminated "Reset" pushbutton the illuminated pushbuttons for the UP/DOWN motion of the tilting table will become active and light up permanently.

Loader "Intact 1600"

Control element	Function
Not-Halt 	Actuating the emergency stop button stops all hazardous movements of the machine Restart only possible after unlocking the actuated emergency stop element and acknowledgement at the operating station.
Illuminated "Up" pushbutton (only INTACT 1600 – for loading belt with tilting function) 	<ul style="list-style-type: none"> - press and hold down permanently to raise the tilting table. - lights up green when illuminated pushbutton is ready for actuation. - flashes green when tilting table is in upward motion. - is off when the illuminated pushbutton is not ready for operation (e.g. if a safety function has been triggered).
Illuminated "Down" pushbutton (only INTACT 1600 – for loading belt with tilting function) 	<ul style="list-style-type: none"> - press and hold down permanently to lower the tilting table (= jog button, for lowering the tilting table in jogging mode). - lights up green when illuminated pushbutton is ready for actuation - flashes green when tilting table is in downward motion - is off when the illuminated pushbutton is not ready for operation (e.g. if a

Control element	Function
	safety function has been triggered).

Turning station

Control elements	Function
Main switch (only INTACT 1600 turning station) 	<ul style="list-style-type: none"> - disconnects the voltage of the turning station. - protect with a padlock while the turning station is switched off against unauthorised or accidental switching on of the turning station. <p>Clamping points at the main switch are partially live even after the main switch has been switched off!</p>
Emergency stop 	<ul style="list-style-type: none"> - actuating the emergency stop button stops all hazardous movements of the machine - restart possible only after unlocking all actuated emergency stop elements and acknowledgement at the operating station.
"Power On" indicator (only INTACT 1600 turning station) 	<ul style="list-style-type: none"> - lights up white when turning station is switched on.
"Flipper active" indicator (only INTACT 1600 turning station) 	<ul style="list-style-type: none"> - lights up green when the turning station has been activated by the INTACT control and is being moved.

Unloader

Control elements	Function
 Emergency stop	<ul style="list-style-type: none">- actuating the emergency stop button stops all hazardous movements of the machine- restart possible only after unlocking all actuated emergency stop elements and acknowledgement at the operating station.

5.4 Operating modes

Automatic mode

The normal operation (automatic mode) allows for a fully automatic control of the machine via a PC.

All interlocks relevant for machine safety are monitored by safety components of the control system. Pending system messages are shown on the PC display or can be called up and edited there.

Service mode (manual)

The service mode must be activated by entering a password and is only accessible to a specially instructed group of persons.

In this operating mode, individual axes can be moved without collision monitoring. Selecting this operating mode will not restrict any safety functions.

6 Assembly



Please read the safety instructions in chapter 2 before carrying out the work described here.

6.1 Hardware Requirements

To be able to use INTACT your system must meet the following minimum requirements:

- PC with Intel Core2 processor or higher
- At least 8 GB RAM
- At least 2 GB free hard disc memory
- Graphic card with 1280 x 1024 pixels and 32 bit
- Firewire card or network card for cameras (depending on model)
- Network adapter (hub) with an RJ45 port

6.2 Software Requirements

INTACT will only run properly if you have installed the following software:

- Windows 7 Ultimate Service Pack 1
- Internet Explorer 8 with Service Pack 3
- Driver for the hardware key
- Software and driver for the Firewire camera or GigE camera (depending on model)
- DLL files for representation of the user interface

6.3 Installation of the CodeMeter

To execute INTACT, the CodeMeter (Dongle), which is delivered with the software, is essential. It must be connected to a USB interface of the computer before INTACT is started. The driver for the CodeMeter is installed with the help of a setup program (**INTACT1200Setup.exe**).

Installation can only be undertaken in association with the INTACT software. It is described in Chapter - **1.1. Installation of the INTACT Software**.

6.3.1



Connection to the Interface

Insert the CodeMeter (Dongle) into a USB interface of your computer. The Dongle software is already installed at the time the tire testing machine is delivered. The icon is in the task bar. The color of the icon changes to green when you insert the Dongle into a USB interface.

6.3.2

Installation of a New Software License

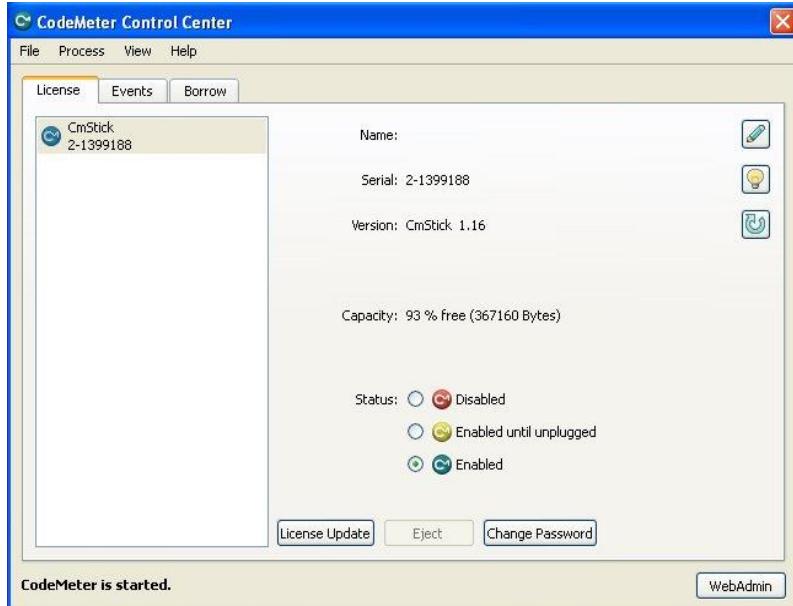
A new INTACT software license may be needed once you have installed an update or new functions. The Dongle must remain inserted in the computer when the new license is being installed.

Carl Zeiss Optotechnik GmbH will send you the file you need for installation purposes.

How to install the new license:

1. Copy the file into your computer, for instance, in the directory **D:\DongleUpdate**. The file name is made up of the Dongle serial number and the WibuCmRau supplement.

The CodeMeter Control Center displays the serial number of your Dongle.



2. Click on the symbol in the task bar to start the software for the Dongle (CodeMeter Control Center).
3. A dialog box is shown in which you will find the serial number of your Dongle. Check to see that it is the same as that of the license file.

The serial numbers of Dongle and license file must be the same.

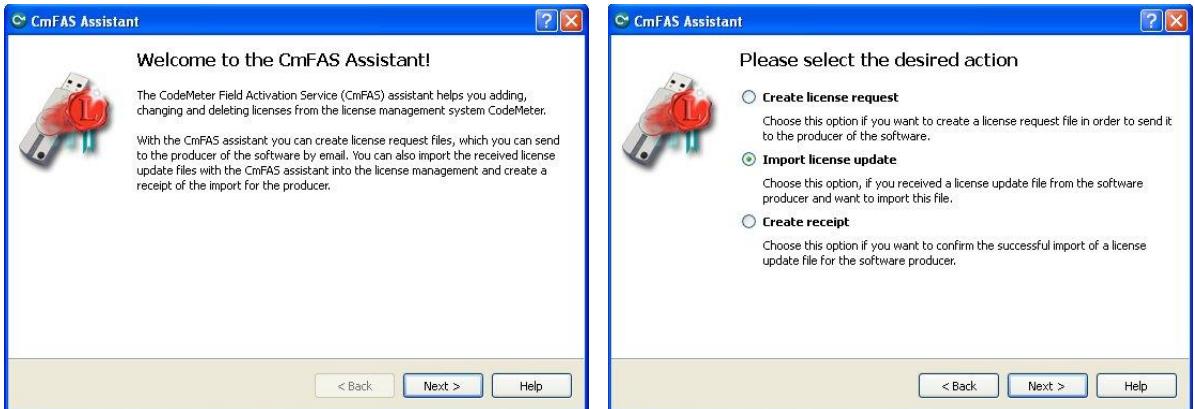
Please do not edit the license file name.



If you have received the wrong license file, do NOT continue but instead contact us.

4. Click on **License Update**. The update assistant is started.
5. Click on **Next** to start the update process.
6. Select the Import License Update in the following list box and click on **Next**.

Starting the Assistant and selecting the step.



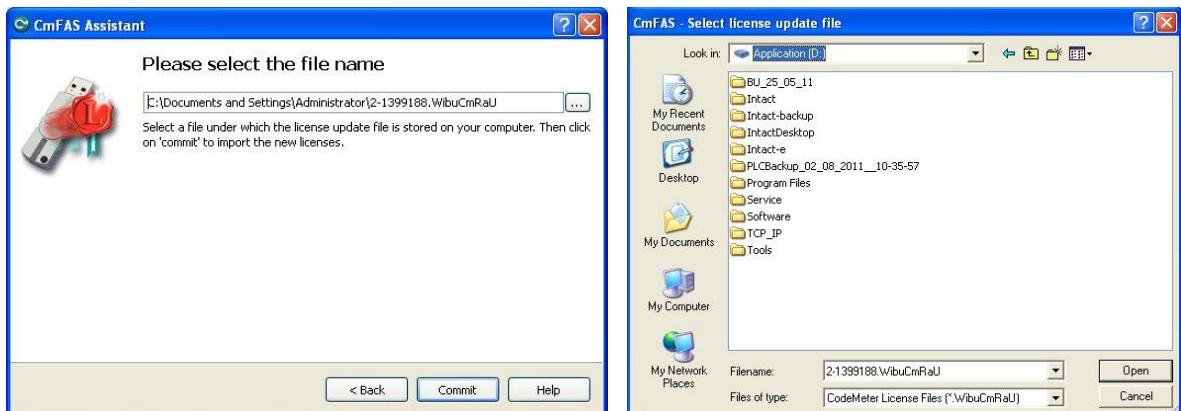
7. In the following dialog box, indicate the path in which you have stored the license file to make the entry easier, you can also click on the button behind the input line. You are then provided with a browser where you can select the path of the license file.

Click on **Application** to install the new license.

- or -

Click on **Back** to get to the previous dialog box.

*Selection of
the license
file*



8. The installation is over. Now start the INTACT software to check if the license update has been successful.

6.4 Installation of the Hardware Key

To execute INTACT, the hardware key (also called a 'dongle') which is delivered with the software is essential. Depending on the hardware key type, you need to connect it to a USB interface of your computer prior to starting INTACT. The driver for the key is installed with the help of a setup program.

6.5 Installation of the INTACT Software

To install the INTACT software, please use the installation program provided by Carl Zeiss Optotechnik GmbH.

The installation program installs all the required drivers and program sections. In this way you can also install updates.

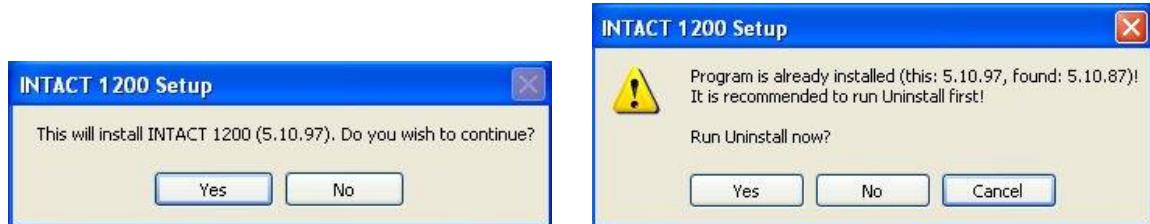
This is the way to install the INTACT software:

1. Create a backup copy of the current INTACT software by copying the program folder.
2. Double-click the **INTACT 1200Setup.exe** file.
3. A dialog box which refers to an already present INTACT software appears. Click on **Yes** to continue the installation.

- or -

Click on **No** to terminate the installation.

Recognizing the existing INTACT software.



4. Firstly uninstall the existing INTACT software. This involves the creation of a file with the settings and parameters. To uninstall the existing INTACT software, click on **Yes**.

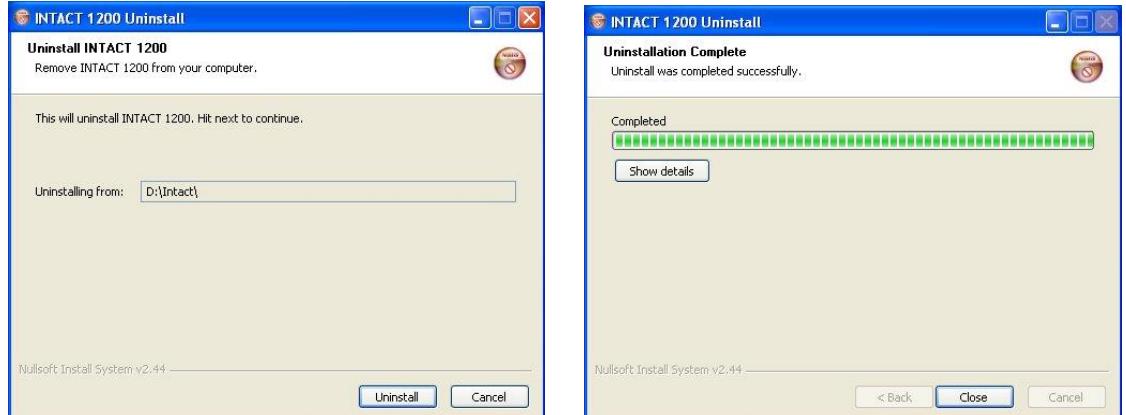
- or -

Click on **No** to continue with the installation without uninstalling the existing INTACT software.

- or -

Click on **Cancel** to terminate the installation.

Uninstalling the existing INTACT software.



5. Click on **Uninstall** to continue with the operation.
6. A dialog box shows you that uninstalling has been completed. Click on **Close**.
7. Confirm successful uninstalling by clicking on **Yes**.

- or -

Click on **No** to terminate the installation.

8. You can select the programs to be installed in the following dialog box.
Install all the programs to ensure a reliable operation of the INTACT software.

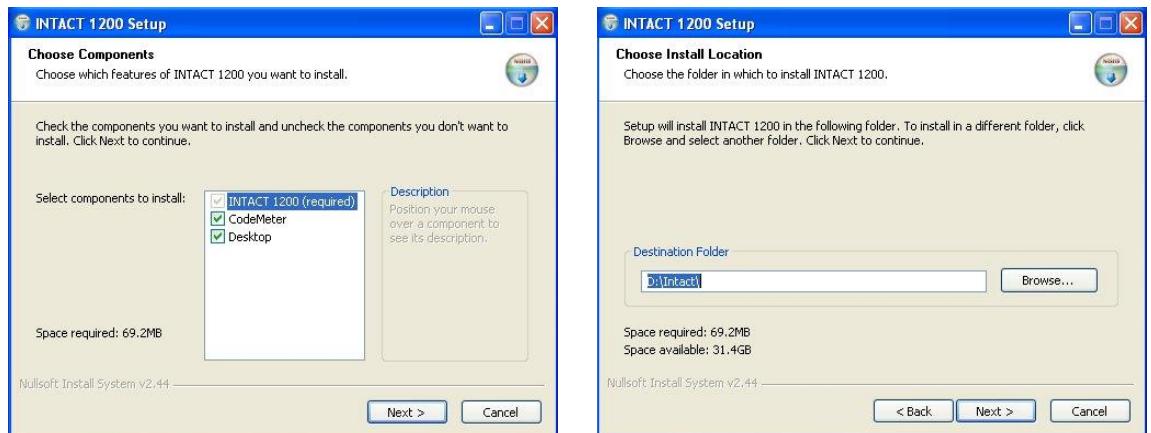
CodeMeter = Software for the Dongle
Desktop = Software for the user interface

Click on **Next** to install the selected programs

- or -

Click on **Cancel** to terminate the installation.

Selecting and installing the new INTACT software.



9. In the following dialog box you can enter the directory for the INTACT software. The directory we use is **D:\INTACT**. Click on **Next** to adopt this directory and to continue with the installation.

- or -

Click on **Back** to see the previous dialog box again.

- or -

Click on **Cancel** to terminate the installation.

10. Select the startup directory. The directory we use is **INTACT1200**. Click on **Install**. The installation is continued.

- or -

Click on **Back** to see the previous dialog box again.

- or -

Click on **Cancel** to terminate the installation.

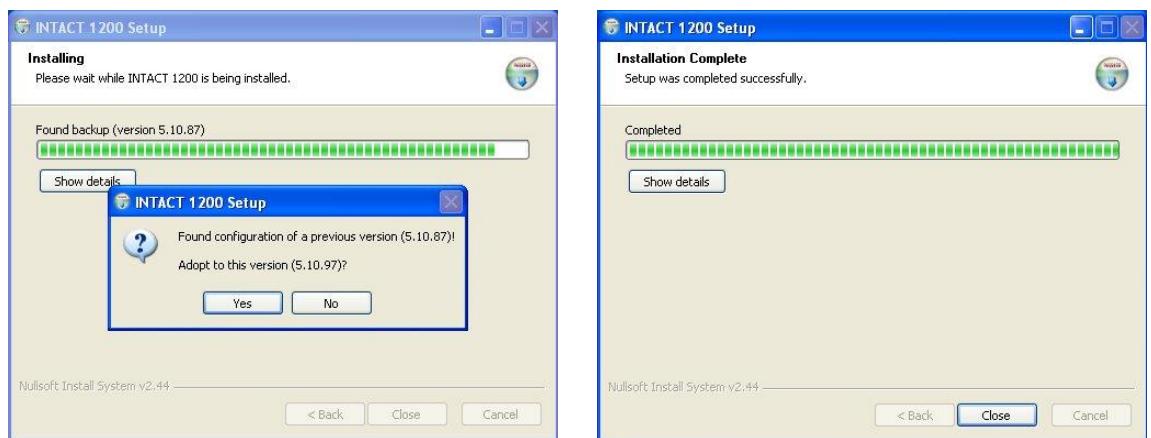
11. Installation of the new INTACT software begins. Any INTACT software which was has been uninstalled on your computer can now be configured.

Click on **Yes** to adopt this configuration.

- or -

Click on **No** to discard this configuration. Installation is continued with the standard configuration.

Adopt the previous configuration of the INTACT software.



12. With the installation successfully concluded, click on **Close**.

13. You can now start the INTACT software.

6.6 Installation of the Tire Testing Machine

The tire testing machine type INTACT is delivered fully assembled and ready-to-use. To ensure safe transport, however, it has been necessary to dismount a few parts. They include the feet. These need to be re-mounted prior to commissioning.

6.6.1

Mounting the Feet

As mentioned above, the feet have been removed prior to transport and packed in a box.

1. Unpack the feet and check whether the rubber discs are present.
2. Press the disks firmly onto the plates of the feet.
3. With a fork lifter, lift the machine high enough to screw on the feet. The machine should be about 13 cm above the floor.
4. Check whether the machine is horizontal.

6.6.2

Pneumatic Connection

With the fast coupling at the maintenance unit of the pneumatic system on the back of the machine, the system is supplied with compressed air of at least 6 bar from a compressor or compressed air system. The maintenance unit is at the back of the machine and is set to a 6 bar pressure. In case of a power cut or an emergency stop, the maintenance unit stops the supply of air. The maintenance unit and the valves can also be operated manually with the help of a hand drive. A description of how this is done is provided in the Service Manual: **Control of the Pneumatic System without Power**.

6.6.3

Installation of the Measuring Heads

The measuring heads are not removed prior to transporting the tire testing machine but simply secured. They are secured with tie-downs, which need to be removed as described above.

6.6.4

Connection of Computer and Accessories

The computer which controls the machine is in the control cabinet. The cables are already in the cabinet and have been connected to the corresponding ports on the back of the computer. The computer is not removed prior to transport.

You will find a detailed, fully illustrated description of the plug-in points in the computer documentation which is also supplied.

The printer is fitted in the operator's panel of the tire testing machine.

The monitor, keyboard and mouse are installed in the control panel of the tire testing machine. Depending on machine type, the monitor is either placed in the control panel or screwed onto the vacuum chamber. The holder is already fitted on the vacuum chamber.

5.5. Connection of Supply Voltage

6.6.5

Adjustment of Voltage

In the control cabinet of the tire testing machine, you will find a transformer where different input voltages can be adjusted. This adjustment serves to ensure that the output voltage is 220 VAC (115 VAC). The default input voltage is 380 V.

If you have a different voltage, you have to adjust the system to the value valid in your network. The possible settings are given on the transformer and in the wiring plan on Page 3.

If you do not adjust the voltage, the connected devices (computer, monitor, etc.) may be damaged or may not run properly because the voltage is too low.

6.6.6

Connection of Supply Cable

Repeat the electrical test before making the electrical connection.

Before making the electrical connection, check the setting on the installed transformer and adjust it according to the available mains voltage (if necessary). Please find further details in the electrical circuit diagram (the data sheet of the transformer is part of applicable documents)

1. Check whether all fuses **4F1 – 4Fx** in the control cabinet and the main switch **3Q1** are switched off.
2. The cable for the supply voltage is connected directly to the main switch **3Q1** in the control cabinet.
Further details are given in the wiring plan.
3. After switching on the supply voltage, the voltage at the main switch has to be at least 380 VAC. Switch on the main switch and Protective Switch **3Q2**. The voltage at the transformer output has to be 220 VAC (115 VAC). If it deviates from this value by more than +/- 10 %, you need to adjust the input voltage as described above.

Before you start adjusting the voltage, it is essential that you verify that the cables at the transformer are not under power. Failure to do so may endanger your life.



4. You can now switch on all fuses and devices (computer, monitor and printer).
5. Function test of the vacuum pump
 - 5.1. Start the tire testing software. Instructions on starting the machine are provided in Chapter **0. Start**.
 - 5.2. At the start of the program, a machine self-diagnosis is performed. This self-diagnosis also tests the function of the vacuum pump. If no vacuum is created, the pump motor might run with the wrong rotation direction. This can be checked visually by watching the fan of the pump motor. The fan must run clockwise. Otherwise, two of the three

phases of the input voltage need to be changed.

- 5.3. Terminate the INTACT software, shut down the system and switch off the machine. The lids must be closed. For a description of how to shut down the system, please refer to Chapter **9.4. Shutdown**.
- 5.4. Change two of the three phases of the input voltage for the vacuum pump. For further information see Page 3 of the wiring plan.



Before you start changing the cables, it is essential that you verify that the machine is not under power. Failure to do so may endanger your life.

6.7 Installation of the Loader and Unloader

Not all machines feature a loader. The tilting table can be screwed directly onto the vacuum chamber on request. Setting up and connecting this machine configuration is described in Section **6.7.4. Mounting the Tilting table to the Vacuum Chamber**.

The machine can also be configured to use the loader for both loading and unloading. With this configuration, no unloader is required.

The loader and unloader positions have been designed and configured according to the specifications given in your order. This makes it very easy to install the machine.

Prior to installing the loader and unloader, please pay special attention to the notes given in Section the Service Manual under **Loader/Unloader**.

6.7.1 Setup and Connection

1. Position the loader and unloader at the corresponding sides of the machine. They must be at least 5 cm away from the closed lids of the test chamber.
2. Connect the plugs for the loader to the corresponding jacks. The jacks are provided on the bottom plate of the machine. The plug and jack are marked to prevent them being mixed up or wrongly inserted.



Please make sure that the cables run underneath the cross connection and lids of the machine.

3. If the loader of your tire testing machine is provided with a tilting table, you need to connect the compressed air hose using a fast coupling.
4. If the loader is provided with a tilting table, the Control of the tilting table needs to be connected to the hub in the control cabinet.
5. The photoelectric beams and reflector must be properly mounted at the loader; they have been attached only provisionally for transport.
 - 5.1. Unscrew the holders for the photoelectric beam and reflector.
 - 5.2. Turn both of them over in such a way that the holders point upwards.
 - 5.3. Tighten the holders again.
One photoelectric beam points diagonally across the conveyor belt and the other beam is parallel to the lid. How you align the photoelectric beams is described below.

6.7.2

Alignment of the Unloader

1. Set up the unloader approx. 10 cm from the closed lid of the test chamber.
2. Insert the photoelectric beam plug into the corresponding jack. The jack is on the bottom plate of the machine.



Please make sure that the cables run underneath the cross connection and lids of the machine.

3. Align the unloader sideways in such a way that the unloader is positioned in the middle of the lid.
4. Adjust the height of the unloader in such a way that the conveyor belt in the machine and the topmost roller of the unloader are at the same height. The unloader may be lower but is not to be higher than the conveyor belt.
5. The unloader must be fastened to the floor.

6.7.3

Alignment of the Loader

1. Set up the loader at approx. 5 cm from the closed lid of the test chamber.
2. Start the INTACT software.
When self-diagnosis has been successfully completed, the lids are open and you can start aligning the loader.
You can also open the lids manually as described in the Service Manual: **Control of Pneumatics Without Electricity**.
3. Adjust the height of the loader so that the conveyor belt in the machine and that of the loader are at the same height.
4. Check whether the loader is horizontal.
5. Align the loader in such a way that the center of the measuring heads, the middle photoelectric beam and center of the tilting table form one line. This line must be at right angles to the tire testing machine and the loader. Further details are given in Section **6.8.4 Retro-Reflective Sensors at the Lead-In Lid**.
6. Align the photoelectric beams at the loader and unloader.
One photoelectric beam points diagonally across the conveyor belt (from back to front); the other beam is parallel to the lid. If your loader is not equipped with a tilting table, align both photoelectric beams parallel to the lid.
 - 6.1. Loosen the holder.
 - 6.2. Turn the holder until the orange LED of the photoelectric beam lights up.
 - 6.3. Tighten the holder again.
7. After aligning the loader, run an accuracy check. Start the INTACT software and execute a self-diagnosis.
 - 7.1. Load a tire onto the loader. Loading is described in Section **9.3.3. Load the Tire Testing Machine**.
 - 7.2. Transfer the tire to the test chamber with the **Loading** function of the **Machine** menu.
 - 7.3. You can now use the **Seek Measuring Position** function of the **Machine** menu to check eccentricity. If the eccentricity value is greater than **Zero** you have to realign the loader. The eccentricity tolerance is +/- 5 – 10 mm.

6.7.4

Mounting the Tilting table to the Vacuum Chamber

As mentioned above, the steps described here only need to be carried out if your machine does not have a loader.

1. Use a lift truck to lift up the tilting table on which the grating is side-fitted.
2. Fasten the tilting table with 8 hexagon socket screws (4 on each side).
3. Insert the plug which sets up the connection to the tilting table into the corresponding jack. The jack is on the bottom plate of the machine. The plug and jack are marked to prevent them being mixed up or wrongly inserted.



Please make sure that the cables run underneath the cross connection and lids of the machine.

4. The tilting table is also supplied with compressed air via the plug.

6.7.5

Mounting the Protective Grating

1. The individual parts of the protective grating are not labeled as any form of incorrect assembly is impossible.
2. The protective grating is the same for the loader and the unloader.
3. The machine is equipped with a control panel for the loader if the push buttons are not provided on the control cabinet.
The control panel for the loader has been removed prior to transport.
Screw the control panel to the protective grating and plug in the cable at the back of the control panel.
4. Screw the protective grating to the floor.
5. Screw the holder for the photoelectric beam to the grating of the unloader. Align the holder so that the orange LED of the photoelectric beam lights up.

6.8 Setup of the Tire Testing Machine

6.8.1

Lift axis

The lift axis of the tire testing machine does not need to be set up separately. This is done during self-diagnosis with every program start.

During self-diagnosis, the axis checks its reference position. It is then moved downwards until the photoelectric beam reaches the conveyor belt and switches itself off. This position is used as the home position for tire measurement purposes.

Mechanical influences or changes are taken into account and compensated by this procedure.

6.8.2

Shift axis

The shift axis of the tire testing machine does not need to be set up separately. This is done during self-diagnosis with every program start.

During self-diagnosis, the axis is moved to its reference point which is also the zero point. The reference point is in the center of the two measuring heads. Thus, the minimum diameter of the two measuring heads is automatically determined.

Mechanical influences or changes are taken into account and compensated by this procedure.

6.8.3

Tilt Axes¹

The tilt axes of the tire testing machine do not need to be set up separately. This is done during self-diagnosis with every program start.

During self-diagnosis, the axes are moved to their reference points which are also the zero points. After referencing, the measuring heads are aligned parallel to the tire support.

Mechanical influences or changes are taken into account and compensated by this procedure.

² Not all machines are provided with tilt axes.

6.8.4

Retro-Reflective Sensors at the Lead-In Lid

The retro-reflective sensors (laser) at the lead-in lid of the test chamber measure the diameter of the tire and check whether the tire is centered when it is moved into the machine. The three retro-reflective sensors are arranged at a fixed spacing from each other on a rail in the vacuum chamber. The rail can be adjusted.



This icon is found at the lead-in and lead-out lids as well as on the lift axis. This warning sign indicates the special danger proceeding from the retro-reflective sensors. They present a similar danger to those of the diode lasers. As the retro-reflective sensors cannot be switched off, you need to be particularly careful.

Attention: Do never touch moving axes or tilting table or doors! You could be injured. Use the conveyors only to transport tires! Never stay below the tilting table!

The reflectors are positioned opposite the 3 retro-reflective sensors. The lids need to be opened before setting the retro-reflective sensors since otherwise they will be set to an incorrect position.

1. Position the rail with the retro-reflective sensors in such a way that as much light as possible impinges on the reflectors.
2. The two hexagon socket screws are now tightened at the rail. The green and orange LEDs at the photoelectric beams must light up continuously. If the red LED lights up, this points to the fact that the retro-reflective sensor has been interrupted or that the signal is too weak. You can set the position of this retro-reflective sensor with the help of the adjusting screws provided on the holder.
3. Adjust the loading unit in such a way that the center of the measuring heads, the middle retro-reflective sensor and the center of the tire support form one line. This line must be at right angles to the tire testing machine and the loader. In Section **6.7.3. Alignment of the Loader** you will find more information.

Setting up has now been completed and should be verified in a test run.

You will find further details on the retro-reflective sensors in Section **11.8. Errors Loading the Tire**.

6.8.5

Pressure Sensor

The vacuum in the machine is monitored by a pressure sensor which transfers the digitized values to the controller. The measurement range of the pressure sensor is 0 mbar -160 mbar.

During the automatic self-diagnosis, proper functioning of the pressure sensor is checked and the sensor is set to the ambient pressure.

Mechanical influences or changes are taken into account and compensated by this procedure.

A recalibration of the sensor is usually not required, but can be performed on request. The sensor must be sent to the manufacturer for this purpose.

On request, a calibrated manometer can be installed in addition to the pressure sensor. In this way, the customer can verify the vacuum display of the software. The manometer has to be calibrated once a year. For this purpose, it must be sent to the manufacturer.

6.8.6

Tire Flip Device (Flipper)¹

1. Set up the tire flip device at a 5 cm distance from the closed lid.
2. The DOS-PLC of the tire flip device needs to be connected to the built-in hub at the main cabinet. To do so, plug in the RJ45 plug at one jack of the built-in hub.
3. Align the tire flip device sideways so that it is positioned in the middle of the lid.
4. Adjust the height of the tire flip device in such a way that the conveyor belt in the machine and the transport rollers of the tire flip device are equally high.
5. The tire flip device must be fastened to the floor.
6. Use the **Seek measuring position** function of the **Machine** menu to check if the tire is still centered after being flipped. You can change the tire's centering by sideways adjustment of the two holders that fix the tire in place during flipping.

¹ Not all machines use a tire flip device.

7 User Interface

7.1 User levels²

7.1.1

Within Microsoft Windows Operating System

The Microsoft Windows operating systems are widely known so that many users are familiar with their use and do not need special training. The proper operation of the INTACT® software requires a special configuration. To protect this configuration, specific functions have been access protected for users.

The startup screen is displayed automatically. From here, the user can start the INTACT software. Other functions may not be available, depending on the configuration.

To be able to use the operating system and our service software without limitations, you need administrator rights. Click the **Log off** button in the startup screen to get to the Login menu, in which you can log in as an administrator. You will need a password to log in.

7.1.2

Within the INTACT Software

One of the most important features of this software is its easy handling. Thus, all functions are constructed so that operation errors can be handled. In addition, a password can be assigned for access to specific functions. This results in an **Operator Level** and a **Supervisor Level**.

The Operator Level

This level allows the execution of all functions which are required for daily use in the industry, especially loading and unloading of the machine, opening and closing the lids, selection of the test programs for different tires, and, of course, automatic testing. Those functions that are not available are marked in gray in the menu.

² Not all machines are provided with or set up for this function!

The Supervisor Level

This level allows the use of all INTACT functions that are necessary, for example, for changing a test program or inspecting a tire manually. The **Supervisor Level** is password-protected.

The following function reference shows which functions and their use can be locked for operators. In this case, the function is marked [**Supervisor Level only**].

How to change from Operator Level to Supervisor Level:

1. Call the **Remove Restrictions** function in the **INTACT** menu.
2. A dialog box opens in which you can enter the password.
3. Confirm your entry with **OK**. Further details are given in the **Remove Restrictions** function description in Section **8.1.1. INTACT Menu**.

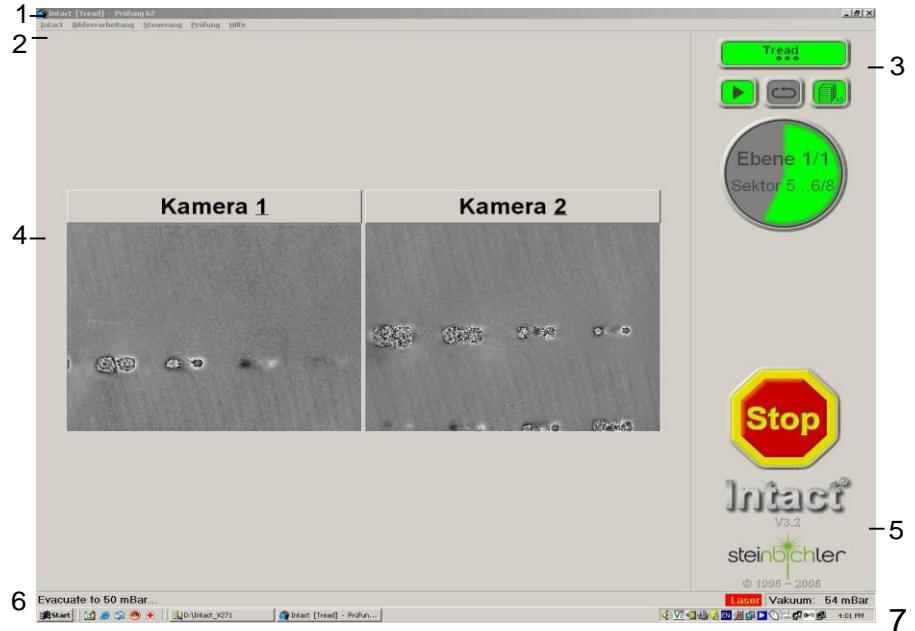
How to return to the Operator Level:

1. Select the **Exit** function of the **INTACT** menu to terminate the **INTACT** software.
2. Start the **INTACT** software. The software automatically starts up in the **Operator Level**.

7.2 Structure of the User Interface

The user interface of INTACT is divided into the following sections:

Structure of the INTACT user interface.



1. Title Bar
2. Menu Bar
3. Tool Bar
4. Window for images
5. Company symbol and version number
6. Status Bar
7. Task Bar

7.2.1 The Title Bar

At the left margin of the title bar, the name of the application appears first: **INTACT**. It is followed by the test program that is currently being used; the name of the test program is enclosed in square brackets.

The number of tire tests executed since the program start is also shown.

On the right, you see the usual Window buttons for '**minimize**', '**maximize**' and '**close**'.

7.2.2

The Menu Bar

The menu bar contains all INTACT functions. They are grouped according to themes here. With a mouse click, you start the corresponding function. As an alternative, you can also start functions by using the corresponding key combinations. For this purpose, you need to open the menu by pressing the **ALT** key together with the key for the underscored letter. When the menu is open, you press the underscored letter of the desired function. In addition, some key combinations are predefined for certain functions (the key combinations are provided behind the function name in the opened menu).

This gives you three different ways to reach the **File/Exit** function, for example:

1. Click **INTACT**. The menu opens. Now click **Exit** to start the function.
2. Press **Alt+F** to open the **INTACT** menu. Then press **X** to start the **Exit** function.
3. Start the **Exit** function directly by pressing **Ctrl + X**.

7.2.3

The Tool Bar

The tool bar is on the right of the user interface. With the icons displayed there, you can select and start a new test program. You can also switch to the test documentation even while the test is still running. After the test run is started, a large **STOP** icon is displayed. This allows you to interrupt the test cycle at any time.

Through the use of icons for the most important software functions, you can also operate the machine via a touch screen.

7.2.4

Window for images

Below the menu bar, there are the windows for the single tire sectors. Here, the images of the individual measurements are displayed. Clicking on an image enlarges it.

In the enlarged image, you can activate a local menu with the right mouse key (for changing the zoom factor and color display (Output Lut) of the image).

7.2.5

The Status Bar

Aside from general data (e.g., time and date), the status bar provides information on the program status (e.g., state of the laser diodes, current vacuum value).

7.2.6

The Task Bar

Currently active programs and applications such as INTACT and Explorer are shown in this line. By clicking an icon on the task bar, you can switch to the corresponding program.

The task bar will be hidden in Operator Mode if this option has been set in Windows. Further details are given in Section **7.1.1 Within Windows**.

8 Function Reference

8.1 Functions

8.1.1 INTACT Menu

Remove restrictions³

[Operator Level only]

Menu: INTACT / Remove restrictions

Icon: -

Key combination: Alt + I, R

With this function, you can change from Operator Level to Supervisor Level.

How to change to Supervisor Level:

1. Call the **Remove restrictions** function.
2. The input box for the password appears.
3. Enter password and confirm with **OK**.
4. All functions of the software are now available. Instead of **Remove restrictions**, the **Change password** function appears.

³ Not all machines are provided with or set up for this function!

Change password³

[Supervisor Level only]

Menu: INTACT / Change password

Icon: -

Key combination: Alt + I, C

With this function, the password for the Supervisor Level can be changed. This necessitates the **Remove restrictions** function being executed beforehand

How to change the password:

Call the **Change password** function.

The input box for the new password appears.

Enter the new password and repeat for confirmation.

Exit the input box with **OK**.

³ Not all machines are provided with or set up for this function!

Exit

[Operator Level only]

Menu: INTACT / Exit

Icon: -

Key combination: Alt + I, X

To terminate INTACT, select the **Exit** function. INTACT protects you from accidental data loss by asking if you really want to leave the program at this stage.

You can also choose to have the lids closed automatically when terminating the program. This is recommended if you will not be using the machine for a prolonged period of time.

How to close the lids when exiting the software:

1. When you click **Exit** in the **INTACT** menu, a dialog box appears.
2. Click on **Yes** to exit the software and close the lids

- or -

Click on **No** to exit the software without closing the lids.

- or -

Click on **Cancel** so as not to exit the software.

8.1.2

Image Processing Menu

Snap

[Supervisor Level only]

Menu:	Image processing / Snap
Icon:	-
Key combination:	Ctrl + B or Alt + P, S

This function is used for recording a single image in INTACT. In this function any connected video camera records an image and displays it on the screen.

How to record a single image:

1. Adjust the measuring heads to the required view.
2. Click on **Snap** in the **Image processing** menu.
3. The selected view is now displayed on the screen.

Grab

[Supervisor Level only]

Menu: Image processing / Grab

Icon: -

Key combination: Ctrl + L or
Alt + P, G

The **Grab** function shows on the screen what is currently being recorded by the video cameras. It is mainly used for service purposes.

How to obtain a live image:

1. Click on **Grab** in the **Image processing** menu.
2. On the screen you see what is currently being recorded by the video cameras.
3. Pressing the appearing **Stop** button interrupts the continuous intake of images

Realtime deformation

[Supervisor Level only]

Menu: Image processing / Realtime deformation

Icon: -

Key combination: Ctrl + V or
Alt + P, R

Before using this function, move the measuring heads to the required positions.

Realtime fringes are used for the visualization of deformations, which are recorded with the connected measuring heads. For this purpose, the original state of deformation (reference image) is continuously compared to the ongoing deformation. The interference fringes are displayed with enhanced contrast. The deformation can either be produced mechanically or by means of a vacuum. Before working with a vacuum, the **Close chamber** function must be executed.

How to display the realtime fringes:

1. Click on **Realtime deformation** in the **Image Processing** menu. In the windows, the realtime recordings are displayed.
2. By pressing the **Stop** button which now appears, you terminate the function.
3. The phase images of the total deformation between start and end of the realtime acquisition are displayed.

8.1.3

Machine Menu

Feed

[Supervisor Level only]

Menu: Machine / Feed

Icon: -

Key combination: Alt + M, F

This function starts the tire loading system.

The lids must be opened beforehand and the measuring heads moved upwards. The tire is transported into the machine and measured automatically. The measuring result is used for positioning the measuring heads.

If a tire is in the test chamber, it is automatically moved out.

Convey

[Supervisor Level only]

Menu: Machine / Convey

Icon: -

Key combination: Alt + M, C

With this function, you can transport a tire into the machine and/or out again without measuring it.

How to transport a tire:

1. Click on **Convey** in the **Machine** menu.
2. The **Convey** dialog box appears.
3. You can change the **Distance**, the **Direction** and the **Speed**.
4. Click on **OK** to start transfer and leave the dialog box.

- or -

Click on **Cancel** to leave the dialog box without starting the transport.

5. By clicking **Stop** you stop the transport.

*Dialog box for
transporting a tire.*



Unload

[Operator Level only]

Menu: Machine / Unload

Icon: -

Key combination: Alt + M, U

This function permits a tire to be transported from the vacuum chamber without being tested when no further tire is to be tested. The measuring heads must be in the home position and the lids opened in order to use this function.

How to transport a tire:

1. Click on **Unload** in the **Machine** menu
2. The tire is transported onto the unloader.

Flip⁵

[Supervisor Level only]

Menu: Machine / Flip

Icon: -

Key combination: -

With this function, you can flip a tire without having tested it. The measuring heads have to be in the home position and the lids opened in order to use this function. To flip a tire, it first has to be transferred to the machine and measured.

The **Flip** function distinguishes between whether a tire flipper is connected to the machine or not.

How to flip a tire using a flipping device (only INTACT 1200):

1. Click on **Feed** in the **Machine** menu.
2. The tire is transported to the machine.
3. Click on the **Seek measuring position** in the **Machine** menu. A dialog box is displayed.
4. Click on the **Arrow** button. The measuring heads are lowered to determine the tire width.
5. Click on **Home** to retract the measuring heads to their zero position.
6. Click on **Stop** to close the dialog box.
7. The **Flip** function is enabled. Click on **Flip** in the **Machine** menu.
 - 7.1. The flipping device is prepared for taking up the tire.
 - 7.2. The tire is conveyed from the machine to the flipping device.
 - 7.3. The tire is flipped and conveyed back into the machine.

⁵ Not all machines provide this function!

How to flip a tire using a flipping device:

1. Click on **Feed** in the **Machine** menu.
2. The tire is transported to the machine.
3. Click on the **Seek measuring position** in the **Machine** menu. A dialog box is displayed.
4. Click on the **Arrow** button. The measuring heads are lowered to determine the tire width.
5. Click on **Home** to retract the measuring heads to their zero position.
6. Click on **Stop** to close the dialog box.
7. The **Flip** function is enabled. Click on **Flip** in the **Machine** menu.
 - 7.1. A dialog box prompts you to press the **Up** button on the tilting table's control panel.
 - 7.2. The tilting table moves up and the tire is transported to it.
 - 7.3. A dialog box prompts you to press the **Down** button on the tilting table's control panel.
 - 7.4. The tilting table moves down and you can then flip the tire.
 - 7.5. Press the **Up** button on the tilting table's control panel. The tilting table moves up and the tire is transported to the vacuum chamber.

Automatic reload

[Supervisor Level only]

Menu: Machine / Automatic reload

Icon: -

Key combination: -

This function is only enabled when the machine has an additional conveyor belt on the loader side. With this function, you can transfer the tire to the machine without placing more tires on the belt.

How to reload a tire automatically:

1. Click on **Automatic reload** in the **Machine** menu.
2. The tire is conveyed to the machine.

Manual control of the flipper⁵ (only INTACT 1200)

[Supervisor Level only]

Menu: Machine / Manual control of the flipper

Icon: -

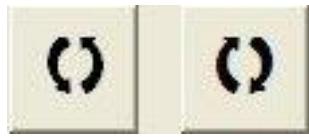
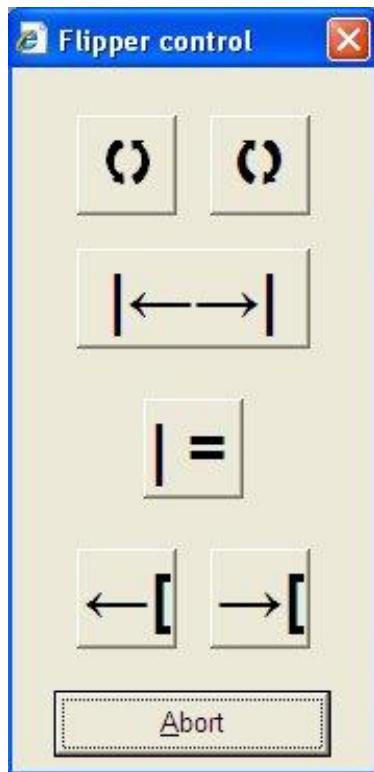
Key combination: -

This function is only enabled when the machine has a Flipper.

How to operate the Flipper:

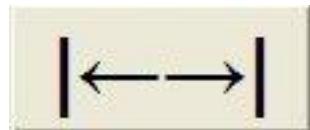
1. Click on **Manual Control of the Flipper** in the **Machine** menu.
2. A dialog box with icons is provided. Make use of the icons to execute the flipper functions.
3. Click on **Abort** to close the function.

Dialog box for controlling the Flipper.

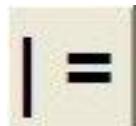


By clicking one of these buttons you turn the cage clockwise or anticlockwise. The cage keeps turning for as long as the button is pressed or until the final position is reached.

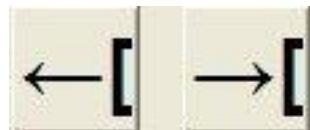
⁵ Not all machines provide this function!



By clicking the button, the horizontal beams holding and centering the tire when it is being turned are either opened or closed - depending on their position.



By clicking on this button, the cage is either closed or opened - depending on its position.



By clicking one of these buttons, the conveyor rollers are turned either clockwise or anticlockwise. This function is only present when the flipper is equipped with driven rollers.

Open lid

[Supervisor Level only]

Menu: Machine / Open lid

Icon: -

Key combination: Ctrl + Page up or
Alt + M, L

With this function, the chamber of the tire testing machine are opened.

Beforehand, the software checks the pressure in the vacuum chamber. If there is negative pressure, the chamber is ventilated until the ambient pressure is reached.

Close lid

[Supervisor Level only]

Menu: Machine / Close lid

Icon: -

Key combination: Ctrl + Page dn or
Alt + M, L

This function provides for lid-closure enabling. Before closing the chamber, the function checks whether an object (e.g., a tire) is located actually in the danger area.

Evacuate

[Supervisor Level only]

Menu: Machine / Evacuate

Icon: -

Key combination: Alt + M, E

With the **Evacuate** function, you can set a negative pressure in the vacuum chamber in a range between **0** mbar and **80** mbar. The lids must be closed beforehand! Details on how to close the lids are given above.

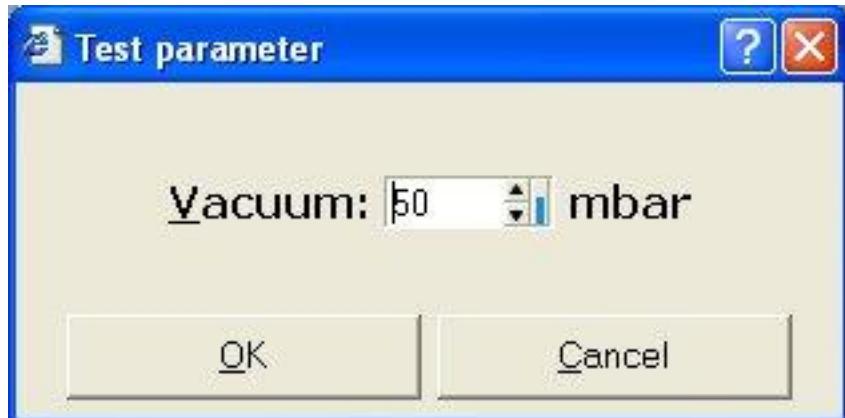
How to evacuate the vacuum chamber:

1. Call **Evacuate** in the **Machine** menu.
2. A dialog box appears to set the negative pressure required for the vacuum chamber.
3. Click on **OK**. The vacuum pump is started. When the required negative pressure is reached, the changeover valve upstream of the vacuum pump is closed.

- or -

Click on **Cancel** to close the dialog box without generating a negative pressure.

Dialog box for setting the low pressure for the vacuum chamber.



Ventilate

[Supervisor Level only]

Menu: Machine / Ventilate

Icon: -

Key combination: Alt + M, V

With this function, the machine is ventilated until the ambient pressure is reached.

Stop pump

[Supervisor Level only]

Menu: Machine / Stop pump

Icon: -

Key combination: Alt + M, P

The vacuum is produced by a pump which is always started when any function changes the pressure.

After completion of the automatic cycle, the pump is automatically switched off. However, it keeps on working when the pressure is changed manually with the **Evacuate** or **Ventilate** functions. This is only a noise problem, and with this function the pump can be switched off.

Measure head home

[Supervisor Level only]

Menu: Machine / Measure head home

Icon: -

Key combination: Ctrl + Home or
Alt + M, M

With this function, the measuring heads are moved to the home position so that an inserted tire can be removed from the machine or a new tire transferred to it.

Seek measuring position

[Supervisor Level only]

Menu: Machine / Seek measuring position

Icon: -

Key combination: Alt + M, S

The **Seek measuring position** function is used for service and special tests. The measuring heads are positioned according to your specifications to allow for tire inspection. Before you can execute the function, a tire must have been transferred to the machine.

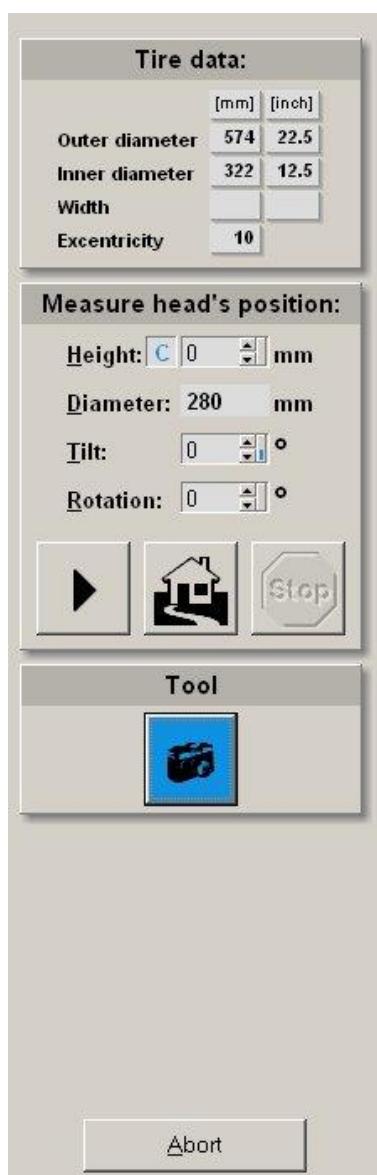
How to find the measurement position:

1. Call **Feed** in the **Machine** menu. A tire will be transferred to the machine.
2. Click on the **Seek measuring position** in the **Machine** menu.
3. The window shown in the figure on the left opens and displays the tire data established by the machine (inside and outside diameters, centering error and axis position).
4. Enter the desired axes positions in the corresponding input fields.
5. Click on the **Arrow**. The measuring heads move to the target positions you have indicated. Click on **Camera** to display the continuous images taken by the cameras.

- or -

Click on **Abort** to exit the dialog box without moving the measuring heads.

For a description of the icons and buttons, please refer to the **Single Sector** function.



Rotate measure head

[Supervisor Level only]

Menu: Machine / Rotate measure head

Icon: -

Key combination: Alt + M, R

With this function, you can turn the measuring heads to any position between 0° and 170° (350°). In the automatic test run, the required measuring head positions are automatically obtained.

How to turn the measuring heads:

1. Call the **Rotate measuring head** function in the **Machine** menu.
2. A dialog box appears in which you enter the required position.
3. Click on **OK**. The measuring heads are turned to the required position.

- or -

Click on **Cancel** to leave the dialog box without turning the measuring heads.

Dialog box for entering the position to which you want to rotate the measuring heads.



8.1.4

Test Menu

Selection

[Operator Level only]

Menu: Test / Selection

Icon:



Key combination: Alt + T, S or F7

With the **Selection** function of the **Test** menu, you can choose the desired program from a predefined list of test programs. The tire is tested fully automatically.

How to select a test program:

1. Click on the **Test Programs** icon on the tool bar.

-or -

2. Click on the **Selection** option in the **Test** menu.

-or -

Press the key combination **Ctrl + 1 ... Ctrl + 9** (the numeric keys associated with the individual test programs are shown in the selection list).

3. The icon on the tool bar shows the selected test program.
3. By pressing key combination **Ctrl + F7**, you set the software to show the list of test programs either only if desired or after each test. The icons indicate which mode is currently active.



The test programs are only displayed if desired.



The test programs are displayed automatically after each test.

Selection / Tread³

[Operator Level only]

Menu: Test / Selection /Tread

Icon: -

Key combination: Ctrl + number of the test program

This test program checks the tread and shoulder of the tire.

After the start of the test program, the tire is transferred to the machine and measured. With the help of this data, the measuring heads are positioned.

⁴ This function may be customer-specific and therefore not available on all machines!

Selection / Bead 2 BeadFlip⁴

[Operator Level only]

Menu: Test / Selection / Bead 2 BeadFlip

Icon: -

Key combination: Ctrl + number of the test program

This test program checks the whole tire.

After the start of the test program, the tire is transferred to the machine and measured. With the help of this data, the measuring heads are positioned.

In the first test layer, the tread and shoulder of the tire are tested. The second test layer comprises testing the upper side wall and bead from the outside. When this layer has been completed, the tire is transferred from the machine and turned over. It is then loaded back into the machine and the third test layer is started.

In this test layer, the side wall that is now on top together with the bead are tested from the outside.

⁴ This function may be customer-specific and therefore not available on all machines!

Selection / BeadFlipBead⁴

[Operator Level only]

Menu: Test / Selection /BeadFlipBead

Icon: -

Key combination: Ctrl + number of the test program

This test program tests the two side walls and the bead on both sides.

After the test program start, the tire is transferred to the machine and measured. With the help of this data, the measuring heads are positioned.

In the first test layer, the upper side wall and bead from the outside are tested. The tire is then transferred to the turning mechanism and turned over. It is then transferred to the machine.

The second test layer comprises testing the upper side wall and bead from the outside.

If you want to test other parts of the tire, such as the tread, you need to call and run the corresponding test programs at the end of this test.

⁴ This function may be customer-specific and therefore not available on all machines!

Selection / BeadTopOnly⁴

[Operator Level only]

Menu: Test / Selection / BeadTopOnly

Icon: -

Key combination: Ctrl + number of the test program

This test program checks the upper side wall and the bead.

If you want to test other parts of the tire, such as the tread, you need to call and run the corresponding test programs at the end of this test.

After the start of the test program, the tire is transferred to the machine and measured. With the help of this data, the measuring heads are positioned.

⁴ This function may be customer-specific and therefore not available on all machines!

Selection / Conveying through⁴

[Operator Level only]

Menu: Test / Selection / Conveying through

Icon: -

Key combination: Ctrl + number of the test program

This test program transfers the tire through the vacuum chamber without checking on it.

If you want to test the tire, such as the tread, you need to call and run the corresponding test program.

After the start of the test program, the tire is transferred to the machine and immediately passed on to the unloader.

⁴ This function may be customer-specific and therefore not available on all machines!

Selection/ Single Sector⁴

[Supervisor Level only]

Menu: Test / Selection / Single Sector

Icon:

Key combination: Ctrl + number of the test program

With this function, the tire is manually tested. The tire is automatically transported to the machine if no tire is in the test chamber. The lids of the machine are closed and the measuring heads are moved to the required positions. When the correct positions are reached, a tire sector is tested.

With the following steps, you can test a tire manually:

1. In the **Test** menu, go to the **Selection** function and select the **Single Sector** program as described above.

2. Press the **F5** key to start the test program.

3. The lids are closed and the measuring heads are moved to the tire center (default setting “**C**”).

4. A dialog box opens.

It shows the values which the machine measured for the tire (inside and outside diameters as well as centering error).

5. In the **Measuring head's position** group box, you can enter the required target positions for the lift, shift and rotation axis.

6. You can also change the test vacuum in this dialog box.

7. Click on the **Arrow**. The software now checks whether the target position can be reached and moves the measuring heads (see further down).

- or -

Click on **Abort** to exit the dialog box.

8. Click on **Camera**. The software shows the current video image.

9. Click on the **Checkmark** to start the selected sector test.
The result image is shown in the test documentation.

- or -

Click on **Abort** to exit the dialog box.

10. To take the tire out of the machine, use the **Convey** or **Unload** function of the **Machine** menu.

-or -

Start the next automatic test.



⁵ Not all machines provide this function!

Meanings of the Buttons

1. Arrow



By clicking on this button, you move the measuring heads to the positions you defined for the individual axes. If a position cannot be reached, the software detects this. It then automatically moves the measuring head to the possible minimum or maximum position.

To change the position, you first need to change the numeric value of the corresponding axis, e.g. the rotation axis. Then click again on the "Arrow" button.

2. Home



When you click on this button, the measuring heads are moved to their home positions. This is necessary when you want to unload the tire. By starting an automatic test, the measuring heads are automatically moved to the home position.

3. Stop

Click on the "Stop" button to stop axis movement. This button is only enabled while the axes are moving. You can change the positions.

4. Camera



When you click on this button, you see the video images of the measuring heads. In this way, you can watch axis movement online and evaluate the positions the axes have moved to. The button color changes when the button is enabled.

5. Checkmark

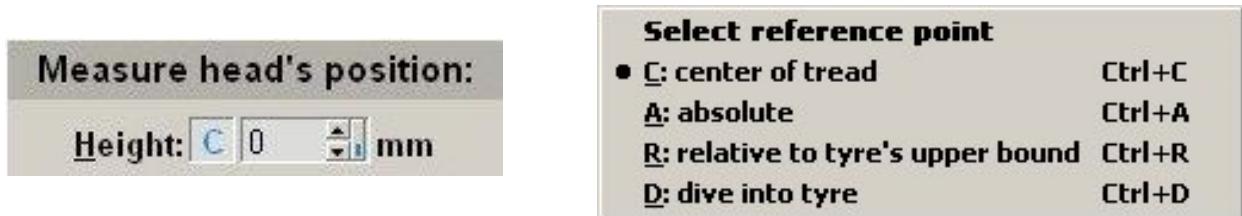


Clicking on this button starts the measurement. The measuring heads are not moved. The negative pressure set in the **Test Vacuum** function is used for the test. The test results are shown in the test documentation. The tire is not automatically taken out of the machine. You can test another sector of the tire by restarting the test program.

Reference Points for “Single Sector”

The “Single Sector” test program includes four different reference points. These reference points are also used for the “Seek measuring position” and „Manual Setting“ functions. The reference points are required for positioning.

You open a list box by clicking on the button directly in front of the **Height** input field.



1. C

The reference point is the center of the tire tread.

Positive values: upward

Negative values: downward

2. A

The reference point is the conveyor belt. The measuring heads move to a position to reflect the indicated spacing to the conveyor belt.

The minimum value that may be moved to is approx. 70 cm (spacing between belt and objective lens axis).

Negative values are not possible.

3. R

The reference point is the upper side wall of the tire. The measuring heads move upwards along the spacing specified to the side wall.

Positive values: upward

4. D

The reference point is the upper side wall of the tire. The measuring heads move upwards along the spacing specified to the side wall.

Positive values: downward

Selection / Manual Setting⁵

[Supervisor Level only]

Menu: Test / Selection / Manual Setting

Icon: -

Key combination: Ctrl + number of the test program

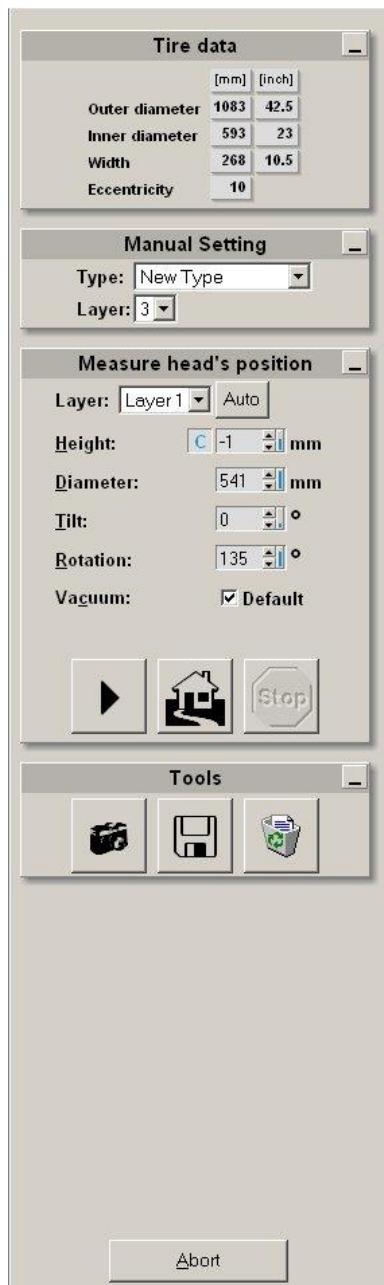
With this function, the tire is automatically transferred to the machine, the lids are closed and the measuring heads are moved to the required positions. The parameters can be saved and reloaded when required.

How to find the manual settings:

1. In the **Test** menu, go to the **Selection** function and select the **Manual Setting** program as described in Section 8.1.4. **Test Menu**
Start the test.
2. The lids are closed and the measuring heads are moved to the tire center (default setting "C").
3. A dialog box opens.
It shows the values which the machine measured for the tire (inside and outside diameters as well as centering error).
4. In the **Measure head's position** area, you enter the required target positions for the lift, shift and rotation axis and you specify the number of layers.
5. You can also enter a specific value for the test vacuum with the **Vacuum** function or use the default setting.
6. Click on the "Arrow" to move the measuring heads to the target positions.
7. When you have determined the correct positions, you can save the parameters. Click on the **Diskette** button.

- or -

Click on **Abort** to close the dialog box without saving the parameters.



How to create a new parameter record:

1. Click on the arrow in the **Type** line.
2. A list of all parameter records is displayed.
3. Select **New Type**. A dialog box is displayed. You can now enter the tire designation into the input box.

⁵ Not all machines provide this function!

4. Click on **OK** to save the tire designation and return to **Manual Setting**.

- or -

Click on **Abort**

5. In the next line, you choose how many layers you want to create (**One Layer** or **Two Layers**).
6. In the **Layer** line, select the layer you want to edit (**Layer 1** or **Layer 2**).
7. Select the reference point (see **Single Sector**).
8. In the following dialog boxes, you specify the measuring head positions and the vacuum value.
9. Click on the **Arrow** to move the measuring heads to the specified positions. Click on **Camera**. The continuous images taken by the cameras are displayed.
10. If you have chosen two layers, you need to carry out steps **6, 7** and **8** separately for each layer.
11. Click on the **Diskette** button to save the parameters.

- or -

Click on **Abort** to close the dialog box without saving the parameters.

How to edit a parameter record:

1. Click on the arrow in the **Type** line.
2. A list of all parameter records is displayed.
3. Select the parameter record you want to edit. The current values are displayed.
4. Change the axis positions as required and click on the **Arrow**. The measuring heads move to the new positions. Click on **Camera**. The continuous images taken by the cameras are displayed.
5. Click on the **Diskette** to save the parameters.

- or -

Click on **Abort** to close the dialog box without saving the parameters.

Attention: The parameter record will be overwritten immediately without a confirmation prompt or warning message.

How to delete a parameter record:

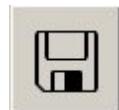
1. Click on the arrow in the **Type** line.
2. A list of all parameter records is displayed.
3. Select the parameter record you want to delete. The current values are displayed.
4. Click on the **Recycle bin** button. The parameter record is deleted.

- or -

Click on **Abort** to close the dialog box without deleting the parameter record.

Attention: The parameter record will be deleted immediately without a confirmation prompt.

Meanings of the Buttons



1. **Diskette**

Click on this button to save the parameters. You do not have to confirm your entry. The parameter records are saved in the **D:\INTACT\TestProgs\ManualSettings.xml** file.

2. **Recycle Bin**

Click on this button to delete the selected parameter record. No confirmation prompt will be displayed.

For a description of the other icons and buttons, please refer to the **Single Sector** function.

Selection / Run Manual Setting⁵

Menu: Test / Selection / Run Manual Setting

Icon: -

Key combination: Ctrl + number of the test program

This program is intended for measuring tires of a special geometry. With this function, the tire is automatically loaded into the machine and tested in a single layer (e.g. only the tread). Before testing the tire, you select a parameter record that matches the tire. The parameter record needs to be created previously. It specifies the measuring head positions (see “**Manual setting**”).

How to test using manual settings:

1. In the **Test** menu, go to the **Selection** function and select the **Run Manual Setting** program as described in Section **8.1.4. Test Menu**
2. Select the **Test** function of the **Test** menu to start the tire measurement.

- or -

Click on the **Arrow**.

-or-

Press the **F5 key** on the keyboard.

3. A dialog box with a drop down list box opens.
4. Click on the **Arrow**.
5. The drop down list box opens and displays the list of available parameter records.
6. Click on the desired parameter record.
7. Click on **OK** to start the test using the selected parameter record. A message is displayed if the tire cannot be tested with the selected parameter record.

- or -

Click on **Abort** to close the dialog box without starting the test.

⁵ Not all machines provide this function!

Selection / Combined Setting⁵

[Supervisor Level only]

Menu: Test / Selection / Combined Setting

Icon: -

Key combination: Ctrl + number of the test program

With the **Combined Setting** function, you create a combined test program from the **Manual Settings**. This function can be used without loading a tire into the machine. How the **Manual Settings** are created is described above.

How to create a combined test program:



1. In the **Test** menu, go to the **Selection** function and select the **Combined Setting** program.
2. Select the **Test** function of the **Test** menu to start the tire measurement.
 - or -

Click on the **Arrow**.

-or-

- Press the **F5** key on the keyboard.

3. A dialog box with a drop down list box opens.
4. Click on the arrow in the **Setting** line.
5. A list of all parameter records is displayed.
6. Select **New Setting**. A dialog box is displayed. You can now enter the tire designation into the input box.
7. The **Layer** boxes allow one to choose a manual or automatic test program for testing the tire.
In the first column, specify the tire section that is to be tested with the program you select in the second column.
The **Flip** layer does not need to be assigned a test program.
8. Click on the **Diskette** button to save the parameters.

- or -

Click on **Abort** to close the dialog box without saving the parameters.

Attention: The parameter record will be overwritten immediately without a confirmation prompt or warning message.

⁵ Not all machines provide this function!

How to delete a parameter record:

1. Click on the arrow in the **Tire Type** line.
2. A list of all parameter records is displayed.
3. Select the parameter record you want to delete. The current values are displayed.
4. Click on the **Recycle bin** button. The parameter record is deleted.

- or -

Click on **Abort** to close the dialog box without deleting the parameter record.

Attention: The parameter record will be deleted immediately without a confirmation prompt.

Selection / Run Combined Setting⁵

Menu: Test / Selection / Run Combined Setting

Icon: -

Key combination: Ctrl + number of the test program

This program is intended for measuring tires of a special geometry. With this function, the tire is automatically loaded into the machine and tested in one or more layers (e.g. tread, side walls, etc). Before testing the tire, you select a parameter record that matches the tire. The parameter record needs to be created previously. It specifies the measuring head positions (see “**Combined Setting**”).

How to test using combined settings:

1. In the **Test** menu, go to the **Selection** function and select the **Run Manual Setting** program as described in Section **8.1.4. Test Menu**
2. Select the **Test** function of the **Test** menu to start the tire measurement.

- or -

Click on the **Arrow** button.

-or -

Press the **F5 key** on the keyboard.

3. A dialog box with a drop down list box opens.
4. Click on the **Arrow** button.
5. The drop down list box opens and displays the list of available parameter records.
6. Click on the desired parameter record.
7. Click on **OK** to start the test using the selected parameter record. A message is displayed if the tire cannot be tested with the selected parameter record.

- or -

Click on **Abort** to close the dialog box without starting the test.

⁵ Not all machines provide this function!

Selection / ImportTestDoc⁵

[Operator Level only]

Menu: Test / Selection / ImportTestDoc

Icon: -

Key combination: Ctrl + number of the test program

By using this function, test results already saved can be loaded into the test documentation.

The scope exists to measure and mark any faults in the tire. Although the images can be printed, they cannot again be saved.

How to load the test results into the test documentation:

1. In the **Test** menu, go to the **Selection** function and select the ImportTestDoc program as described in Section **8.1.4. Test Menu**

2. Select the **Test** function of the **Test** menu to start the tire measurement

- or -

Click on the **Arrow**.

-or-

Press the **F4 key** on the keyboard.

3. A dialog box with a drop down list box opens.

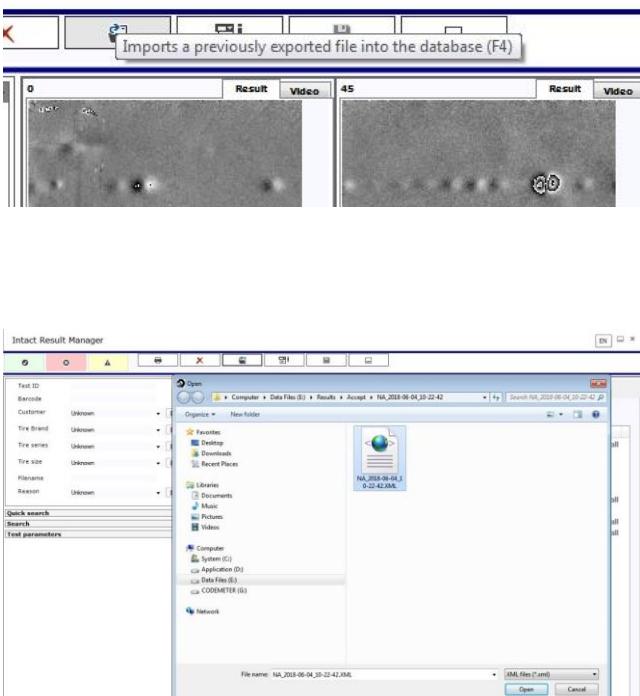
4. Double-click the directory where the test results are saved in order to open it.

5. Click on the directory you want to open.

6. Click on **OK** to close the dialog box and display the test results saved in the test documentation.

- or -

Click on **Abort** to close the dialog box without displaying the test results saved in the test documentation.



⁵ Not all machines provide this function!

Selection / Verify Function⁵

[Supervisor Level only]

Menu: Test / Selection / Verify Function

Icon: -

Key combination: Ctrl + number of the test program

This test program provides operators and service engineers with an easy means of checking whether the measuring heads and the image processing feature are functioning properly.

How to call the Verify Function:

1. In the **Test** menu, go to the **Selection** function and select the **Verify Function** program as described above.
2. Select the **Test** function of the **Test** menu to start the tire measurement.

- or -

Click on the **Arrow**.

-or -

Press the **F5** key on the keyboard.

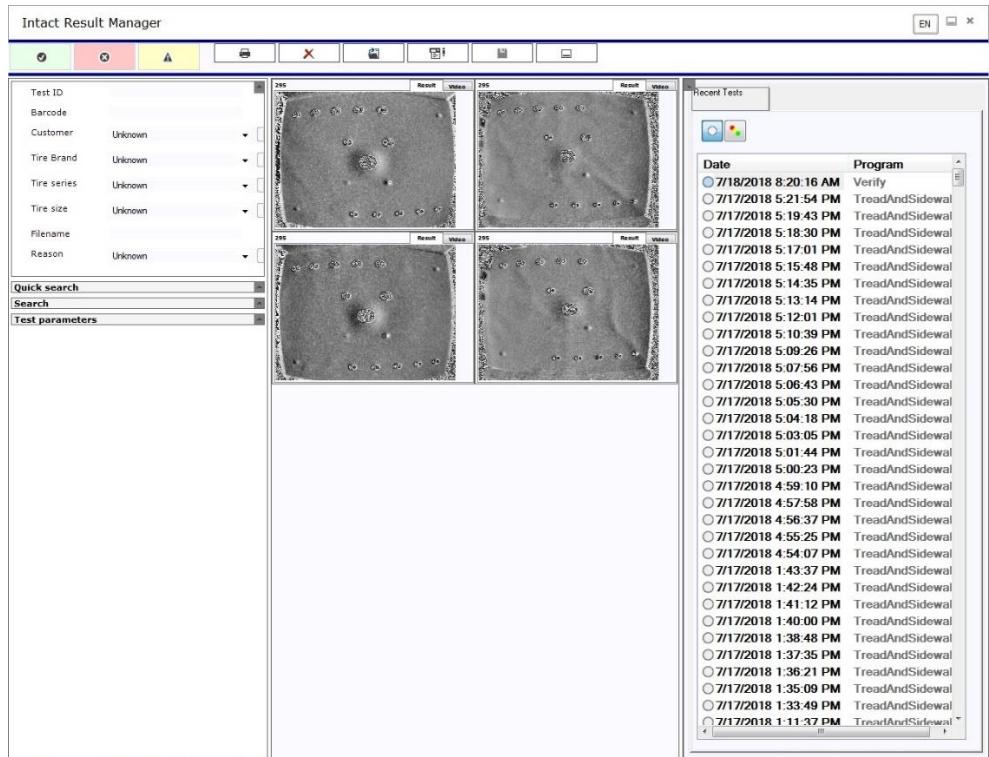
After calling the function as described above, the measuring heads are automatically moved to the positions for testing the built-in Verify Bodies.

On completion of the test, the result images are displayed in the **Test Documentation**. The **Test Documentation** shows the phase and video images of both measuring heads. For a detailed description of the **Test Documentation**, see the **Results** function.

⁵ Not all machines provide this function!

You can switch back and forth between the phase and video images by clicking on the tabs. In the video image, four hash marks are shown. 4 inches up and 5 inches across is the spacing between the hash marks.

The Test Documentation
window with the result of
the **Verify Function**.



How to check the lateral calibration:

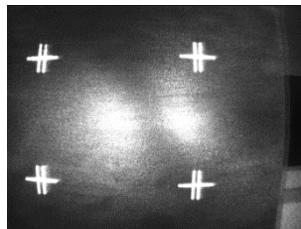
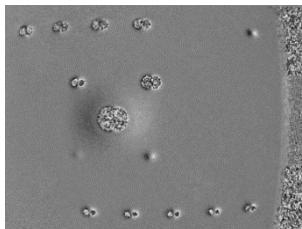
1. Move the mouse into the corner of the upper left hash mark.
2. Click the right mouse button.
3. Move the mouse into the corner of the lower right hash mark. The right button must remain pressed when doing this.

If the displayed result deviates from the original images, the measuring heads and image processing feature need to be examined. The original images are in 13.Appendix, together with the data of the sizes of the air bubbles.

The following section provides a list of the possible reasons for errors. For a description of how to remedy these errors, please refer to Service Manual chapter **Service/Maintenance** and **11. Trouble Shooting of this manual**.

These errors might occur:

Phase image	Video image	Cause	Solution
		The Verify Function has been properly executed. The machine is ready to run.	-
		Mode hopping of a diode laser during measurement. In this example, the diode laser to the left of the objective lens has changed its mode.	11.5.1. Mode Hopping of Single Diode Lasers
		One or more diode lasers are defective. In this example, the diode laser fitted well out to the left and which illuminates the lower part of the image is defective and must be replaced.	Fehler! Verweisquelle konnte nicht gefunden werden. Visual Check of Diode Lasers as described in service manual. Exchange of Defective Diode Lasers 11.5.3. Single Diode Lasers Defective
		The Verify Body is leaking air somewhere, which results in pressure compensation during measurement. The top left error in the center is not visible.	The Verify Body has to be replaced as described in service manual.
		The positions of the tilt axes are incorrect. The axes tilt up too far. A reason may be that they were not in home position when the function was started. If the upper errors are not visible, this means that the tilt axes have not tilted up far enough. The axis drive is defective.	Use the Measure head home function of the Machine menu to move the tilt axis to home position. If the tilt axis does not tilt up far enough, check the tension of the toothed belts first and tighten them. A description of how this is done is given in Service Manual, Sections Tilt axis , Tensioning of the Toothed Belts and 11.3.11. Referencing the Measuring Head Tilt Axis .



A problem has occurred at the rotation axis as it cannot move to the specified position.

A problem has occurred at the rotation axis. The axis cannot move to the specified position.

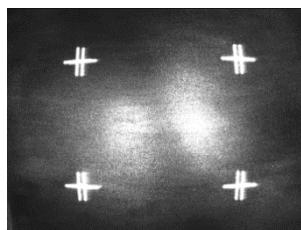
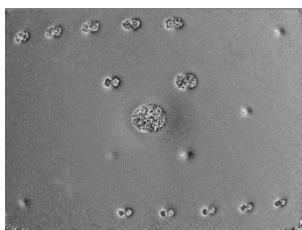
The rotation axis moves too far, e.g. because it was not in home position when the function was started or because the inductive switch has moved or the holder for the Verify Body has moved or has not been properly set.

The drive might also be defective.

Use the **Measure head home** function of the **Machine** menu to move the rotation axis to home position.

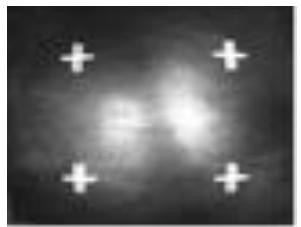
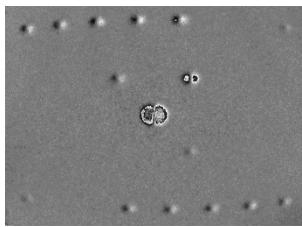
When in home position, the measuring heads are parallel to the conveying direction. In this position, the inductive switch must be actuated.

Check whether the second video image, which shows the second Verify Body, also shows an offset. See Section **11.3.10 Referencing the Rotation Axis** for further information.



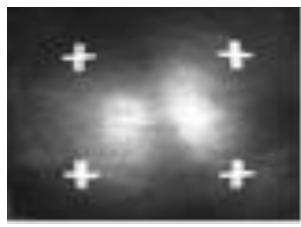
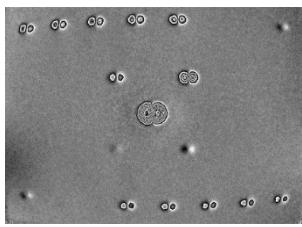
The rubber plate has come loose from the base plate and formed an air bubble.

Replace the Verify Body with a new one.



The test pressure was too low.

Contact ZEISS service!



The test pressure was too high

Contact ZEISS service!

Test

[Operator Level only]

Menu: Test / Test

Icon:



Key combination: Alt + T, T or F5

To start an automatic test run, use this function. The tire to be tested is then transferred to the test chamber and measured so that the measuring heads automatically move to the correct positions. The result images of the single sectors are displayed one after the other.

On completion of the test, the **Test Documentation** window is displayed. If the **Continuous** function has been additionally selected, the **Test Documentation** is not displayed automatically. Instead the next tire is tested. The **Test Documentation** can be called at any time.

During the test run, a red **stop** button appears with which the measurement can be interrupted.

How to start the automatic test run:

1. Select a test program (as described above) and click on the **Test** function in the **Test** menu. INTACT now starts the automatic test run for the tire.

-or -

Press the **F5** function key.

or -

Click on the **Test** icon on the tool bar.

2. The tire is measured.
3. During the test, the following is possible at any time
 - Switching the **Continuous** function on and off.
 - Switching the automatic test program display on and off.
 - Displaying the **test documentation**.
4. On completion of tire testing, the **Test Documentation** window appears and displays all the result images provided the **Continuous** function (see further down) is not active.

Continuous

[Operator Level only]

Menu: Test / Continuous

Icon:



Key combination: Alt + T, C
F6

When a test has been successfully completed, the next test is started automatically when you activate this switch.

How to start and stop the continuous run:

1. Select the **Continuous** function in the Test menu.

- or -

Click on the **Continuous** icon on the tool bar.

-or -

Press the **F6** function key.

2. If no test is as yet running, the test can be started as described for the Test function.

3. To stop the continuous run, click the **Continuous** icon once again. The current test cycle is terminated and the **Test Documentation** is displayed.

- or -

Click on the red **Stop** button to interrupt the test.

Attention: The test results may be incomplete.

Vacuum

[Supervisor Level only]

Menu: Test / Vacuum

Icon: -

Key combination: Alt + T, V

The required negative pressure is set using the **Test Vacuum** function. The negative pressure remains in effect until you change it. Possible are values between **0 mbar** and **80 mbar**. The vacuum value can be separately set for the tread and side wall.

The standard test vacuum setting for testing tires in the INTACT machine is **50 mbar**.

Please note that it is not possible to detect any defects in a tire if the **test Vacuum** is set to **0 mbar**!

The images are recorded during the evacuating step. To stop trouble which might arise from switching off the vacuum pump, the image recording is stopped at the vacuum figure set. Only at a later stage is the pump switched off. This results in the vacuum figure shown on the status bar being higher than the figure set.

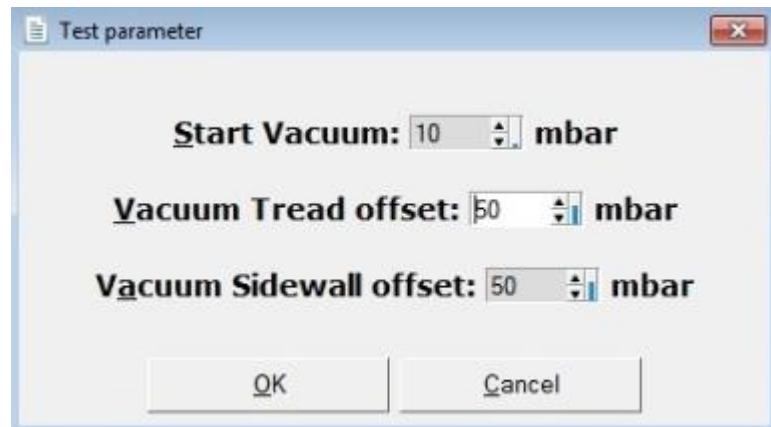
How to set the test vacuum:

1. Click on **Vacuum** in the **Test** menu.
2. The **Test parameters** dialog box appears.
3. You can change the negative pressure by clicking on the arrow buttons or by keyboard entry.
4. Click on **OK** to confirm the **Test Vacuum** and close the dialog box.

- or -

Click on **Cancel** to leave the dialog box without adopting the figure.

Dialog box in which you can edit the test vacuum for all tests.



Results (before Version 6.0)

[Operator Level only]

Menu: Test / Results

Icon:



Key combination: Alt + T, R or F8

While the tire is being tested, only the images of the sectors that are currently being tested are displayed. At the end of the test cycle, you can automatically look again at all the result images. The images can then be printed, saved or deleted.

The number in the lower right corner of the icon indicates how many test findings still need to be processed. The icon color changes from green to yellow and then to red. The color depends on the number of test findings that still need to be processed.

How to display the results:

1. Click on the **Results** option in the **Test** menu.

-or -

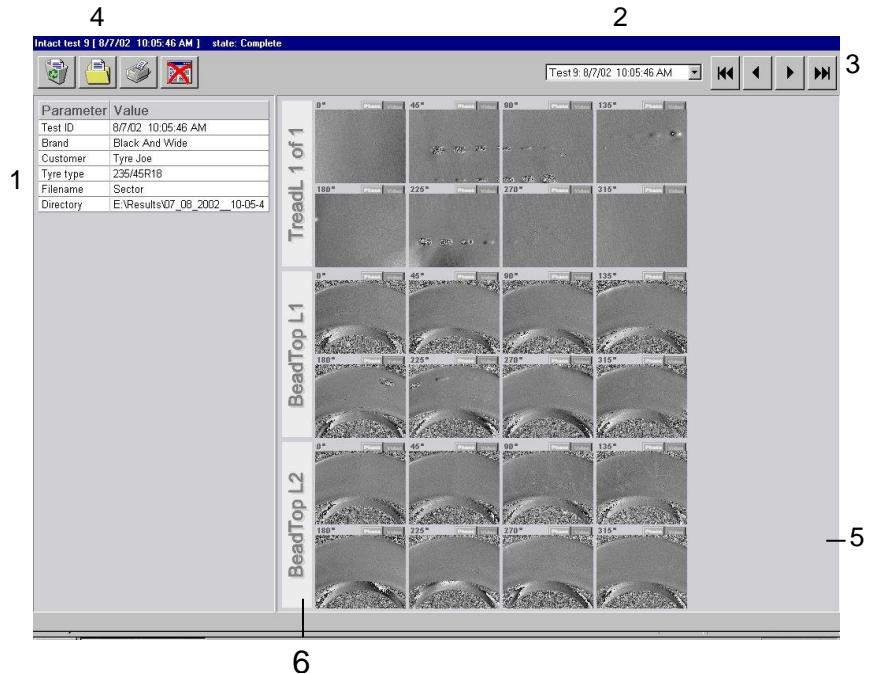
Press the **F8** function key.

- or -

Click on the **Results** icon on the tool bar. You can switch to the **Test Documentation** at any time - even during the test.

The Test Documentation window with all result images is displayed.

Structure of the test documentation



1. Parameter window

2. Display of temporarily saved images
3. Skip Ahead / Back
4. Tool Bar
5. Window for images
6. Layer Bar

1. Parameter window (before Version 6.0)

Here, you can enter the data of the tire you have just tested e.g. TestID, customer, tire size and other information. This data is saved and printed together with the result images.

In the **Directory** option, you select the path and file name under which the images are to be saved. The software is set in such a way that the result images are saved in a directory made up of the date and time of the test, e.g. 19_4_2001_21-49-47.⁵

How to change the directory:

1. Click on the arrow which is right next to the entry in the **Directory** line.
2. A dialog box appears in which all drives, such as the hard disc and CD drive, are displayed. You can select an existing directory from the list or create a new directory.

- or -

Enter the desired path directly into the **Directory** line.

2. Display of temporarily saved images (before V. 6.0)

The test results are saved in a temporary directory until they are deleted or permanently saved.

When 20 tests have been temporarily saved, a message is displayed on the screen, asking you to process the test results⁶. The message appears before the start of the test and is intended to prevent Partition D:\, on which the temporary directory is located, from becoming too full.

How to select a test result from the list:

1. Click on the arrow at the end of the line. The complete list of test results appears.
2. Click on the test that you would like to look at again.
3. The result images are displayed in the **Window for Images**.
4. The list of test results is again closed.

⁶ Standard settings which may differ from machine to machine!

3. Skip Ahead / Back (before Version 6.0)

With these buttons you can look again at the temporarily saved test results without having to open the list every time.

The buttons that are available are displayed in black.

How to use the skip functions:



By clicking on this button you jump from the current to the first test result of the list.

-or -

Press the **F9** function key.



With this button you skip from the current test result to the previous one. Clicking on this button again shows the result images before this test. In this way, you can look at all the test results.

- or -

Press the **F10** key.



By clicking on this button you jump from the first to the last test result, i.e. to the current test result.

- or -

Press the **F11** key.



With this button you skip from a previous test to the result images of the next test until you reach the last, i.e. the current test. In this way, you can look at all the test results.

- or -

Press the **F12** key.

4. Tool bar (before Version 6.0)

Click on this icon with the left mouse button to delete the result images just displayed.



-or -

Press the **F5** function key.

Pressing the **Ctrl + F5** key suppresses the confirmation prompt "Really Delete" which asks you whether you really want to delete the image.

- or -

Click on the "Recycle Bin" icon with the right mouse button to open a list box with different options which simplify the deletion of multiple result images.

Click on the desired option with the left mouse button.

-or -

Press the key for the underscored letter.

When there are no further result images in the **Test Documentation**, the window is closed and the screen automatically changes to the INTACT software.

Click on this icon to save the result images and the entries you made in the **Parameter Window**.

-or -



Press the **F6** function key.

An HTML file is created which enables you to look at the images in the Internet Explorer. The result images are saved in JPEG format. This also removes the result images from the **Test Documentation**.

When there are no further result images in the **Test Documentation**, the window is closed and the screen automatically changes to the INTACT software.



Click on this icon to print the result images and test parameters. You can test the next tire while the printer is running.

-or -

Press the **F7** function key.

Clicking on the “**Printer**” icon with the right mouse button opens a list box which provides different print options. Enable the desired options by clicking on them.

Print the phase image only:

If you enable this option, only the phase images will be printed. If you do not enable this option, both the phase images and video images will be printed.

Overall:

All layers will be printed on one page (as shown on the screen).

Print with Fault Table⁵:

Besides the result images, this option also prints a table which indicates the fault positions and sizes.

Print only Fault Table⁵:

This option only prints the table indicating the fault positions and sizes.

Click on this button to exit the **Test Documentation** window and you return to the INTACT software screen. The result images are not lost, however. They can be saved, printed or deleted at any time.



-or -

Press the **F8** function key.

- or -

Click on the “X” button on the title bar (see **User Interface** chapter).

-or -

Press the **Alt + F4** keys.

⁵ Not all machines provide this function!

5. Window for images (before Version 6.0)

This window shows the result images of the test run. Above the images you will find the position in degrees. The number of images differs depending on the test program you are using. The images of the tread are displayed first, followed by those of the side wall.

The images are provided with two tabs⁶. One is for the phase image and the other for the video image. By clicking on these tabs, you switch back and forth between the two images. After the test, the phase images are displayed automatically.

To enlarge an image, double-click on it with the mouse. You can now choose between three icons for simple forward or backward skip. Next to or above the icons, you see which image can be switched to. By clicking on the center icon, the display returns to the overall view.

The two tabs (phase and video) are now connected by a scroll bar. This enables you to superimpose the phase and video images on one another.

Test documentation with superimposed phase and video images



You can print this phase image and the video image by clicking on the **Printer** button.

⁷ If the software has been set to save the video images.

6. Layer Bar (before Version 6.0)

The layer bar is only displayed if you are using a test program with more than one layer. In the test program **Bead2BeadFlip**, the tire is tested in three cycles (Tread L1 of 1, BeadTop L1 and BeadTop L2).

If you click on a field of the layer bar, only the images from this layer are displayed. The images are enlarged to enable you to detect even minor faults on the tire.

-or -

Double-click directly on the desired image. Only this image will then be displayed (see above).

In this display mode, you switch to the other layers by using the forward and backward skip icons. Next to or above the icons, you can see which layer you can switch to.

-or -

Press the corresponding **Arrow Key** on the keyboard.

Phase and video images can be displayed.

Test documentation with a test layer shown

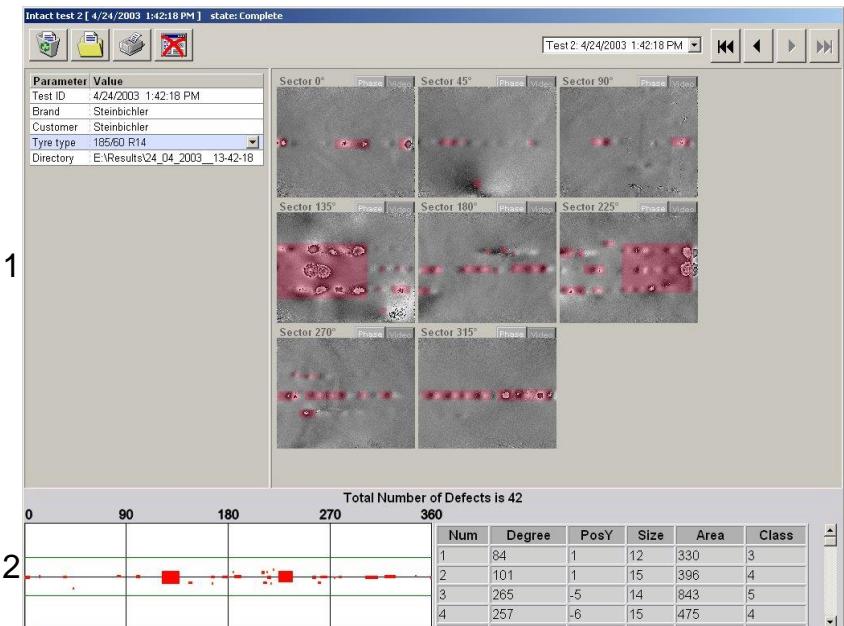


You can print these phase and video images by clicking the **Printer** button (see above).

Automatic Fault Detection (**before** Version 6.0)

The software can be configured in such a way that faults in the tire are highlighted in the test documentation. This helps you to evaluate the result images and facilitates finding the faults in the tire. With the help of the fault table, the quality assurance staff can frequently locate faults that arise and modify the production process, as required.

*Test documentation with
enabled fault detection
feature*



1. Window for images

2. Fault Table

1. Window for images (**before** Version 6.0)

(see further up)

The areas highlighted in red indicate the faults detected by the software. Faults that are located closely next to each other are combined into one. When you move the mouse pointer over a highlighted area, the fault coordinates will be displayed. If you click on a highlighted area with the mouse, the highlight disappears to provide a deleted image for evaluation.

2. Fault Table (before Version 6.0)

The table is split into two areas: on the right you find the numeric area, on the left the graphic area.

The table contains data on the position, size and surface area of the fault. In the last column, the fault is classified according to size. The classification parameters can be customized to requirements.

By clicking on one of the fields in the title bar of the table, you sort out the faults by this property. The table can also be printed (see further up).

The graphic area shows the faults in a chart which represents the tire in two dimensions as if unrolled on a plane.

Faults that are located closely next to each other are combined into one fault. The criteria for combining the faults can be configured. The color of the highlighted areas depends on fault size.

When you move the mouse pointer over the highlighted area, the fault coordinates are displayed. The table can also be printed (see further up).

Marking or Deleting Faults (before Version 6.0)

This function is only available when the automatic fault detector is enabled. A fault which you have marked is both shown in the table and marked in the printout.

A fault which is deleted in the result image also disappears from the table.

How to mark faults:

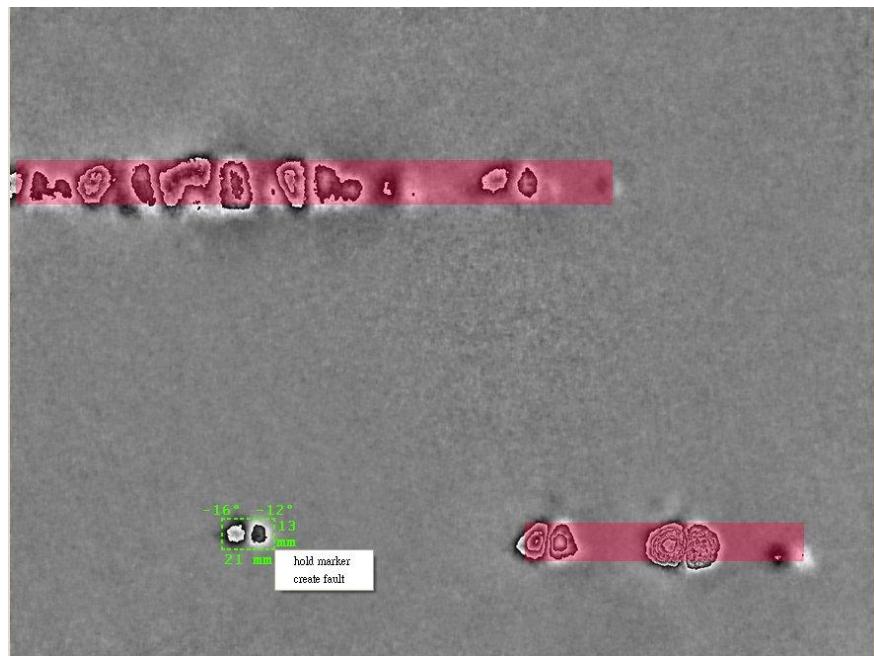
1. Position the mouse pointer to the left over the fault.
2. Click the right mouse button.
3. Drag the mouse down to the right until the fault is completely inside the marking. The right mouse button must remain pressed when doing this.
4. Let go of the right mouse button.
5. You can now read off the size and position of the fault.
6. You are provided with a list box to the right of the marking.
7. Click on **Hold Marker** to retain the marking

- or -

Click on **Create Fault** to mark the fault in red.

8. The marker is again deleted when you click anywhere within the display.

Marking a fault.



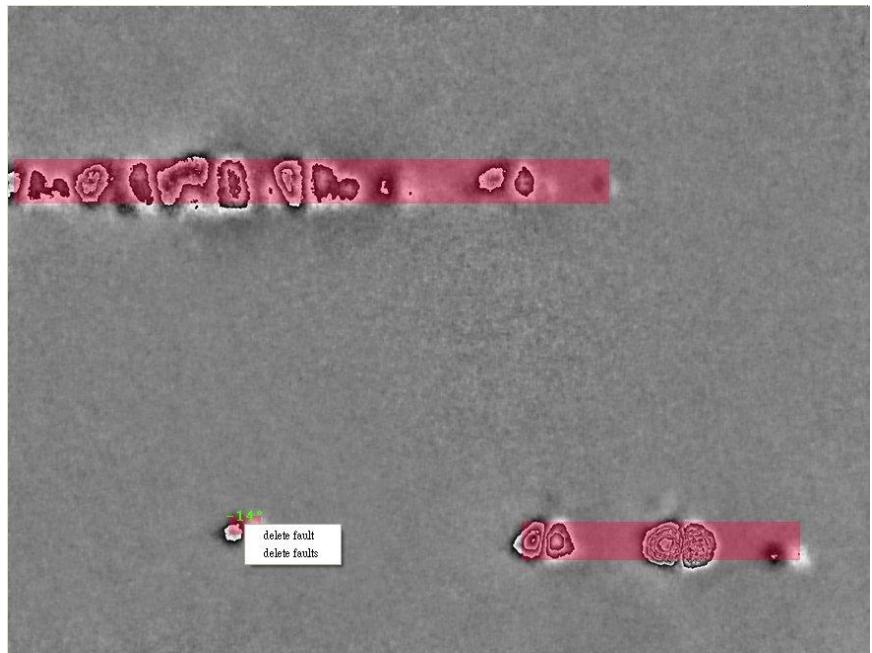
How to delete the marking of a fault:

1. Position the mouse pointer inside the red marking you want to delete.
2. Click the right mouse button.
3. A list box opens.
4. Click on **Delete Fault** to delete the fault

- or -

Delete Faults to delete a number of faults placed one above the other. At the same time, the mouse pointer must be on the point of intersection of the markings arranged one on top of the other.

Delete markings.



Measuring Faults (before Version 6.0)

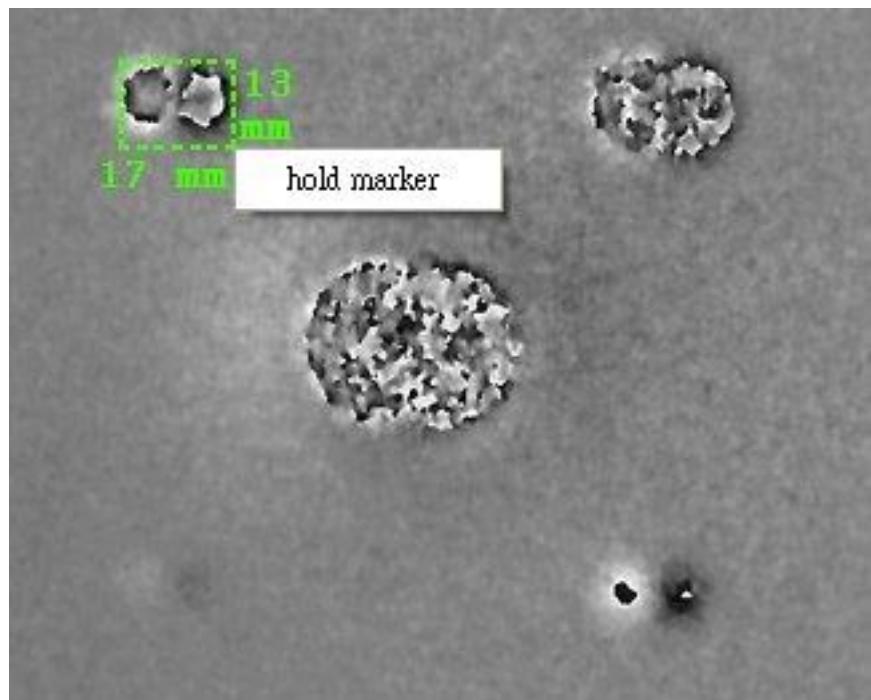
This function is always available. This function makes it possible to evaluate any faults in the tire rapidly and exactly. As a result, the size can be quickly established and you immediately know if the specified limit has been exceeded or not.

The marking cannot be saved or printed.

How to measure faults:

1. Position the mouse pointer to the left over the fault.
2. Click the right mouse button.
3. Drag the mouse down to the right until the fault is completely inside the marking. The right mouse button must remain pressed when doing this.
4. You can now read off the size and position of the fault.
5. Click on **Hold Marker** to fix the marking.
6. Click anywhere within the display to delete the marking.

Measuring a fault



Results (since Version 6.1)

[Operator Level only]

Menu: Test / Results

Icon:



Key combination: Alt + T, R or F8

While the tire is being tested, only the images of the sectors that are currently being tested are displayed. At the end of the test cycle, you can automatically look again at all the result images. The images can then be printed, saved or deleted.

The number in the lower right corner of the icon indicates how many test findings still need to be processed. The icon color changes from green to yellow and then to red. The color depends on the number of test findings that still need to be processed.

How to display the results:

2. Click on the **Results** option in the **Test** menu.

-or -

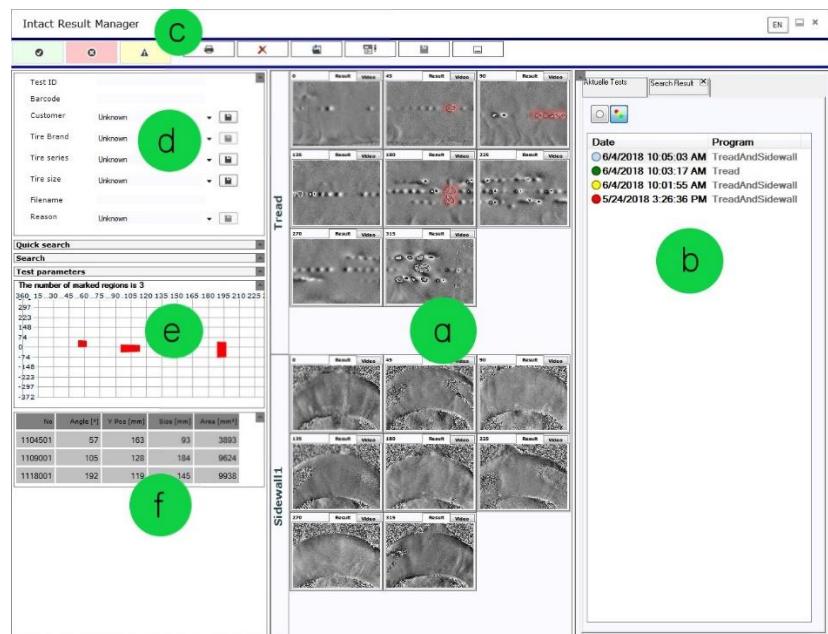
Press the **F8** function key.

- or -

Click on the **Results** icon on the tool bar. You can switch to the **Test Documentation** at any time - even during the test.

The Test Documentation
window with all result images
is displayed.

Structure of the test
documentation



a. Layer-View of the result pictures

b. Navigation Area

- c. Tool Bar
- d. User Info Table
- e. Fault Diagram
- f. Fault Table

There are following additional menus in the user interface (not shown in the picture, because minimized):

- Quick Search
- Search
- Test-Parameters

a. Layer-View of the result pictures (since Version 6.1)

Here are different actions possible:

3. Click on the image: enlarge view of the result
4. Click on Layer Bar: Layer-View
5. Click on the Tab Result/Video: switching between the phase image and the video image. After the test, the phase images are displayed automatically. You can switch all images on the Area to phase or video by using a double-click on this tab.
6. Holding down the right mouse button on an image and moving the cursor: mark a fault.
7. In the superimposed view of the result, you can also overlay the result and video image with the slider.

b. Navigation Area (since Version 6.1)

Different result lists in this area can be chosen by using the tabs.

The newest results are always shown in the first tab. This list is refreshed by processes in the background.

The other tabs contain the search results.

In the first tab there are two different buttons, an empty circle and a colored circle.

Empty circle: show just unevaluated results

Colored circle: show evaluated and unevaluated results

The tabs of the search results contain a button to delete all results of this tab in the database (permanent).

The list can be sorted by a clicking a header such as "Date" or "Program".

"Date" has a higher priority than "Program".

c. Tool Bar (since Version 6.1)

Tools described from left to right:

1. Classification as good
2. Classification as bad
3. Classification as doubtful
4. Print report: generates a report to the current data record
5. Delete: deletes the current data record
6. Import: Imports a previously exported file into the database
7. Profile-Editor: Edit the user data fields
8. Save: saves the current file
9. Minimize window: For performance reasons the application must not get completely closed, by using the cross (in the upper right edge), instead of minimizing it. After completely closing the Application it takes much more time to start the TestdocViewer again. Moreover there is no reason for closing the application completely. To avoid unintentionally closing a confirmation window appears, if you are sure to close the application completely when you close it by using the cross.

d. User Info Table (since Version 6.1)

Keeps user information concerning the test or tire.

Here are different functions available

1. Input of the information: by using Enter an entry is accepted and the cursor skips to the next field. After the last field you move back to the first field.
2. Fields with options (combo boxes) have a button with a disk symbol. If you press the button with the disk symbol, the current value is permanently transferred to the combo box options.

e. Fault Diagram (since Version 6.1)

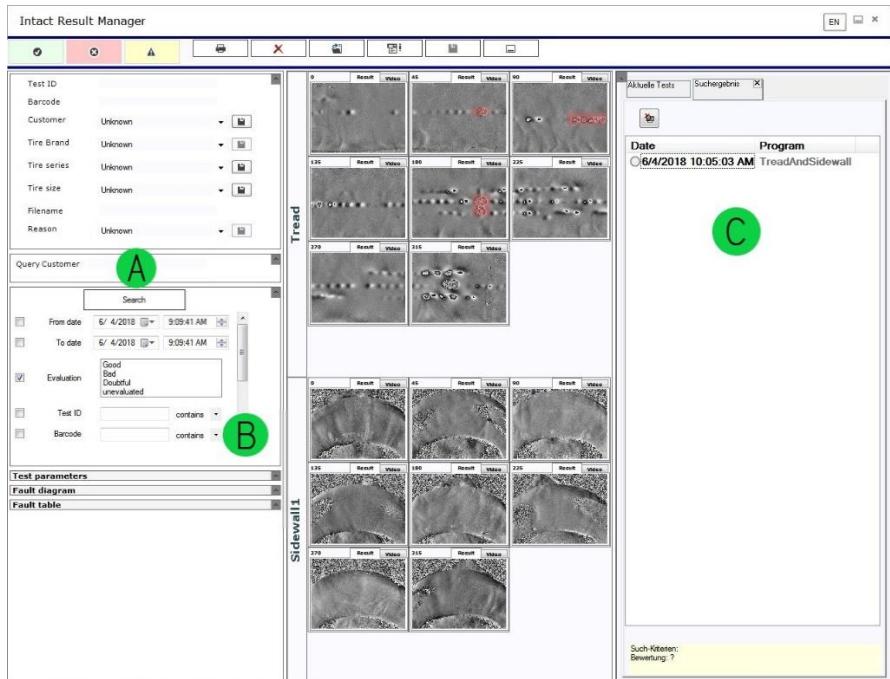
The diagram (on the left with the two red boxes) shows error marks on a "roll-up image". You have to imagine the tire is unfold and rolled up. Viz. imagine, the tire is cut at degree 0, the side wall folded up and down and rolled up flat.

f. Fault Table (since Version 6.1)

Fault table (left down): list of marked faults with its dimensional properties: angle, Y-Position, diagonal, cross section

You can print these phase and video images by clicking the **Printer** button (see above).

Searching for results (since Version 6.1)



Use the quick search to get quick results of a specific theme (A). To start the quick search it is only necessary to finalize the text with enter. Fitting data to the text appears in a new tab (C).

For more complex queries you can use the search (B). It contains all relevant search criteria so there is no need to be configured. They can be chosen by placing a checkmark on the left side next to search criterion.

Search criteria:

- Since date/time
- before date/time
- assessment results (subset of {good, bad, doubtful, unevaluated})
- UserInfo: it is possible to select, whether the UserInfo
 - a. is exactly the same as the search string
 - b. begins with the search string
 - c. ends with the search string
 - d. contains the search string

Test-Parameter (since Version 6.1)

Display of the test-parameters "test-date", "Pressure sidewall", "Pressure tread", "excentricity", "tire width", "inside diameter", "outer diameter", if available

Search	
Date	6/4/2018 10:05:03 AM
Pressure SW	60 mBar
Pressure Tread	60 mBar
Excentricity	17
Width	271
ID	604
OD	1077

Fault diagram
Fault table

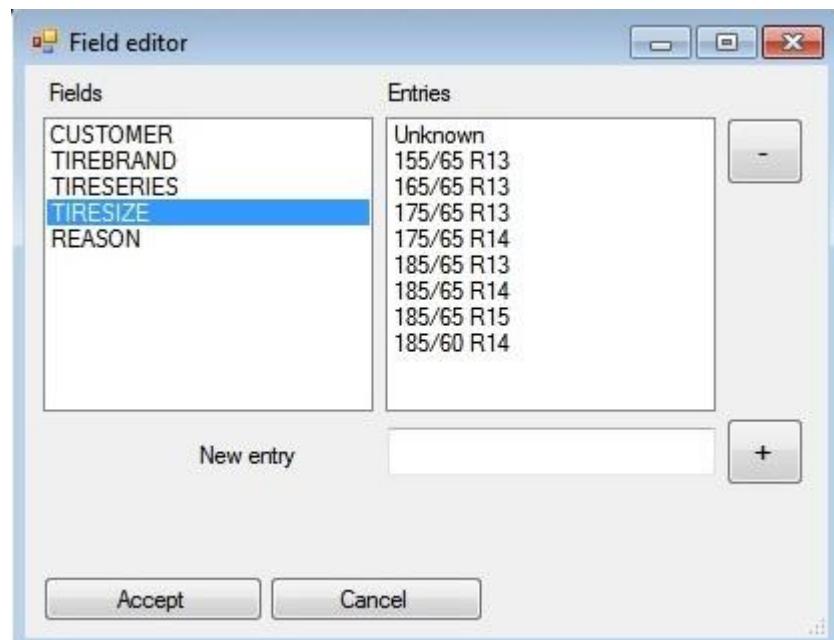
Keyboard Shortcuts (since Version 6.1)

- F4: import test results
- F5: delete test reports
- F6: save test reports
- F7: print report
- F8: minimize window
- Strg +: enlarge window by 250 Pixel
- Strg -: decrease window by 250 pixel
- Left arrow: previous Test (one down in the list)
- Page down: last Test (at the bottom of the list)
- Right arrow: next Test (one up in the list)
- Page up: first Test (on top of the list)

Field-Editor (since Version 6.1)

With the profile editor you can edit the options (the content of the combo box lists) of the user information table.

To start the field-editor it is necessary to activate the supervisor mode in the IntactApplication.

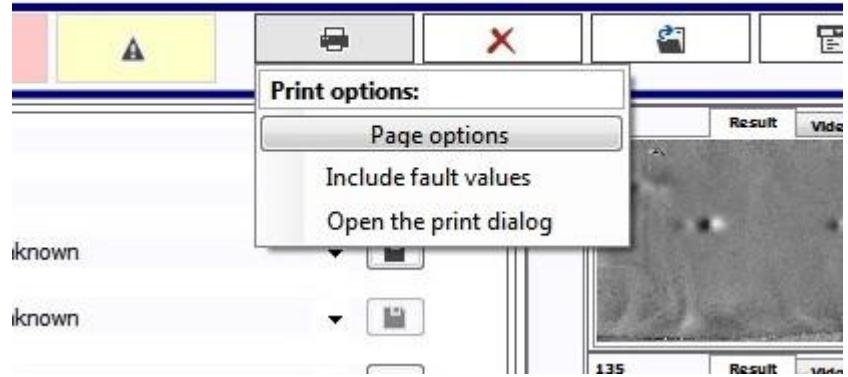


This Area is self-explanatory. New options are saved permanently after the assumption.

Print Report (since Version 6.1)

You can change the properties in the print-context-menu by using a right-click on the print-button.

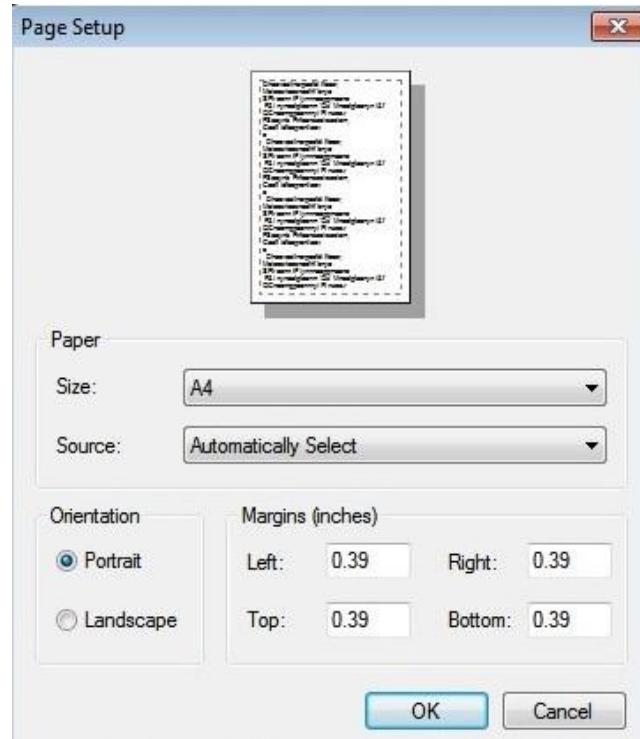
anager



With the option “Include fault values” you can print the fault table and the fault diagram on a separate page.

If you chose the option “Open the print dialog” the page dialog opens before each print.

A click on “page options” opens the page setup to define margins etc.



Accepting the setup by using OK includes a binary-data saved in the TestdocViewerOrdner, named PgSet.bin and this is used as pre-setting to the next printing process.

Updating of results (since Version 6.1)

When a new result is ready to be displayed, this result is displayed if the state of the application allows it.

The following rules apply:

1. A modified text should not be overwritten as long as it was not saved before. But the newest version saves data immediately in the database. So this rule has no effect
2. An original test should only get overwritten, if:
 - a. The window is minimized
 - b. A defined time period has passed since the last test (see ResultWithdrawTimeout)

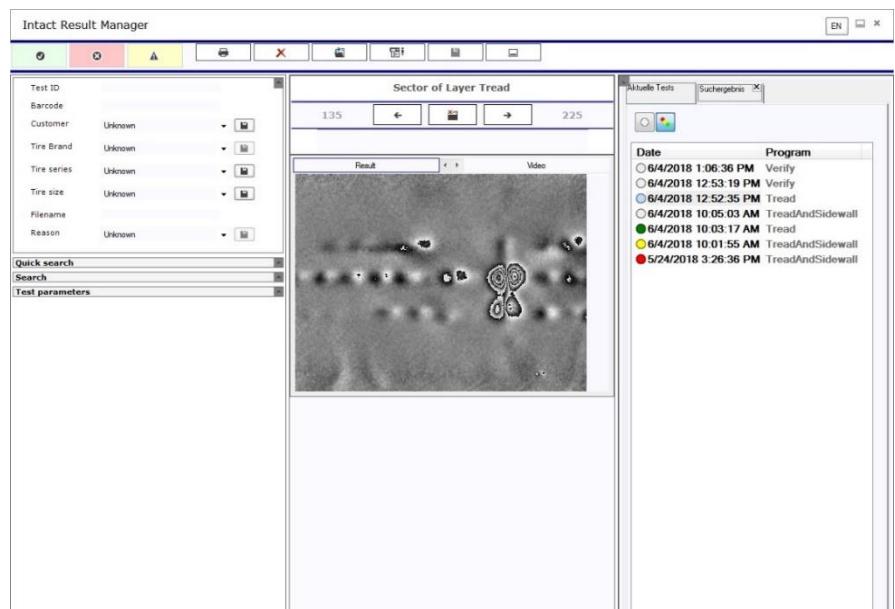
Window for images (since Version 6.1)

This window shows the result images of the test run. Above the images you will find the position in degrees.

The images are provided with two tabs. One is for the phase image and the other for the video image. By clicking on these tabs, you switch back and forth between the two images. After the test, the phase images are displayed automatically.

To enlarge an image, double-click on it with the mouse. You can now choose between three icons for simple forward or backward skip. Next to (or above) the icons, you see which image can be switched to. By clicking on the center icon, the display returns to the overall view.

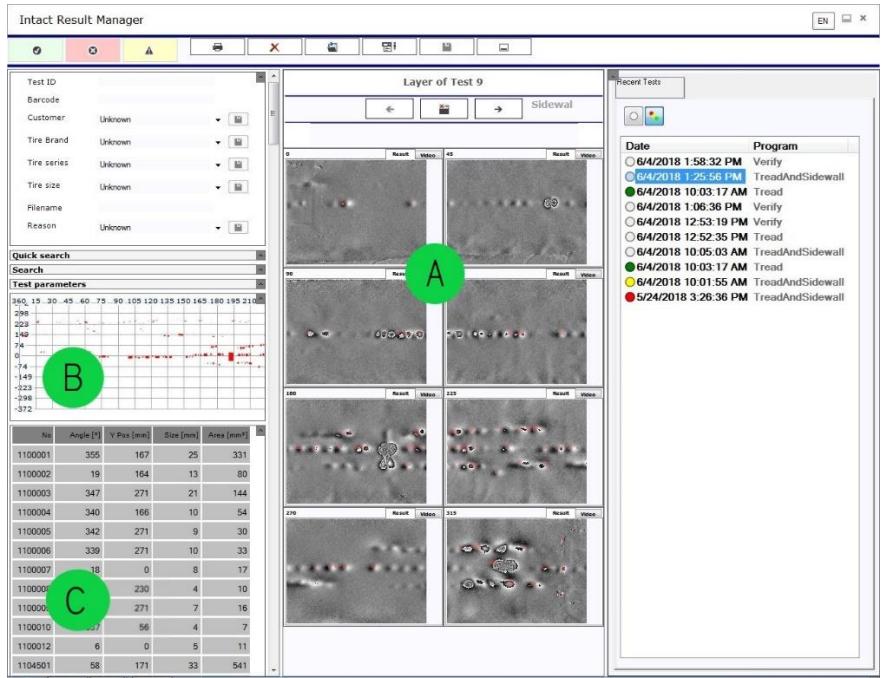
The two tabs (phase and video) are now connected by a scroll bar. This enables you to superimpose the phase and video images on one another.



Automatic Anomaly Detection (since Version 6.1)

The software can be configured in such a way that anomalies in the tire are highlighted in the test documentation. This helps you to evaluate the result images and facilitates finding the anomalies in the tire. With the help of the fault table, the quality assurance staff can frequently locate faults which arise and modify the production process, as required.

Test documentation with enabled anomaly detection feature



1. Window for images
2. Fault Diagram
3. Fault Table

A. Window for images (since Version 6.1)

(see above)

The areas highlighted in red indicate the anomalies detected by the software. Anomalies close to each other are combined to one fault. When you move the cursor over a highlighted area, the anomaly coordinates will be displayed in the fault diagram and the other way around. If you click on a highlighted area with the mouse, the highlight disappears to provide a deleted image for evaluation.

B. Fault Diagram

The diagram (on the left with two red zones) shows marked anomalies on an unwound image. Imagine the tire is cut at 0 degree and its sidewalls are cut off and joined right next to the treat. After that the tire is laid down like a flat plate. The diagram can also be printed (see above).

C. Fault Table (since Version 6.1)

The table contains data on the position, size and surface area of the anomalies. By clicking on one of the fields in the title bar of the table, you sort out the faults by this property. The table can also be printed (see above).

Marking or Deleting Anomalies (since Version 6.1)

This function is only available when the automatic anomaly detector is enabled. A fault which you have marked is both shown in the table and marked in the printout.

A fault which is deleted in the result image also disappears from the table.

How to mark faults:

9. Position the mouse pointer to the left over the fault.
10. Click the right mouse button.
11. Drag the mouse down to the right until the fault is completely inside the marking. The right mouse button must remain pressed when doing this.
12. Release the right mouse button.
13. You can now read the size and position of the fault.
14. You are provided with a list box to the right of the marking.

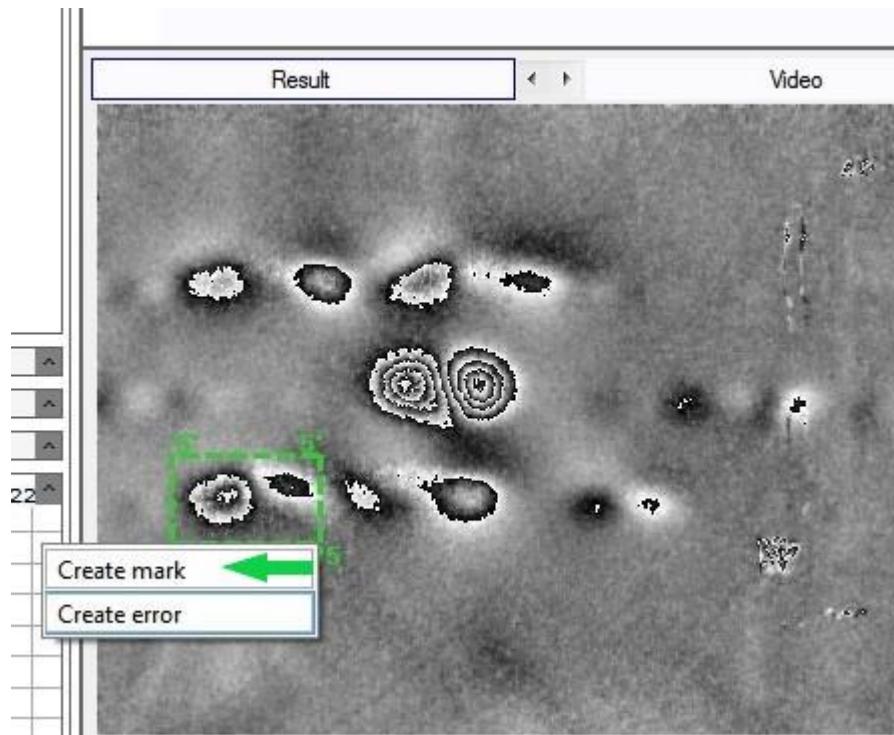
15. Click on **Hold Marker** to retain



Click on **Create Fault** to mark the fault in red.

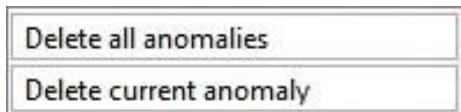
16. The marker is again deleted when you click anywhere within the display.

Marking a fault.



How to delete the marking of an anomaly:

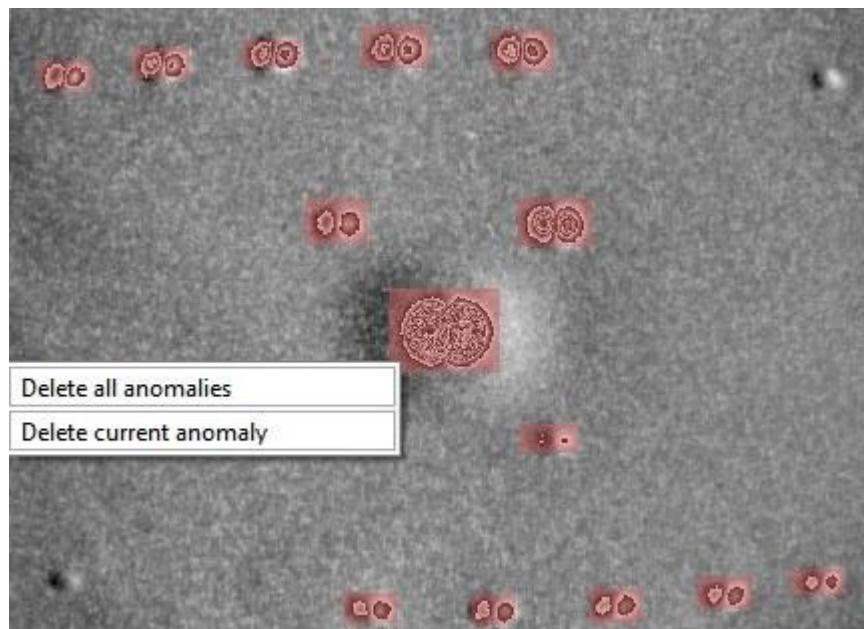
5. Position the mouse pointer inside the red marking you want to delete.
6. Click the right mouse button.
7. A list box opens.
8. Click on **Delete current anomaly** to delete the fault



- or -

Delete all anomalies to delete a number of anomalies placed one above the other. At the same time, the mouse pointer must be on the point of intersection of the markings arranged one on top of the other.

Delete markings.



Measuring Faults (since Version 6.1)

This function is always available. This function makes it possible to evaluate any faults in the tire rapidly and exactly. As a result, the size can be quickly established and you immediately know if the specified limit has been exceeded or not.

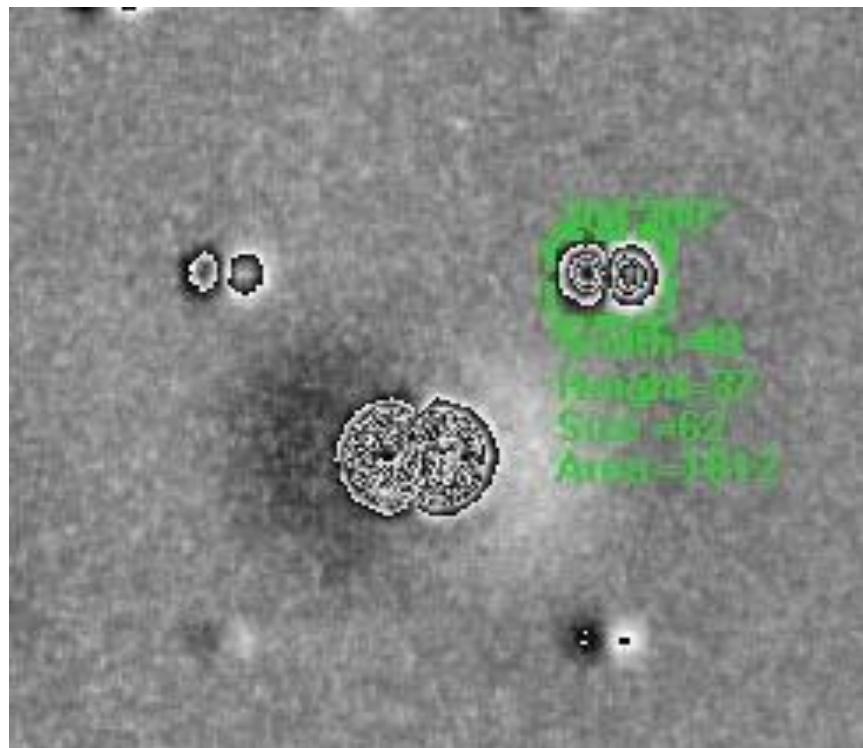
The marking cannot be saved or printed.

How to measure faults:

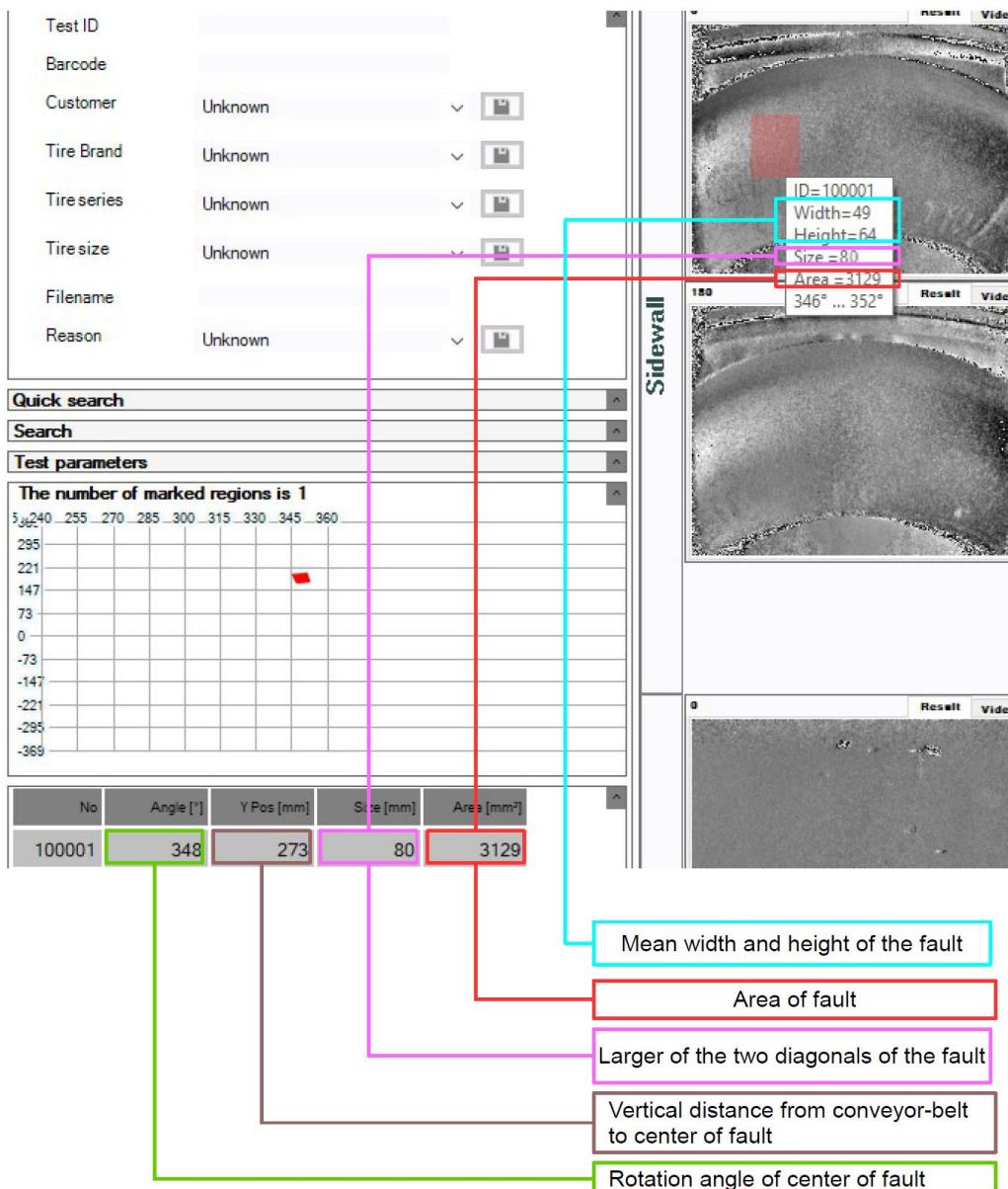
7. Position the mouse pointer to the left over the fault.
8. Click the right mouse button.
9. Drag the mouse down to the right until the fault is completely inside the marking. The right mouse button must remain pressed when doing this.
10. You can now read off the size and position of the fault.
11. Click on **Hold Marker** to fix the marking.
12. Click anywhere within the display to delete the marking.

Measuring a fault

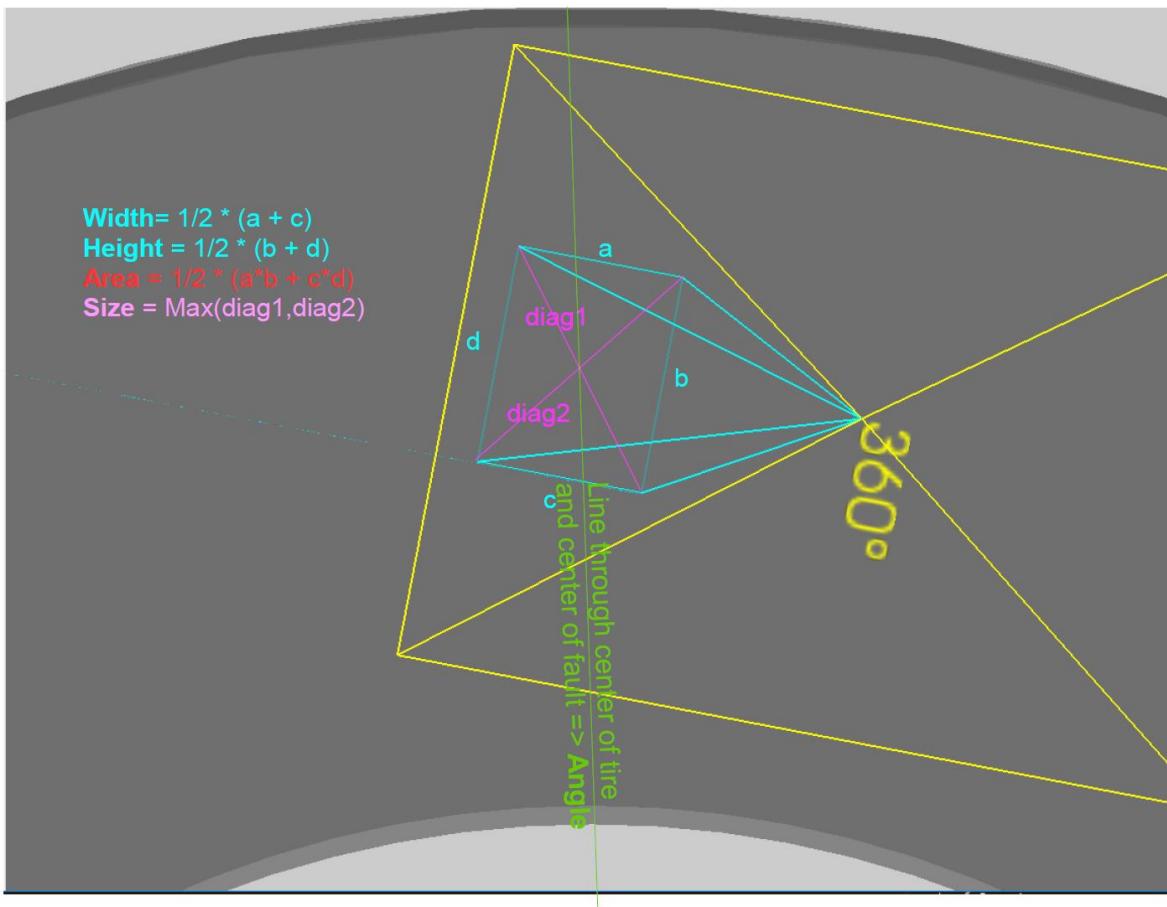
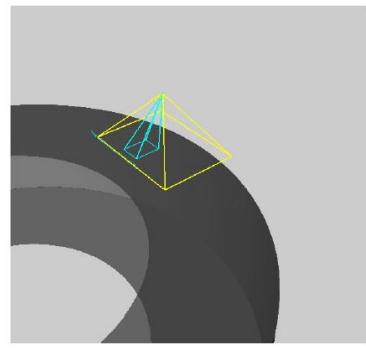
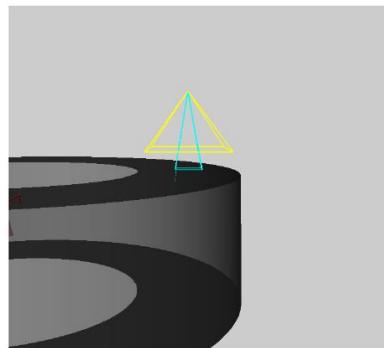
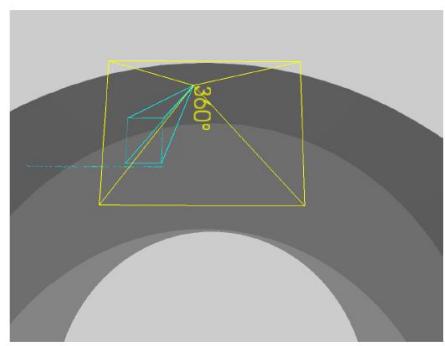
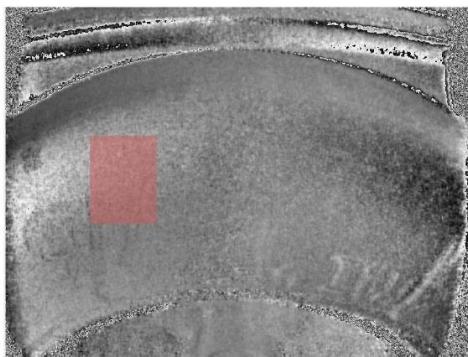
Width, Height, Size, Area

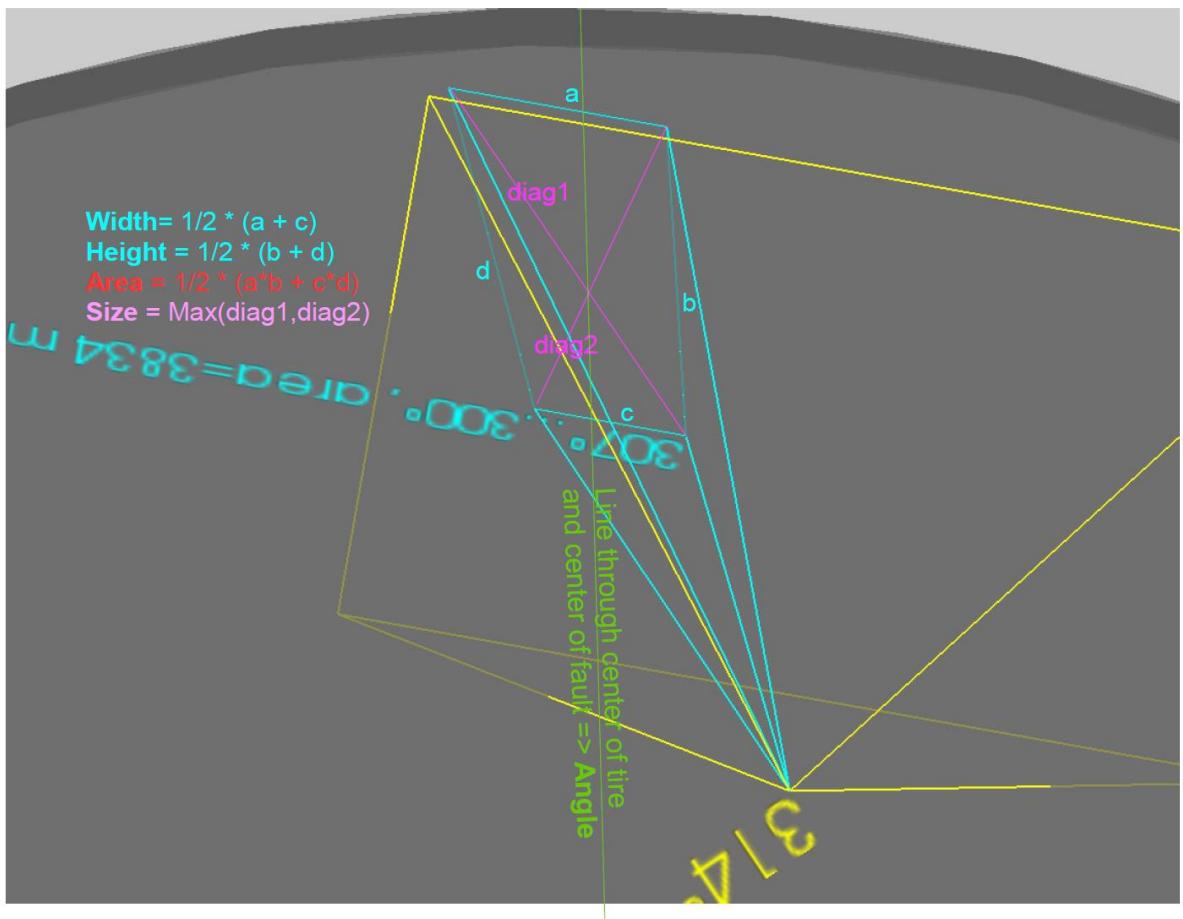
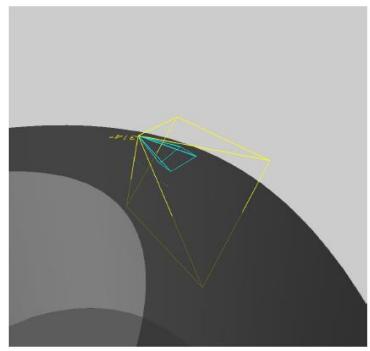
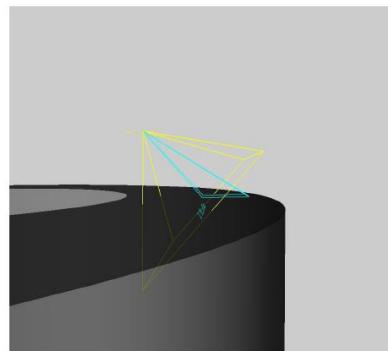
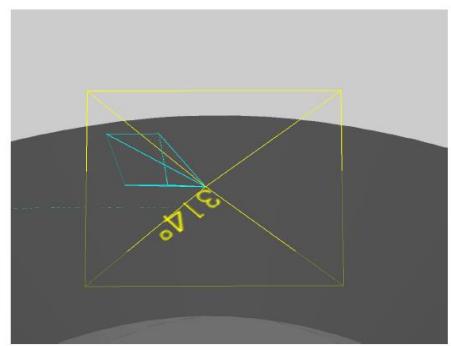


Intact Result Viewer: Illustration of Fault Properties



For a better understanding, compare to the values with the same colors on the following pages.





Show BarCode⁵

[Operator Level only]

Menu: Test / Show BarCode

Icon:



Key combination: -

The software of the tire testing machine can be configured for the tire data to be read with a barcode reader. In this case, the icon shown above is displayed.

The operator scans the tire barcode before loading the tire at loader side. The B/C read is stored inside the machine and used as entry in result data. Optionally the B/C also can be used to access data from customer network.

The number at the bottom right of the icon indicates the number of tires for which the barcode has been read and which are to be tested. As soon as a tire has been tested, the corresponding barcode is deleted from the table. The icon color changes from gray (no barcode) to green.

How to view the read barcode:

1. Select the **Show BarCode** option in the **Test** menu.

- or -

Click on the **Show BarCode** icon on the tool bar.

2. A dialog box opens. It lists all the barcodes that have been read in or entered manually.

The barcode that was read or entered first is shown at the top of the list and the associated tire is the first that has to be tested.

The third column of the table indicates if the tire is currently being tested.

3. Click on the **Delete** button next to the barcode to delete it.
4. Click on **OK** to close the dialog box again.

- or -

Click on **Cancel** to close the dialog box

- or -

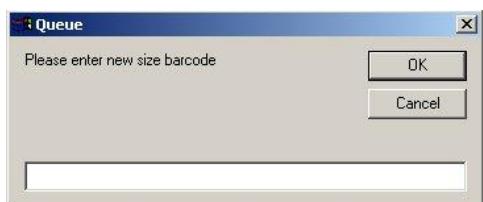
Click on **New** to manually enter a barcode.

1	12345678	Testing	Delete
2	87654321	Waiting	Delete
3	56784321	Waiting	Delete



⁵ Not all machines provide this function!

How to manually enter a barcode:



1. Click on **New** in the dialog box shown above.
2. An input box opens in which you can enter the barcode.
3. Click on **OK** to close the input box and save the barcode.

- or -

Click on **Cancel** to close the input box without saving the barcode.

Counter⁴

[Supervisor Level only]

Menu: Test / Counter

Icon: -

Key combination: -

By using the **Counter** function you can separately count the tires based on the test programs.

How to view the number of tires tested:

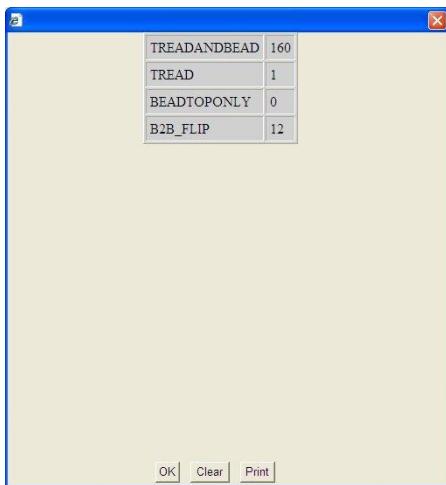
1. Click on **Counter** in the **Test** menu.
2. A dialog box opens. It indicates the number of tires which have been tested.
3. Clicking **Delete** resets the counter - for all test programs - to zero.

- or -

Click on **Print** to have the displayed table printed.

- or -

Click on **OK** to close the window.



⁴ This function may be customer-specific and therefore not available on all machines!

Burn Accept Folder⁵

[Supervisor Level only]

Menu: Test / Burn Accept Folder

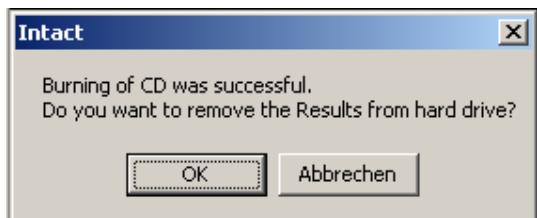
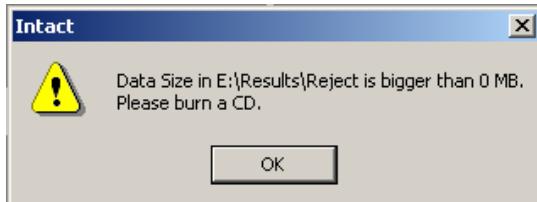
Icon: -

Key combination: -

With the **Burn Accept Folder** function, you can burn the results stored in the **E:\Results\Accept** folder onto a CD and delete them from the hard drive. The software checks the size of the folder and a warning appears if it is bigger than **650 MB**.

How to burn the Accept folder:

1. Click on **Burn Accept Folder** in the **Test** menu.
2. A dialog box prompts you to insert an empty CD into the burner.
3. Click on **OK** when the CD burner is ready.
4. A DOS window opens and you see the progress of burning the data onto the CD.
You will get a warning if the folder size is bigger than **650 MB**.
5. When the burning is over, a further dialog box is opened. Here you can choose whether to delete the results from the hard drive or not.
Click on **OK** to close the dialog box and delete the results on the hard drive.
- or -
Click on **Cancel** to leave the dialog box without deleting the results.
6. You can now remove the CD from the burner.



⁵ Not all machines provide this function!

Burn Reject Folder⁵

[Supervisor Level only]

Menu: Test / Burn Reject Folder

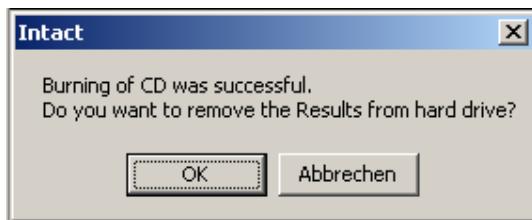
Icon: -

Key combination: -

With the **Burn Accept Folder** function, you can burn the results stored in the **E:\Results\Accept** folder onto a CD and delete them from the hard drive. The software checks the size of the folder and a warning appears if it is bigger than **650 MB**.

How to burn the Reject folder:

1. Click on **Burn Reject Folder** in the **Test** menu.
2. A dialog box prompts you to insert an empty CD into the burner.
3. Click on **OK** when the CD burner is ready.
4. A DOS window opens and you see the progress of burning the data onto the CD.
You will get a warning if the folder size is bigger than **650 MB**.
5. When the burning is over, a further dialog box is opened. Here you can choose whether to delete the results from the hard drive or not.
Click on **OK** to close the dialog box and delete the results on the hard drive.
- or -
Click on **Cancel** to leave the dialog box without deleting the results.
6. You can now remove the CD from the burner.



⁵ Not all machines provide this function!

8.1.5

Help Menu

Selection

Contents

[Operator Level only]

Menu: Help / Contents

Icon: -

Key combination: Alt + H, C

Using this function you open the INTACT Manual which is provided as a PDF file. From the table of contents, you can switch to the individual chapters.

With the **Find** function, you can search for information by entering a topic, title, or a key-word or key-phrase.

About INTACT...

[Supervisor Level only]

Menu: Help / About INTACT

Icon: -

Key combination: Alt + H, A

With this function, you can call up further information about the INTACT software version you are using. In addition, the name of the licensee and serial number of the license are shown.

Click on **OK** to leave this dialog box.

9 Start / Shutdown

Before switching on the machine, make sure that nobody can be endangered by the machine starting up.

Make sure that there are no persons in the pressure chamber or in the danger zone around the tilting table.



Please read the safety instructions in chapter 2 before carrying out the work described here.

Perform a visual inspection of the machine for damage. If necessary, have all damage repaired by trained and authorised, technically suitable/qualified service personnel before commissioning.

Check all safety devices for proper function.

9.1 Stopping in the event of an emergency (emergency stop)



Press the EMERGENCY STOP button only if there is a dangerous situation! The machine is shut down immediately.

9.2 Measures after an emergency stop



Warning

Danger due to unauthorised restarting of the machine!

Risk of bodily injury if the machine is switched on again without the danger having been eliminated beforehand.

- Before switching the machine on again, find the cause of the EMERGENCY STOP and eliminate any emergency situations.
 1. Eliminate emergency situation.
 2. Rectify / eliminate any error displayed.
 3. Pull out and unlock the EMERGENCY STOP pushbutton.
 4. Restart the machine by pushing the start button on the control cabinet. Using manual commands, it is possible to move individual axes (measuring head axes, flipper drives, loading and unloading ports) into home position and to move tires out of the machine. It is also possible to automatically return the machine to the home position by exiting and restarting the INTACT software.

9.3 Start

To start the system, the following steps have to be taken:

9.3.1

Switch on the Machine

The main switch, start button and start lamp are on the right side of the machine's control cabinet. With the main switch, all devices are switched on and off. After switching on the tire testing machine, the computer boots and the operator startup screen appears.

The startup screen appears after Windows has been started.



To start the INTACT software, you simply double click the **INTACT shortcut**.

9.3.2

Self-Diagnosis during Machine Start

After you have started INTACT, tire testing machine initialization is prepared. All the important functions are executed once and referenced. Before self-diagnosis starts, the user is informed that the conveyor belts will move and that any tire that is still inside the machine will be unloaded.

How to start or end self-diagnosis:



1. Click on Yes to start self-diagnosis and close the pop-up window.
2. Click on No to close the pop-up window without starting self-diagnosis.

The user interface of our INTACT software is displayed. You can now view previous ("old") test results. New tests cannot be carried out as the machine has not been initialized

Starting the Emergency Stop System

The Press start button prompt appears. This button is on the right control cabinet door. Using this button, the operator initializes the emergency stop system of the machine, the start lamp is on and the software executes an automatic self-diagnosis.

The "Emergency stop is active" message also appears if an emergency stop button was pressed during the test. The buttons can be released by turning them to the left. The green start lamp goes out and the red stop lamp lights up. By pressing the start button, you reinitialize the machine.



Executing Self-Diagnosis

The functions are called and executed one after the other. When a function has been successfully completed, a checkmark is displayed next to the function.

If executing a function fails, a dialog box opens which allows you to repeat the failed function. If you cancel the execution of the function, a fault message is displayed and the machine is not ready to run. You will find a list of the possible fault messages, their causes and how to correct them in Chapter **11.3. Automatic Self-Diagnosis**.

1. Loading the drivers.
2. A connection is set up to PLC and I/Os. Control hardware and connecting cables are checked.
3. If the lids of the vacuum chamber are closed, then they are opened.
4. The pressure sensor is set to the ambient air pressure.
5. The self-diagnosis checks whether the measuring heads have been moved together (smallest diameter).
If they have not been moved together properly, the measuring heads are moved until they reach the correct positions.
6. The self-diagnosis now checks whether the measuring heads have been aligned horizontally.
If they have not been moved together properly, the measuring heads are moved until they reach the correct positions.
7. The lift axis is checked if it is at the top.
If it is not, the lift axis is moved until it reaches the correct position.
8. The internal loader is referenced.
During this process, the conveyor belt is moved first at top speed and then at a lower speed.
9. The shift axis is referenced.
During this process, the measuring heads are moved apart as far as possible. The path of traverse is limited by a mechanical limit stop. The measuring heads are then moved together again until the reference switch is triggered.
10. The lift axis is referenced.
Referencing the axis is performed in several steps. First, the axis is moved down approx. 1 cm (the photoelectric beam flashes) and then up again. In the second step, the axis is moved down again until it is a few millimeters above the conveyor belt – then it is moved up again. In this way, the maximum path of traverse is determined. In the third step, the axis is moved down again until the photoelectric beam reaches the conveyor belt and switches off. The axis then moves up again.

11. The rotation axis is referenced.

During this process, the axis is first moved against a limit switch at approx. 0°. In the second step, the axis is moved until it reaches its other limit stop. The axis is turned back again and stopped by the reference switch. After referencing, Measuring Head No. 1 points in INTACT 1200 to the left (from operators point of view) lid, in INTACT 1600 to the operator. The other measuring heads (if any) follow clockwise.

12. The tilt axis is referenced.

During this process, the measuring heads are firstly tilted up and then down. The measuring heads are then tilted up until the reference switch is reached. The measuring heads are now horizontal.

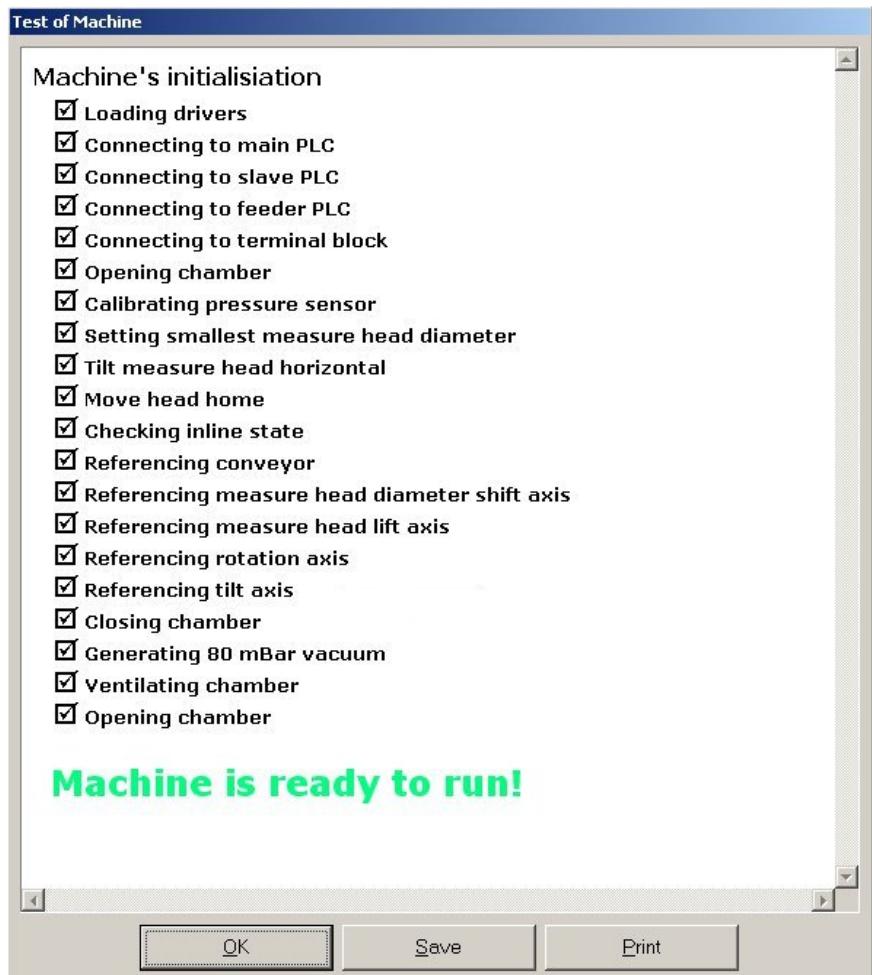
13. The doors of the vacuum chamber are closed.

14. A vacuum of 80 mbar is produced inside the chamber.

15. The vacuum chamber is ventilated until ambient pressure is reached.

16. The lids of the vacuum chamber are opened.

You can terminate the automatic self-diagnosis at any time by clicking the **Cancel** button.



If the automatic self-diagnosis has been executed successfully, the buttons automatically change. The **Cancel** button moves to the background (gray), and the **OK** button comes to the foreground.

Click on **OK** to leave the dialog box of the automatic self-diagnosis and to change to the user interface.

With **Print** the result of the automatic self-diagnosis is printed. This is especially useful in the case of faults.

9.3.3

Loading the Tire Testing Machine

Before the tire can be tested in the tire testing machine, it needs to be loaded. To simplify this process, the tire testing machine usually features a loading system comprising a tilting table and a loader. The loader is set up and installed as described in the previous chapter.

The loading process differs from the procedure described below when the loader is also used for unloading. In this case, the next tire can only be placed on the tilting table after the tested tire has been unloaded (see Step 7 below).

The tilting table can also be mounted directly onto the vacuum chamber as described in Section **6.7. Installation of the Loader and Unloader**. In that case, the loading process differs only slightly from that using the loader; it is described further below.



Make sure that there are no persons in the pressure chamber or in the danger zone around the tilting table.

Loading with the Loader and Tilting table

1. Place the tire on the tilting table and position as required, e.g. serial number on top.
This makes it very easy to assign the result images to the tire after the test.
2. Press the “Up” button on the tilting table control panel.
3. The tilting table is pressed up by two pneumatic cylinders.
4. The tilting table has a final and an intermediate position. It stays in the intermediate position for as long as a tire is on the loader.
If there is no tire on the loader, the tilting table automatically tilts from the intermediate to the final position.
5. When the tilting table has reached the final position, the conveyor belt of the loader starts to move and transports the tire from the tilting table to the machine.
6. As soon as the tire reaches the photoelectric beam that is parallel to the handling direction, the conveyor belt stops the tilting table can be tilt down by pushing the “DOWN” button at the tilting table controller panel.
The Down button needs to be pushed permanently in order to move down the tilting table.
When releasing the down button the tilting table stops the down-movement immediately.
7. The test run can be started and the next tire moved to the intermediate position.

Loading without the Loader, but with the Tilting table

1. Place the tire on the tilting table and position as required, e.g. serial number on top.
This makes it very easy to assign the result images to the tire after the test.
2. Press the “Up”-button of the tilting table. It is located on the control panel or control cabinet.
3. The tilting table is pressed up by two pneumatic cylinders.
4. The tilting table has a final and an intermediate position. It stays in the intermediate position until the test is started.
5. When the test is started, the tilting table is moved to the final position by another pneumatic cylinder and the tire is loaded.
6. The tilting table returns to the intermediate position.
7. At the end of the test, the tire is automatically conveyed back to the tilting table.
8. The tilting table can be tilt down by pushing the “DOWN” button at the tilting table controller panel.

The Down button needs to be pushed permanently in order to move down the tilting table.

When releasing the down button the tilting table stops the down-movement immediately.

9.3.4

Executing an Automatic Measurement Run

Now the automatic measurement run can be started. For this, please select a test program in the **Test** menu. You can also start the measurement run with the **Test** or **Continuous** function. This functionality is described in section **8.1.4. Test Menu**.

9.3.5

Verify

For safe and reliable operation of the machine it is required to start the Verify function every day.

See *Selection / Verify Function*, see page 105.

9.4 Shutdown

After completion of the test runs, the following instructions must be followed before the machine is switched off with the main switch.

1. The lids of the machine automatically open on completion of the test cycle. If the test procedure had to be interrupted, the lids need to be opened with the **Open Lid** function in the **Machine** menu.
2. Remove the tire that was last measured from the machine. This is done by selecting the **Unload** function in the **Machine** menu.
3. When you shut down the INTACT software, a dialog prompt appears, asking you whether you want to close the lids. Click on **Yes** to close the lids.

- or -

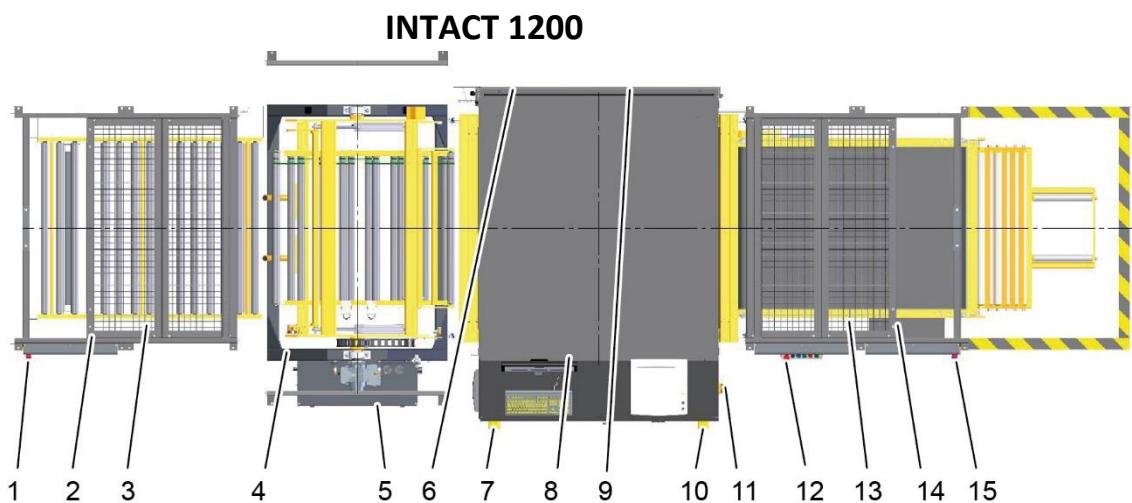
Click on **No** if you do not want the lids to be closed.

4. Do the following to shut down the computer:
 - 4.1. Click on the **Shutdown** button.
All applications will be closed and **Windows** is shut down.
5. Wait until the computer has shut down completely. The monitor then turns dark.
6. You can now switch off the complete machine with the main switch, which is on the right side of the machine control cabinet.

10 Safety Installation

10.1 Safety layout

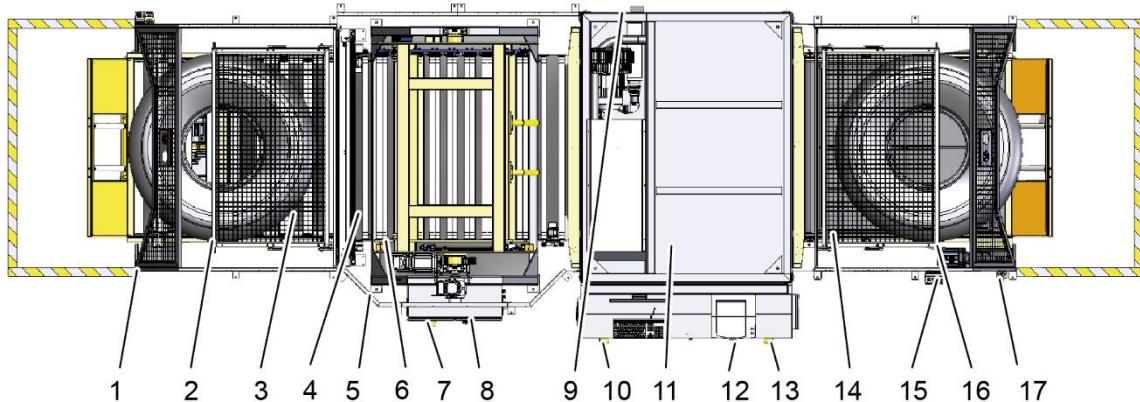
Depending on the machine configuration, the following safety devices may be installed.



Item	Designation
1	Emergency stop button
2	Safety light barrier
3	Guard (both sides and on top)
4	Guard (both sides and on top)
5	Main switch for tire flipper (only for INTACT 1600 with tire flipper)
6	On-off valve (on pneumatic maintenance unit)
7	Emergency stop button (for INTACT 1200 / for INTACT 1600 with tire flipper)
8	Guard (safety enclosure, with control based safety functions and emergency stop button on the inside)
9	Safety switch on the electrically locked service door
10	Emergency stop button
11	Main switch of the machine

Item	Designation
12	Emergency stop button
13	Guard (both sides and on top)
14	Safety light barrier
15	Emergency stop button

INTACT 1600



Item	Designation
1	Emergency stop button
2	Safety light barrier
3	Guard (both sides and on top)
4	Rolling shutter
5	Guard (both sides and on top)
6	Safety switch
7	Emergency stop button
8	Main switch for tire flipper
9	On-off valve (on pneumatic maintenance unit) (rear side of INTACT)
10	Emergency stop button
11	Guard (safety enclosure, with control based safety functions and emergency stop button on the inside)
12	Main switch of the machine
13	Emergency stop button
14	Guard (both sides and on top)
15	Emergency stop button und pushbuttons for control of tilt table (if existing)
16	Safety light barrier
17	Emergency stop button

10.2 Emergency Stop Buttons

Pressing an emergency stop button stops all movements immediately.

The emergency stop buttons are located at the doors of the control cabinet (at the right and left) and at the loading system.

10.3 Safety Switch (only INTACT 1200)

The service door of the vacuum chamber is provided with a safety switch. Opening the door automatically activates the safety switch, which switches off the diode lasers and stops the axes. The emergency stop is activated.

10.4 Laser Protection

The diode lasers at the measuring heads are always on during testing, even if the lids are completely open. A yellow LED on the right control cabinet door indicates that the diode lasers are switched on. The diode lasers have a lens which expands the laser beam to such an extent that there is no danger from it upwards of a 10 cm distance. However, a greater minimum spacing should be selected for one's own safety. Together with the lenses, the diode lasers are of the 1 Laser Protection Class. Do not view the laser beam directly through an optical instrument.

Diode lasers are also used for tire measurement. These lasers are not switched off. The diode lasers comply with Laser Protection Class 2.

10.5 On-Off Valve

The on-off valve shuts off the compressed-air supply if one of the emergency stop buttons has been pressed or the power supply interrupted.

This prevents any creeping pressure drop and unintentional movement of the cylinders.

10.6 Guard

Guards prevent access or entry of persons into the danger zone.

Fixed guards

Fence elements for protection on the loader, tire flipper and unloader.

Sheet metal cladding around the pressure chamber.

Sheet metal cladding around the drives and the moving mechanical assemblies.

Sheet metal cladding around live parts.

Filling pieces on the conveyor belts.

10.7 Safety light barrier

The safety light barrier monitors the size of the passage openings:

- in the loader.
- in the unloader.

If the height falls below the minimum height, e.g. with persons on the conveyor belt, no more automatic movements are performed.

The safety light barrier is integrated into the emergency stop circuit. After it has been triggered, the emergency stop relay must be reset.

10.8 Control based safety functions

When the tire is loaded, the outer and inner diameters are determined by 3 vertically aligned light barriers at the loading port. The tire is centered in the pressure chamber.

If no tire is detected, the test procedure stops.

10.9 Rolling Shutter (only INTACT 1600)

The roller shutter is designed to prevent persons from reaching into the turning station.

Only when the roller shutter is closed the turning station can clamp and turn the tire.

When the rolling shutter is open, the transport rollers can only transport the tire.

11 Trouble Shooting



Please read the safety instructions in chapter 2 before carrying out the work described here.

11.1 Switching on and Starting the Machine

11.1.1

Supply Voltage

1. Is the supply voltage available at the main switch? You can measure the voltage at terminal **X1**. The voltage must be between 380 VAC and 500 VAC. Please note the information given in Section **6.6.5. Adjustment of Voltage**.
2. Check the voltage at main switch **3Q1**. If no voltage is applied there, you have to check the protective switch **3Q2** since the power supply can be interrupted with this switch. Refer to the wiring plan for help.
3. Are all the fuses **4F1 – 4Fx** and the protective switch switched on? They are all in the control cabinet.

11.1.2

Main Relay Does not Work

1. Has an emergency stop button been pressed? The machine is provided with 2 emergency stop buttons in the control cabinet as well as one interlock switch in the vacuum chamber. The loader and the unloader are also each provided with an emergency stop button. To deactivate the emergency stop button, turn and pull it out.
2. Check the start button **5S2.1**, which is located at the control cabinet. The start button is provided with a normally open contact and switches 24VDC. For further information, please refer to the wiring plan.
3. Check whether the voltage supply for the emergency stop circuit is functioning properly. For the buttons and switches in the emergency stop circuit, refer to the wiring plan on Page **5**.

11.1.3

Computer does not Start and Boot

1. Is the computer switched on? The computer has two switches. The main switch is found on the back of the power supply unit. The second switch is provided on the front, next to the floppy drive.
2. Do the control LEDs shine? They are located below the floppy drive.
3. Are all cables connected correctly? Check above all the power cable and the outlet power strip. Refer to the wiring plan on page 40 for help.
4. Is a diskette inserted in the floppy drive?
5. The uninterrupted power supply (UPS) is the topmost unit installed in the computer. A serial cable connects it to a COM interface. Check whether the cable is properly connected and screwed tight.
6. Is a CD inserted in the CD-ROM drive? The CD-ROM drive is installed in the computer as the second unit from the top. If the computer is switched on, you can open the CD-ROM drive by pressing the corresponding button. For further information, please refer to the description of the CD-ROM drive, which is included in the folder for your computer.

11.2 Problems with Software Starting

11.2.1 CodeMeter

1. Hardware

- 1.1. Is the CodeMeter (Dongle) connected to a USB interface?
The LED at the dongle must light up or flash when it is inserted

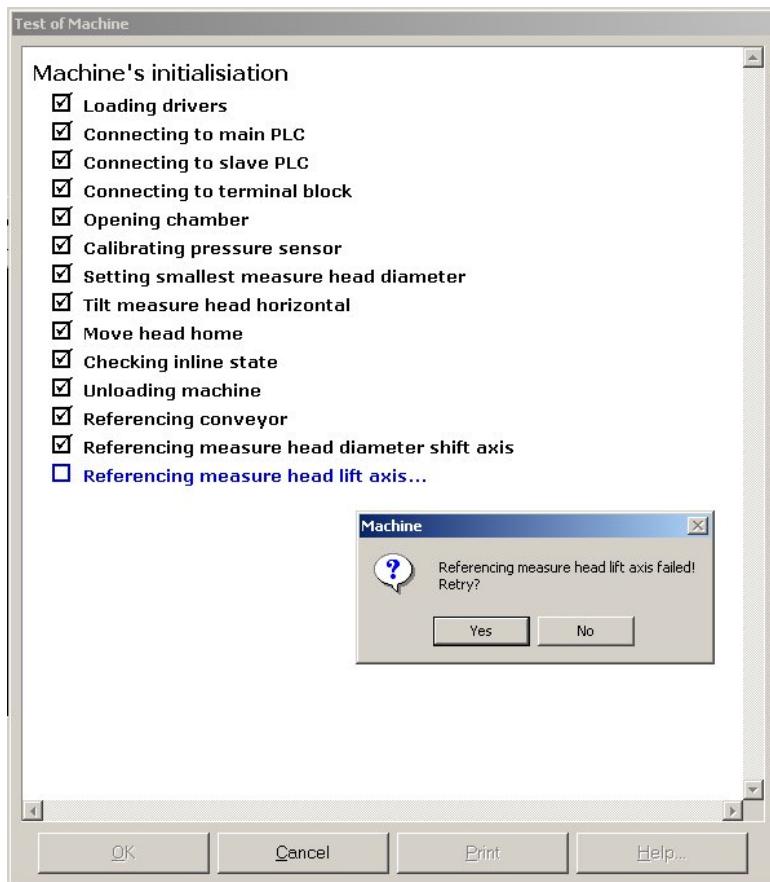
2. Software

- 2.1. Is the driver for the dongle correctly installed?
When the dongle is plugged in, the icon on the task bar should be on hand and green in color.
- 2.2. The license required for the INTACT software is installed.
The instructions for installing the license are in Chapter **6.3.2. Installation of a new Software License**.

11.3 Automatic Self-Diagnosis

During automatic self-diagnosis, all important functions are executed once, i.e., the functionality of the tire testing machine is verified. After its successful completion, you can display various status data via tooltips. A tooltip is a small light-gray box which appears when you place the cursor over the corresponding line.

Firstly required drivers are loaded to connect the PLC and PLC is connected.



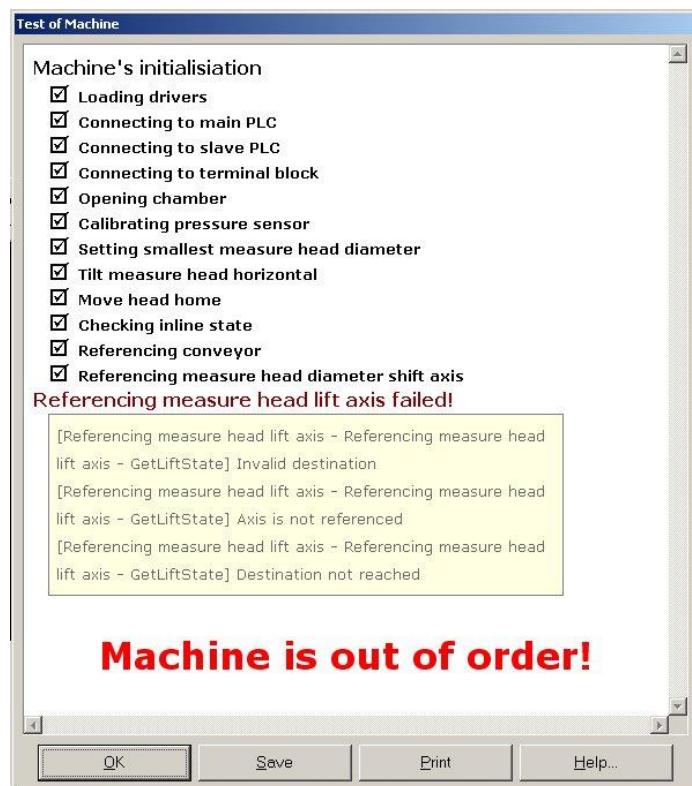
If an error occurs during automatic self-diagnosis, a dialog box is displayed with which you can repeat the failed function, as described earlier in this manual. At present, however, only initialization of the axes can be repeated. If you cancel function execution, the self-diagnosis is terminated with the message **Machine is out of order!** You need to restart the software after correcting the error.

How to repeat the execution of a function:

1. If the initialization of an axis has failed, the above dialog box opens. Click on **Yes** to repeat the failed initialization.

- OR -

Click on **No** to cancel execution of the function. Self-diagnosis is terminated and an error message is displayed.



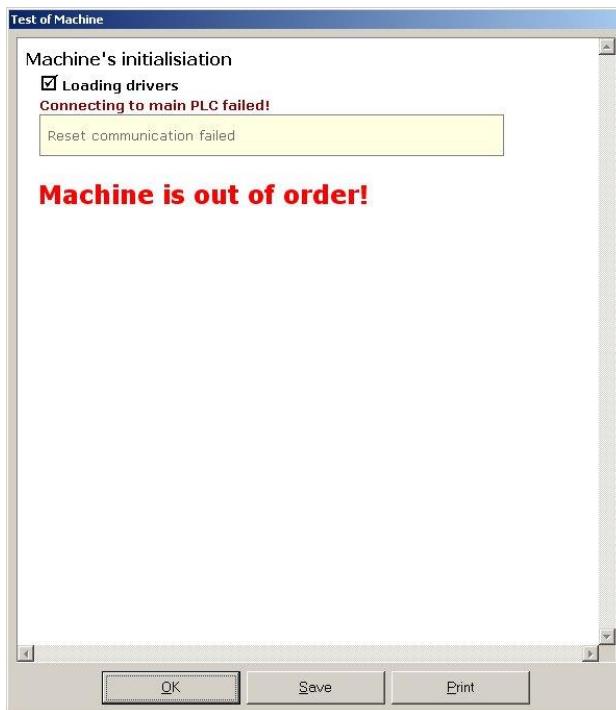
How to restart the software:

1. Click on **OK** to terminate self-diagnosis.
2. The user interface of the INTACT software is displayed.
3. Close the software.
4. Start the software once again by double-clicking the INTACT button on the desktop.

The following pages list and explain possible error messages, give detailed error descriptions and show you how to remedy the error causes. After correcting the error, you need to restart the INTACT software.

11.3.1

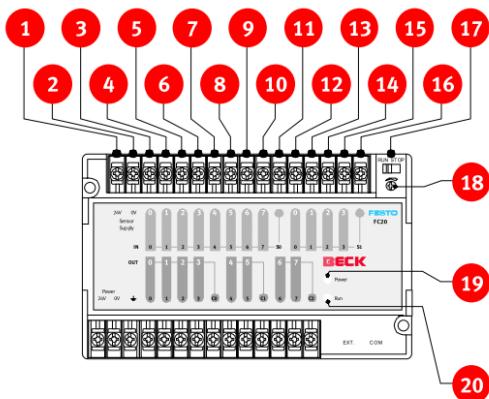
Connecting to PLC (FEC 34)



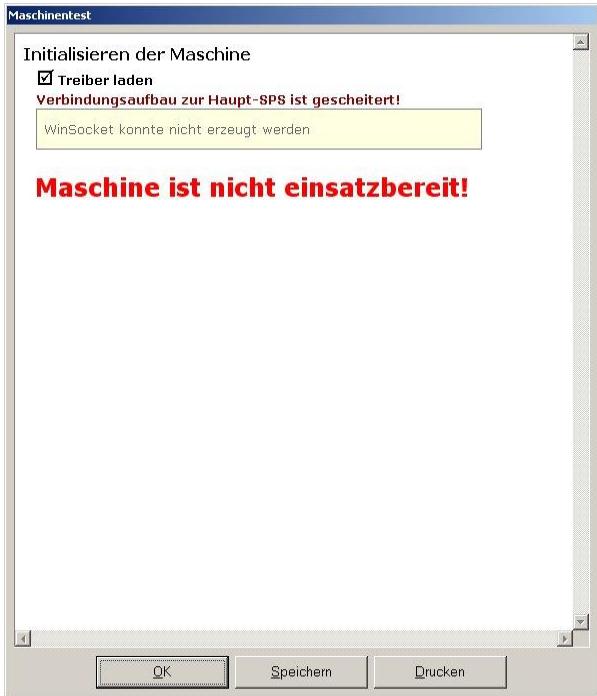
The connection between computer and the PLC could not be established. It is therefore not possible to start the software and place it in the operating mode.

Possible causes:

1. The network cable is not connected properly. Check connection at the network card, at the external hub and at the PLC.
2. The network cable or the connector is defective. The network cable has a clip that prevents the cable from coming loose. This clip may break if the cable is disconnected without pressing down the clip. Without this clip, the network cable can very easily slip off.
3. Contact problems have occurred in the computer (network card) or in the PLC.
4. The PLC is not supplied with 24 VDC.
 - 4.1. Check whether the fuse **4F1** is switched on.
 - 4.2. Check whether the 24 VDC supplied by the power supply unit reaches the PLC. You will find a green LED labeled **Power** on the PLC. This LED lights up when 24 VDC are applied. Further information is provided in the wiring plan.
 - 4.3. The cable is defective or has come loose.
5. The IP address is wrong. The IP address is a set of four three-digit numbers. The message shown in the figure on the left is displayed if the 4th octet has been changed in the network settings of your computer. The correct IP addresses are given in Section **11.4.1. DOS-PLC**.
6. The software of the PLC has not booted properly or is not in **Run Mode**. The LED labeled **Run (Status LED)** lights up in orange and not in green.
 - 6.1. A switch is provided in the upper right corner of the PLC (**Run/Stop Switch**). This switch must be set to **Run**. For further information, please refer to the PLC manual.



- | | | | |
|----|---------------------------------------|----|------------|
| 1 | Sensor supply 24 V DC 100 mA | | |
| 2 | Sensor supply 0 V | | |
| 3 | Input E0.0 | 7 | Input E0.4 |
| 4 | Input E0.1 | 8 | Input E0.5 |
| 5 | Input E0.2 | 9 | Input E0.6 |
| 6 | Input E0.3 | 10 | Input E0.7 |
| 11 | Shared potential S0 for E0.0 ... E0.7 | | |
| 12 | Input E1.0 | | |
| 13 | Input E1.1 | | |
| 14 | Input E1.2 | | |
| 15 | Input E1.3 | | |
| 16 | Shared potential S1 for E1.0 ... E1.7 | | |
| 17 | RUN/STOP switch | | |
| 18 | Analog potentiometer (trimmer) | | |
| 19 | Power LED (power supply) | | |
| 20 | Status LED (status indicator) | | |



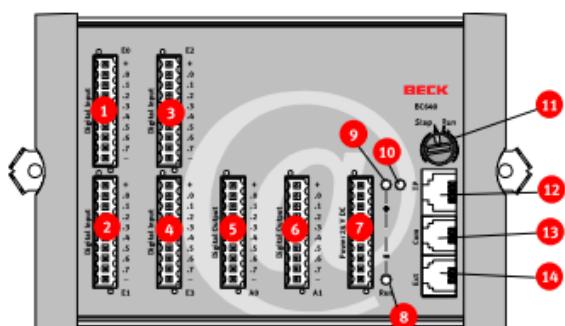
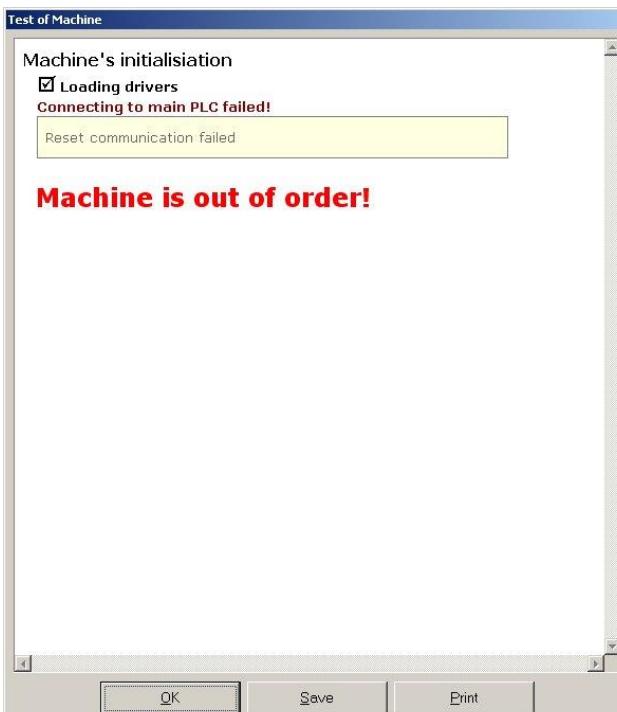
A software module cannot be created.

Possible causes:

1. The IP address is wrong.
The IP address is a set of four three-digit numbers.
The message shown in the figure on the left is displayed if the 3rd octet has been changed in the network settings of your computer. The correct IP addresses are given in Section **11.4.1. DOS-PLC**.
2. The **INTACT.EXE** file is still running in the background. You can close the file with the help of the Task Manager. For instructions on how to do this, refer to the **Windows Manual**.

11.3.2

Connecting to PLC (BC 640)

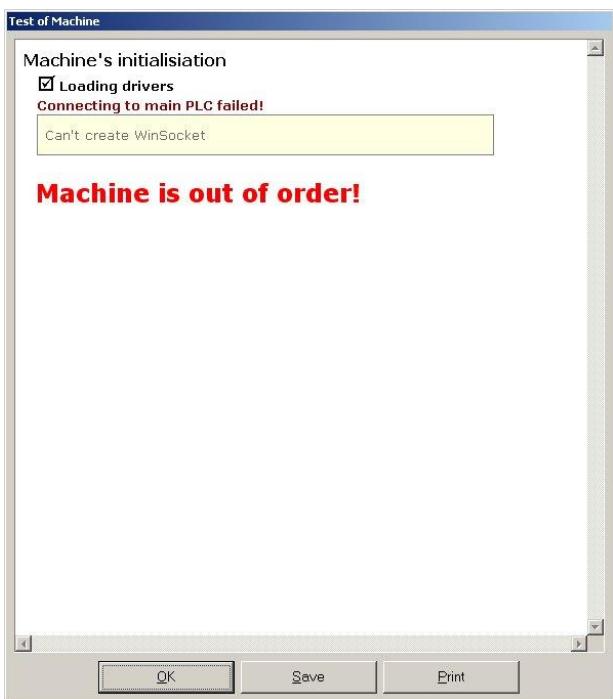


- 1 Eingang E0.0 bis E0.7
- 2 Eingang E1.0 bis E1.7
- 3 Eingang E2.0 bis E2.7
- 4 Eingang E3.0 bis E3.7
- 5 Ausgang A 0.0 bis A 0.7
- 6 Ausgang A 1.0 bis A 1.7
- 7 Spannungsversorgung
- 8 Status LED (rot, grün, orange, blinkend programmierbar)
- 9 Power LED (Spannungsversorgung)
- 10 Link/Traffic LED (Netzwerkaktivität)
- 11 Funktionswahlschalter
- 12 Netzwerkanschluss 10Base T
- 13 Kommunikationsschnittstelle (Com)
- 14 Erweiterungsschnittstelle (Ext)

The connection between the computer and the PLC could not be established. It is therefore not possible to start the software and set it to operating mode.

Possible causes:

1. The network cable is not connected properly. Check the connection at the network adapter, at the external hub and at the PLC.
2. The network cable or the connector is defective. The network cable has a clip that prevents the cable from coming loose. This clip may break if the cable is disconnected without pressing down the clip. Without this clip, the network cable can slip off very easily.
3. Contact problems have occurred in the computer (network adapter) or in the PLC.
4. The PLC is not supplied with 24 VDC.
 - 4.4. Check whether the fuse **4F1** is switched on.
- 4.5. Check whether the 24 VDC supplied by the power supply unit reach the PLC. You will find a green LED labeled **Power** on the PLC. This LED shines when 24VDC are applied. Further information is provided in the wiring plan.
- 4.6. The cable is defective or has come loose.
5. The IP address is wrong. The IP address is a set of four three-digit numbers, called octets, each separated by a dot. The message shown in the figure on the left is displayed if the 4th octet has been changed in the network settings of your computer. The correct IP addresses are given in section 7.4. **DOS-PLC**.
6. The software of the PLC has not booted properly or is not in **Run (1)** mode. The LED labeled **Run** shines orange instead of flashing green.
 - 6.1. A mode switch is provided on the right-hand side of the PLC. It has two settings: **Stop** and **Run**. When **Run** is active, you can set different numerical values. This switch must be set to **Run (1)**. For further information, please refer to the PLC manual.



A software object cannot be created.

Possible causes:

3. The IP address is wrong.
The IP address is a set of four three-digit numbers, called octets, each separated by a dot. The message shown in the figure on the left is displayed if the 3rd octet has been changed in the network settings of your computer. The correct IP addresses are given in section 7.4. **DOS-PLC**.
4. The **INTACT.EXE** file is still running in the background. You can close the file with help of the Task Manager. For instructions on how to do this, please refer to the **Windows Manual**.

11.3.3

Lids are Blocked

The lids of the vacuum chamber cannot be closed because one of the photoelectric beams is interrupted.



Possible causes:

1. The reflector or photoelectric beam is dirty. Clean the reflector with a cloth.
2. The photoelectric beam is misaligned.
3. An object, e.g. a tire, is in the lid.
Remove the object and click on **OK**.

- or -

Click on the **Cancel** button.

Further details are given in Section **6.8.4. Photoelectric beams at the Lead-In Lid**.

11.3.4

Opening and Closing the Test Chamber

Closing the Lids

Closing the lids comprises two separate operations.

1. Each lid is pulled up by two cylinders provided at each side of the machine.
2. On reaching the upper inductive switches, each lid is pulled toward the vacuum chamber by another two cylinders. These cylinders are provided on the base plate below the vacuum chamber.
3. The operation is complete when the inductive switches of the two cylinders have been reached. The cylinder piston is provided with a magnetic ring which actuates the inductive switch.

Opening the Lids

Opening the lids comprises three separate operations.

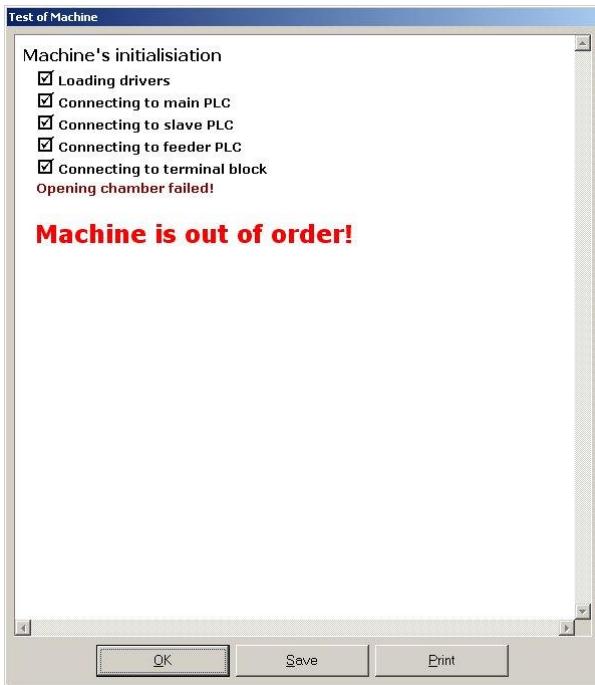
1. Each lid is pulled slightly upwards by two cylinders.
2. Each of the lids is then pushed away from the vacuum chamber by a cylinder on the base plate.
3. On reaching the inductive switches of the two cylinders, each of the lids are pressed down by two cylinders. The operation is complete when the inductive switches have been reached. The cylinder piston is provided with a magnetic ring which actuates the inductive switch.

Information on the inputs and outputs that control the pneumatic valves and on the inductive switches are provided in the machine wiring plan.

In Chapter **11.9. Correction of Problems with the Lids**, you will find details on error messages and faults that may occur in connection with the lids.

Opening the test chamber

The message shown in the figure on the left indicates that the test chamber could not be opened.



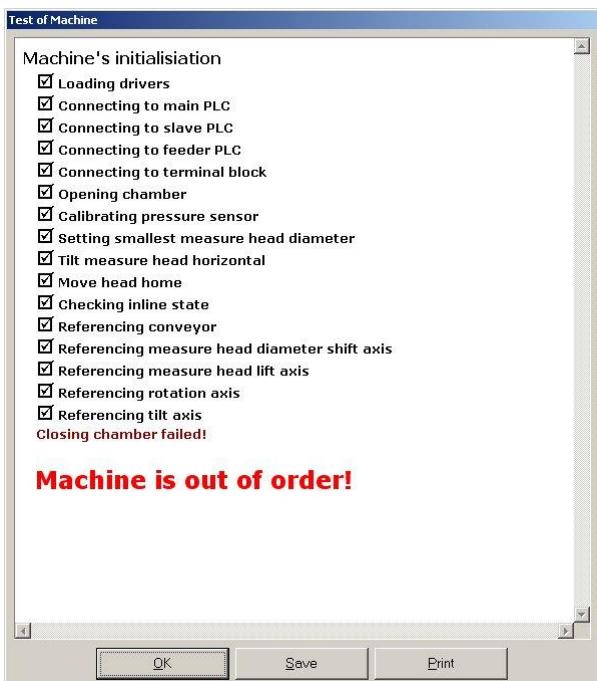
Possible causes:

1. The compressed air supply is not switched on. The pressure must be at least 6 bar and is indicated at the maintenance unit. At the maintenance unit you can step up the pressure if necessary.
2. The on-off valve at the maintenance unit has not opened.
 - 2.1. Is the on-off valve defective?
 - 2.2. 24 VDC must be supplied to the on-off valve when it switches. This is indicated by an LED at the connector. The on-off valve is integrated directly into the machine's emergency stop circuit. For further information, see the wiring plan.
3. The pneumatic valves for opening the lids are not activated or working.
 - 3.1. 24VDC must be supplied to the valve. This is indicated by an LED at the connector. The valves react to digital outputs. For further information, see the wiring plan.
 - 3.2. The valve does not switch because of a defect in the valve.
4. The input for the inductive switch at the cylinder is defective. The green LED at the inductive switch is lit up. But the LED at the digital input is not. For further information, see the wiring plan.
5. The inductive switch at the cylinder is incorrectly adjusted. Loosen the hexagon socket screw at the inductive switch and move it about 1-2 cm in both directions until the diode lights up in the open lid.
6. A digital output which controls the pneumatic valves is defective. A green LED is provided at the output. This LED lights up when the output has switched. For further information, see Pages **6, 10** and **12** of the wiring plan.
7. Is one of the lids blocked by an object?

Closing the test chamber

The message shown in the figure on the left indicates that the test chamber could not be closed. Further information on the procedure is provided in Section **11.3.4. Opening and Closing the Test Chamber**.

Possible causes:



1. The compressed air supply is not switched on. The pressure must be at least 6 bar and is indicated at the maintenance unit. At the maintenance unit you can step up the pressure if it is necessary.
2. The on-off valve at the maintenance unit has not opened.
 - 2.1. 24 VDC must be supplied to the on-off valve when it switches. This is indicated by an LED at the connector. The on-off valve is integrated directly into the machine's emergency stop circuit. Further details are given in the wiring plan .
 - 2.2. Is the maintenance unit defective?
3. The pneumatic valve for opening the lids is not working.
 - 3.1. 24 VDC must be supplied to the valve. This is indicated by an LED at the connector. The valves react to digital outputs. For further information, see the wiring plan.
 - 3.2. The valve does not switch because of a defect in the valve.
4. The input for the inductive switch at the cylinder is defective. The green LED at the inductive switch is lit up. But the LED at the digital input is not. For further information, see the wiring plan.
5. A digital output which controls the pneumatic valves is defective. A green LED is provided at the output. This LED lights up when the output has switched. For further information, see the wiring plan.
6. The inductive switch at the cylinder is incorrectly adjusted. Loosen the hexagon socket screw at the inductive switch and move it about 1-2 cm in both directions.
7. Is one of the lids blocked by an object?

11.3.5

Tilting the Measuring Head Horizontally

The tilt axis cannot be moved to home position or the current position of the tilt axis is unknown. However, the lift axis can still be moved to home position.

How to move the lift axis to home position:

1. Click on **Yes**. The axis is moved up and self-diagnosis is terminated.

- or -

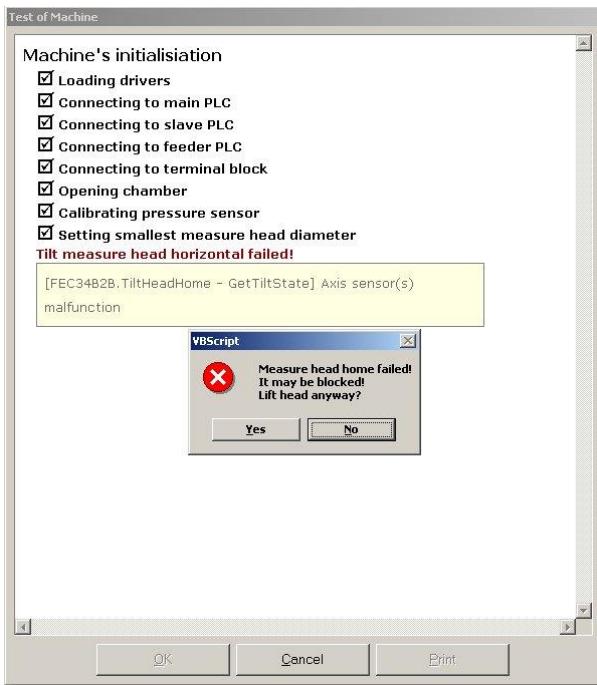
Click on **No**. The window is closed and self-diagnosis is terminated.

Caution: Moving the axis up may damage the measuring head. It is better to terminate self-diagnosis and remove the cause of the error first.



Possible causes:

1. An inductive switch which monitors the home position of the measuring heads is defective or is not being supplied with voltage. The inductive switches switch a digital input and are supplied with 24 VDC by this input. The LED at the inductive switch should light up when the switch is not actuated. For further information, see the wiring plan.
2. Sensor and the switching are too far apart. It must not be in excess of 0.1 mm. Check on this spacing with a gauge.
3. The measuring head is obstructed by a tire or the conveyor belt. Remove the tire and move the axis to home position by confirming the dialog prompt with **Yes**.
4. The drive of the axis is not working properly.
 - 4.1. The toothed belt is not properly tensioned, which causes the measuring head to tilt downwards from its own weight. Information on tensioning the toothed belt is provided in the Service Manual, Section **Tilt axis** and in Section **3.8. Tensioning of the Toothed Belts**.



- 4.2. A gear wheel at the motor or measuring head is not properly fastened. The two gear wheels are fixed to the shaft with a grub screw. Check whether the grub screw has loosened. The grub screw on the measuring head cannot be accessed from the outside and, as a result, can only be inspected by Carl Zeiss service staff.
- 4.3. The axis is driven by a step motor. Check whether the motor is running properly. For further information, see the wiring plan.

11.3.6

Moving the Measuring Head to Home Position

The end positions of the lift axis (at top and bottom) are monitored by two inductive switches. This prevents the axis from running into the mechanical limit stop. A photoelectric beam is provided for checking the path of traverse.

The rated zero position (home position) of the lift axis is determined by a diaphragm between photoelectric beam and reflector.

How the photoelectric beam works at home position:

1. The photoelectric beam is interrupted.
2. The axis moves down 5 mm. The photoelectric beam must then be free; if not, the diagnosis is terminated.
3. The axis moves up again until it reaches the inductive switch. The photoelectric beam must then be interrupted.

You can adjust the home position of the lift axis by shifting the diaphragm. A software tool (**Service Tool.cmd**) has been developed to facilitate adjusting the diaphragm. This tool informs you in which direction and how far you need to move the diaphragm. You will find a detailed description in the Service Manual, Chapter **Service Tool**.

How to adjust the diaphragm without the software tool:

1. Open the loader lid and watch the paths of traverse in the test chamber. Running the machine with the service door open is not possible for safety reasons and due to the emergency stop switch at the service door.

Caution: Please strictly follow the safety notices because the test chamber contains moving parts which are software-controlled and the inside of the chamber cannot be seen from the control panel. In case of danger, press the Emergency Stop button next to the safety switch. Please strictly follow the notes in the Service Manual: Notes on Service and Trouble Shooting.

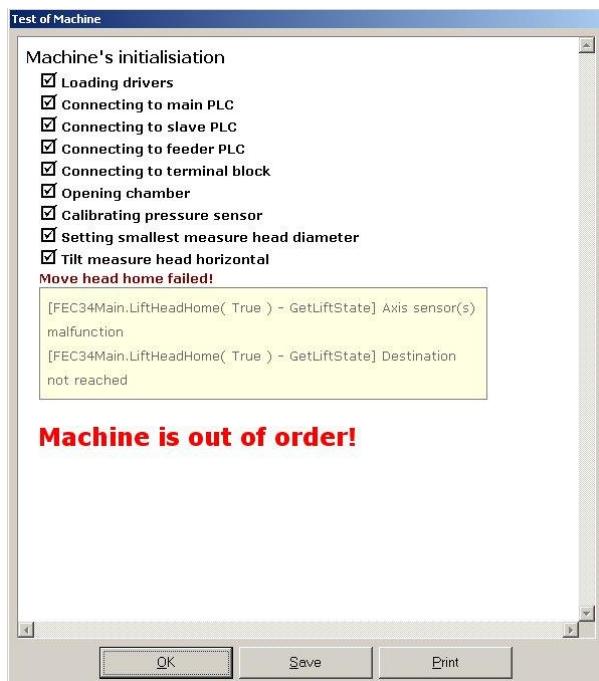


2. Cover the photoelectric beam with black adhesive tape.
3. Start the INTACT software. The axis moves down 1 cm and stops there.
4. You can restart the INTACT software to check the position. The axis now moves up until it reaches the inductive switch. The axis then moves 1 cm down again and stops there.
5. Remove the adhesive tape from the photoelectric beam.
6. Slightly loosen the fastening screw on the diaphragm holder.
7. Slide the diaphragm up or down until the photoelectric beam is interrupted (orange LED off). A scale is provided for determining how far you have moved the diaphragm.
8. Now slowly slide up the diaphragm. The LED first starts to flash. The diaphragm has reached the correct position as soon as the LED lights up permanently.
9. Tighten the screws again.

10. Start the INTACT software. The axis is now moved to home position and later referenced.

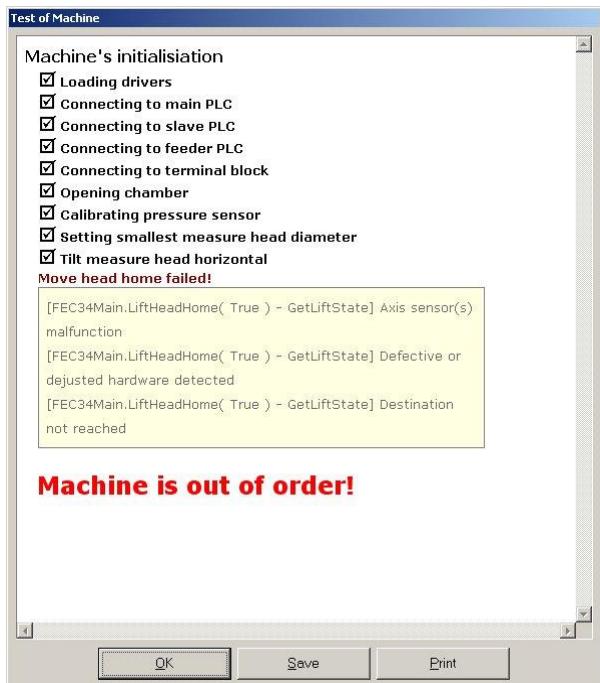
A failure to move the lift axis to home position may be due to a variety of reasons. The error messages therefore vary.

Possible causes:



1. The diaphragm is misaligned. Realign the diaphragm as described above so as to adjust the diaphragm. You can also use the service tool for this purpose. The service tool is described in the Service Manual: **Service Tools**.
2. The photoelectric beam is defective. For further information, see Pages the wiring plan..
 - 2.1. Check whether the photoelectric beam is supplied with 24 VDC. This terminal is provided in the switch box in the vacuum chamber Does the signal of the photoelectric beam reach the PLC? The input must change when the photoelectric beam is interrupted and released again. This is indicated by a green LED.
3. The drive of the axis is not working properly.
 - 3.1. Check the power supply to the motor. When the motor is ready to operate, a green LED at the motor lights up. In the wiring plan, you will find all the information required for testing the electrical signals. The SEW motor is provided with an LED which issues a code in case of a motor malfunction. You will find a table listing the codes in Section **11.3.9. Referencing the Height Adjustment**.
 - 3.2. Check whether the drive is blocked by an object. If it is, remove the object. You will have to open the service door for this. Please strictly follow the safety notices.

Possible causes:



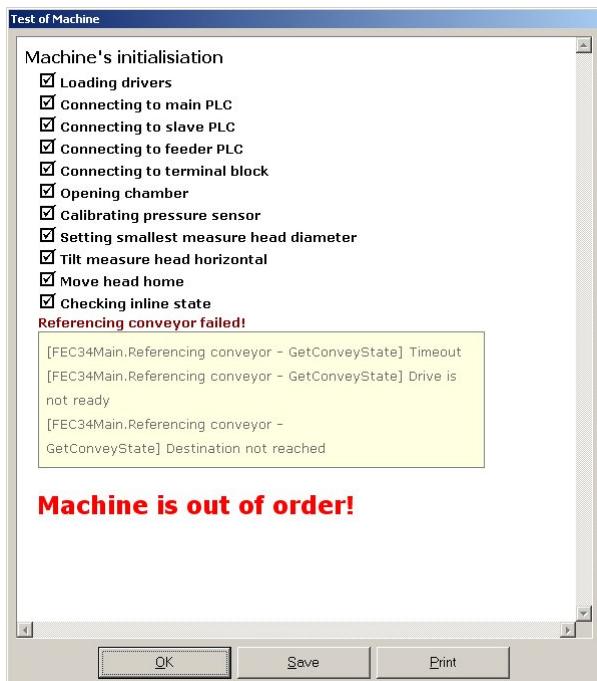
1. The diaphragm is misaligned. Readjust the diaphragm as described above so as to adjust the diaphragm. You can also use the software tool described in Chapter **Service Tool of the Service Manual** for this purpose.
2. The drive of the axis is not working properly.
 - 2.1. Check the power supply to the motor. When the motor is ready to operate, a green LED at the motor lights up. In the wiring plan, you will find all the information required for testing the electrical signals. The SEW motor is provided with an LED which issues a code in the case of a motor malfunction. You will find a table listing the codes in Section **11.3.9. Referencing the Height Adjustment**.
 - 2.2. Check whether the drive is blocked by an object. If it is, remove the object. You will have to open the service door for this. Please strictly follow the safety notices.
3. The encoder which monitors the axis is defective.
 - 3.1. The signals do not reach the PLC because the cable is damaged or the connector is not plugged in properly. Check the cable and the connectors.
 - 3.2. The encoder is not powered. You can measure the voltage at terminal **X5**. The voltage has to be 24 VDC. Also measure the voltage at the contacts of the connector. For further information see the wiring plan.
 - 3.3. The encoder fastening to the motor has come loose. Check the hexagon socket screws.

11.3.7

Referencing the Conveyor

The conveyor belt is traversed at various speeds during referencing. During this process, it is moved by at least one revolution.

Possible causes:



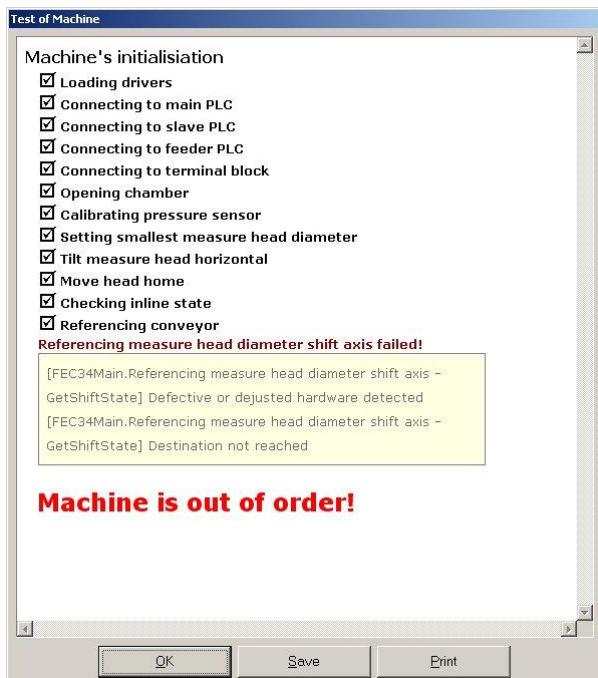
1. The encoder which monitors the axis is not working properly. Further information see Pages 7 and 24 of the wiring plan.
 - 1.1. The signal does not reach the PLC. The PLC is provided with an LED for each input.
 - 1.1.1. Switch off the motor with the protective switch.
 - 1.1.2. Bridge Contact No 14 at relay. You will find the relay in the wiring plan.
 - 1.1.3. Slowly move the conveyor belt forward by hand. The input at PLC flashes while you are moving the conveyor belt.
 - 1.2. Check whether the cable is damaged or broken.
 - 1.3. Check whether the connector is plugged in properly.
 - 1.4. The encoder is fastened on the shaft with a hexagon socket screw. This connection may loosen.
 - 1.5. The encoder is not powered with 24 VDC. Please check whether the power supply unit is defective or a fuse has blown. For further information, see the wiring plan.
 2. The motor or drive is defective.
 3. The conveyor belt slips and needs to be re-tensioned. This can be done using the set screws at the bearings.
 - 3.1. Loosen the four nuts on two bearings.
 - 3.2. Turn the set screw clockwise. This moves the bearing, thereby tightening the conveyor belt. Ensure that you move both bearings of a shaft equally far.
 - 3.3. Re-tighten the four nuts.

11.3.8

Referencing the Diameter Adjustment

The axis is firstly traversed up to the inner limit stop and then up to the maximum limit stop. On reaching the maximum limit stop, it moves to its home position where the inductive switch is located.

Possible causes:



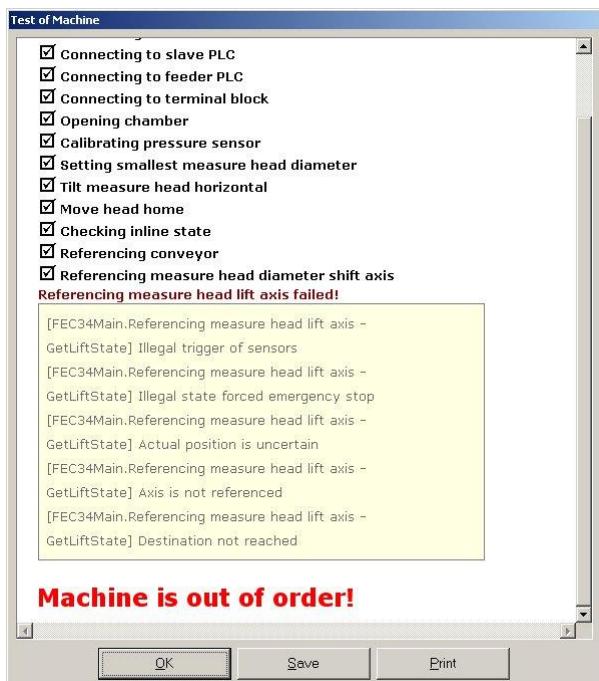
1. One of the limit stops is missing or at the wrong position.
2. The axis is sluggish or blocked.
3. The toothed belt is too loose. Please tighten the toothed belt with the tension roller.
4. The measuring head holders are fastened to the toothed belt by two clamps and move simultaneously in radial directions. If a clamp has come loose, the measuring head holder will stop moving and thus not reach the limit stop. Please check whether both clamps are tight.
5. The inductive switch is defective or the switching distance is too great. The switching distance is not to be above 1mm. The inductive switch is provided with an LED that lights up when the switch is not assigned. Please check the digital input and the 24 VDC voltage supply. For further information, see the wiring plan.
6. The inductive switch has been moved and is no longer at the home position. The inductive switch therefore supplies an incorrect signal - depending on its position. Please readjust the position of the inductive switch.
 - 6.1. If the inductive switch is too far to the front, it is traversed. The signal is briefly present before disappearing.
 - 6.2. If the inductive switch is too far back, it cannot be reached by the axis and does not supply any signal to PLC.
7. The drive gear wheels are loose. Check the connection between the gearbox and motor. The gear wheels are secured on the shaft by means of a grub screw.

11.3.9

Referencing the Height Adjustment

When the height adjustment is being referenced, the lift axis is traversed several times at different speeds. During this process, the maximum path of traverse is determined. Subsequently, the maximum acceleration is determined and the system checks whether the axis can be traversed at the designated speed.

Possible causes:



1. The diaphragm is misaligned. You will find a description of how to adjust the photoelectric beam in Section **11.3.6. Moving the Measuring Head to Home Position**.
2. An object is on the conveyor belt. The result is an incorrect path of traverse. Remove the object and restart self-diagnosis.
3. The drive of the axis is not working properly. The designated speed therefore cannot be reached or the axis does not move at all.
 - 3.1. Check power supply to the motor. When the motor is ready to operate, a green LED at the motor lights up. In the wiring plan, you will find all the information required for testing the electrical signals.
4. The encoder is not working properly.
 - 4.1. The signals do not reach the PLC because the cable is damaged or the connector is not plugged in properly. Check the cable and the connectors.
 - 4.2. The encoder is not powered with voltage. You can measure the voltage at terminal **X5**. The voltage has to be 24 VDC. Also measure the voltage at the contacts of the connector. The signal is transmitted via Contact No. **19**. For further information, see the wiring plan.
 - 4.3. The encoder fastening to the motor has come loose. Check the hexagon socket screws.

The LED provided at the motor indicates the status of the motor and brake and thereby assists you in finding faults. The following table provides you with an overview of all possible LED states.

Table of all possible states of the motor LED.

LED color	LED status	Operational status	Description
-	Off	Not ready	No 24 V power supply
Yellow	Steady flashing	Not ready	Self-test phase active or 24 V power supply present but supply voltage not OK
Yellow	Steady light	Ready but unit inhibited	24 V power supply and supply voltage OK, but no enable signal
Green/ yellow	Flashing with alternating colors	Ready, but timeout	Communication via RS-485 disrupted
Green	Steady light	Unit enabled	Motor operating
Green	Steady, fast flashing	Current limit active	Drive has reached the current limit
Red	Steady light	Not ready	Check the 24 V _{DC} supply Make sure that there is a smoothing DC voltage with a low ripple (residual ripple max. 13 %) present
Red	2 x flash, pause	Fault 07	DC link voltage too high
Red	3 x flash, pause	Fault 11	Excessive temperature in output stage
Red	4 x flash, pause	Fault 84	Excessive temperature in motor Assignment of motor to frequency inverter incorrect
Red	5 x flash, pause	Fault 89	Excessive temperature in brake Assignment of motor to frequency inverter incorrect
Red	6 x flash, pause	Fault 06	Mains phase fault

As you can see from the table, the error type is coded in the number of flashing signals emitted after traversing. The SEW MOVIMOT Manual provides a detailed description of the individual LED codes.

11.3.10

Referencing the Rotation Axis

When the rotation axis is being referenced, it is first traversed up 0° (360°). The axis then rotates until it reaches the second limit stop located at the max. position. The rotation axis then rotates back to 0° again. When the axis reaches the inductive switch for the home position, speed is reduced until the limit stop is reached. The number of steps by which the step motor moves the axis must be the same for both rotation directions.

Possible error causes:

1. The inductive switch that monitors the home position is defective or not supplied with power. The inductive switch is provided with an LED that lights up when the switch is unassigned. Check the Input at PLC and the 24 VDC power supply. For further information, see the wiring plan.
2. The holder with the inductive switch or the index pin for the home position has come loose or is out of adjustment. The inductive switch therefore does not switch or switches at the wrong time. Readjust the holder and secure the two screws with **Loctite (red)**. For setting purposes, turn the measuring heads in such a way that Measuring Head No. 1 points to the left and both measuring heads are parallel to the conveying direction.
3. The switching distance between inductive switch and switching lug has shifted. Adjust the inductive switch in such a way that the distance to the switching lug is 2 mm. Secure the two screws with **Loctite (red)**. To adjust, turn the measuring heads in such a way that Measuring Head No. 1 points to the left and both measuring heads are parallel to the conveying direction.

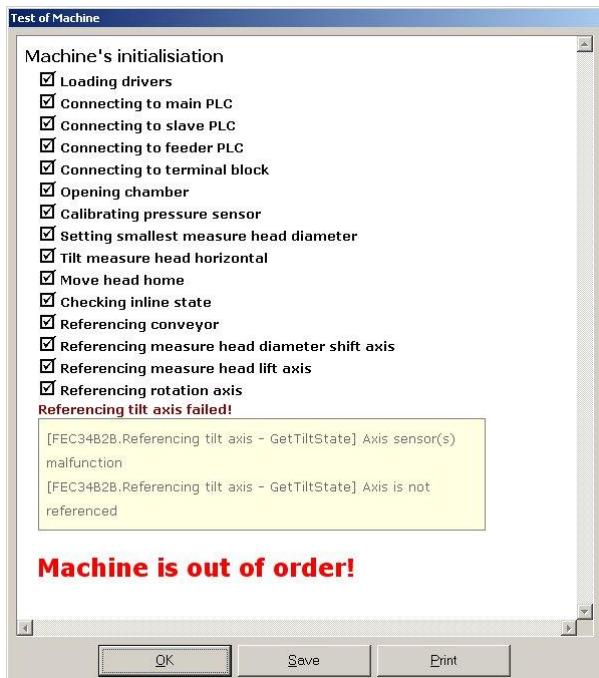
4. The drive of the axis is not working properly or is sluggish.
 - 5.1. The axis has too much clearance as the toothed belt is not properly tensioned. Tension the toothed belt by loosening both tension rollers and pressing them together.
 - 5.2. The gear wheel at the motor has worked loose. Retighten the grub screw securing the gear wheel. You can additionally secure the grub screw with **Loctite (red)**.
 - 5.3. The rotation axis is sluggish in one or a number of places. Check whether the cable duct rubs against the axis or blocks it.
 - 5.4. Check whether the step motor is functioning properly. The motor is powered with 24VDC and controlled by the PLC outputs. Further information is provided in the wiring plan.

11.3.11

Referencing the Measuring Head Tilt Axis

The axis is traversed first to the upper and then to the lower limit stop. After reaching the lower limit stop, the axis moves to its home position. This is where an inductive switch is. In the home position, both measuring heads must be horizontal.

Possible causes:



1. The inductive switch that monitors the home position is defective or not supplied with power. The inductive switch is provided with an LED that lights up when the switch is not assigned. Please check inputs at the PLC and the 24 VDC power supply. For further information, see the wiring plan.
2. The inductive switch and switching lug are too far apart. It must not be in excess of **0.1 mm**. Continue to screw the grub screw at the switching lug towards the sensor. Secure the grub screw with **Loctite (red)**.
3. The measuring head is blocked.
4. The switching lugs on the two measuring heads do not have the same position. You can adjust the switching lug by loosening two grub screws.
5. The tilt axis only points in one direction.
6. The drive of the axis is not working properly or is sluggish.
 - 6.1. The toothed belt slips because it is not properly tensioned. Retighten the toothed belt. You will find a description of how to use the tension meter in Section **Tensioning of the Toothed Belts in the Service Manual**.
 - 6.2. The gear wheel at the motor has worked loose. Retighten the grub screw securing the gear wheel. In doing this, ensure that the screw is perpendicular to the relevant flat portion of the axis shaft. You can additionally secure the grub screw with **Loctite (red)**.

The measuring heads must be exactly horizontal when in home position. How you can adjust the measuring heads is described in Section **Adjustment of the Tilt Axis in the Service Manual**.



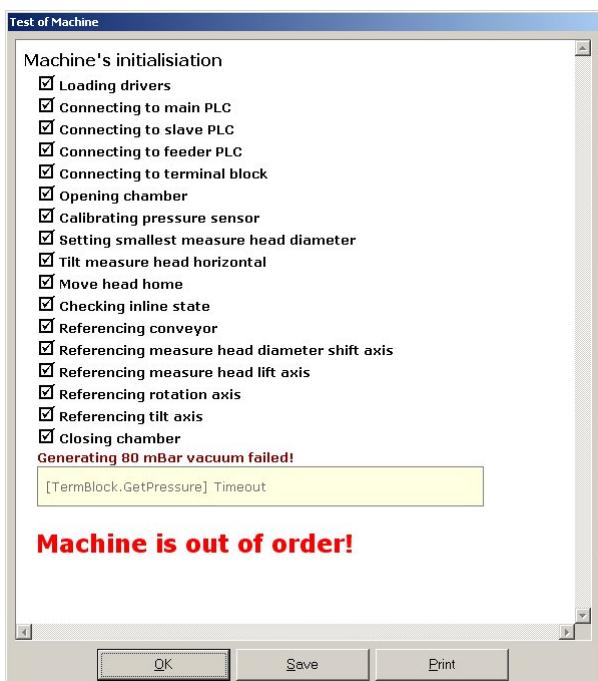
11.3.12

Generating an 80 mbar Vacuum

At the end of self-diagnosis, the system checks whether the vacuum chamber is airtight and whether the vacuum pump and quick ventilation are working. For this purpose, a negative pressure of 80 mbar is generated.

Possible causes:

1. The vacuum chamber is not airtight. Air can leak into the chamber through the sealing profiles at the service door or lids. Check the sealing profiles to see whether air is leaking into the chamber somewhere.
2. The quick ventilation is not airtight or is not working properly.
The quick ventilation is below the vacuum chamber.
 - 2.1. Check the sealing profiles to see whether they have loosened completely or in part.
 - 2.2. Check whether the valve that controls the cylinder of the quick ventilation is piloted properly. A small LED is provided at the valve connector. This LED lights up when the valve is piloted. For further information, see the wiring plan and the pneumatic diagram.
 - 2.3. Check whether the quick ventilation closes properly. The effect of overtightening the nut which fixes the quick ventilation disk produces an inclined disk which does not properly close. Slacken the nut a little so that the disk can rotate. Secure the nut and disk with **Loctite (red)**.
3. The vacuum hose below the chamber is leaky or loose.
4. The vacuum pump is dirty and therefore does not work properly. Clean the sound absorbers and vane wheel of the vacuum pump. The vacuum pump manual, which is included in the documentation folder, provides installation instructions.



5. The vacuum pump is piloted by a converter. In some machines there are valves to change the air flow and close the vacuum chamber.
 - 5.1. Check whether Protective is switched on. If so, then the voltage must be present at the converter or the valves. For further information, see the wiring plan.
 - 5.2. Check at the output of Converter as to whether the voltage is on and is available at the vacuum pump motor. The voltage can be checked at terminals).
 - 5.2. If valves are used, clean or possibly change them.
6. The pressure sensor is not working properly or is defective.
 - 6.1. The connector has come loose or contact problems exist.
 - 6.2. The cable is defective, thus preventing the signals from reaching the analogue input terminal. This input powers the pressure sensor with 24 VDC. Further information find in the wiring plan.
7. The analogue input terminal of the pressure sensor is defective. The analogue input is provided with a green and a red LED. The red LED indicates a fault in the analogue input or the voltage. The wiring plan provides further information.
8. The lids are not properly closed.
Even if closing the lids was properly carried out, they might still not be properly sealed. A reason might be an insufficient pressure or volumetric flow of the compressed air supply. Pressure must be at least 6 bar and the volumetric flow at least **20 l per Minute**.
Check the pressure at the maintenance unit manometer. It is provided on the back of the machine.
You can increase the pressure at the pressure reducer, if necessary. If the pressure cannot be increased any further, you need to increase the pressure in the compressed air supply system.
How the lids function and which conditions need to be met to effectively close the lids is described in **Section 11.3.4. Opening and Closing the Test Chamber**.

11.4 Status Requests after Successful Self-Diagnosis

When the self-diagnosis has been successfully completed, the machine is ready for operation. Before you exit the dialog box by clicking on **OK**, you can perform a few status requests (version number, axis lengths, PLC, etc.).

How to get the status information:

Move the mouse to the desired line and leave it there for a few seconds. The stored information is displayed in a yellow box. The box disappears again after a certain time.

11.4.1

DOS PLC INTACT 1200 (FEC34)

Depending on its type and scope, the machine may comprise multiple controllers. The order in which the status information is given is the same for all controls.



Available information on the PLC:

1. Which PLC is involved.
2. Which type was used and which hardware.
3. Which axes are controlled and monitored by this PLC.
4. The version number and software type with which the PLC operates.
5. The version number and creation date of the software developed by Carl Zeiss.

A list of possible controllers (PLCs):¹⁰

- | | |
|-----------------------|------------------------------|
| 1. Main PLC | 192.168.202.18 ¹¹ |
| 2. B2B PLC | 192.168.202.19 |
| 3. Feeder PLC | 192.168.202.20 |
| 4. Conveyor belt PLC | 192.168.202.21 |
| 5. Unloading belt PLC | 192.168.202.22 |
| 6. Flip device | 192.168.202.23 |

¹⁰ Which controllers have been installed depends on the configuration of the machine.

¹¹ IP addresses may vary from customer to customer. They depend on your company network.

11.4.2

DOS-PLC INTACT 1600 (BC 640)

Depending on its type and scope, the machine may comprise multiple controls. The order in which the status information is given is the same for all controls.



Available information on the PLC:

6. Which PLC is it?
7. Which type was used and which hardware.
8. Which axes are controlled and monitored by this PLC.
9. The version number and software type with which the PLC is working.
10. The version number and creation date of the software developed by Carl Zeiss.

A list of possible controls (PLCs):¹⁰

1. Measuring head (MHD) PLC 192.168.202.18¹¹
2. Handling (CCC) PLC 192.168.202.19
3. Flip device (FLP) 192.168.202.23

¹⁰ Not all controls have been installed. Which controls have been installed depends on the configuration of the machine.

¹¹ The IP addresses may vary from customer to customer. They depend on your company network.

11.4.3

Beckhoff PLC

The Soft PLC is connected with INTACT software using ADS tools and a unique address

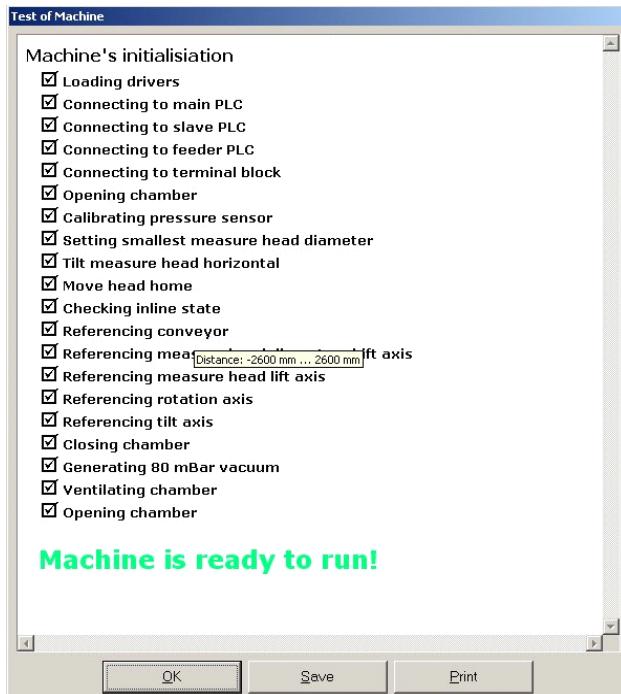
After connection this unique address is given in the available information of the self-test dialog.

Available Information:

1. AMS-Net-ID.

11.4.4

Conveyor



Available information:

1. The maximum path of traverse of the conveyor belts is displayed. The value applies to both directions.

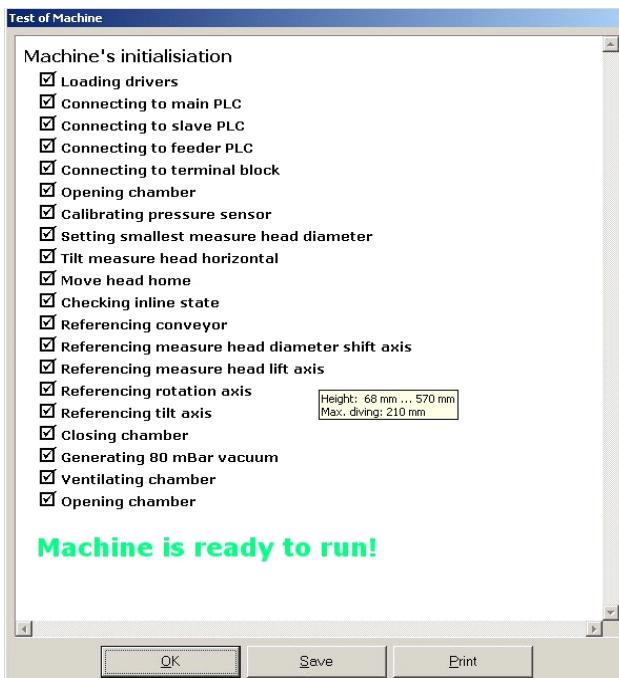
11.4.5

Diameter Adjustment



Available information:

1. The formula for calculating the current diameter is displayed.
 - 1.1. Minimum diameter: here 280 mm
 - 1.2. Maximum path of traverse: here 261 mm
Diameter: 280 mm ... 802 mm

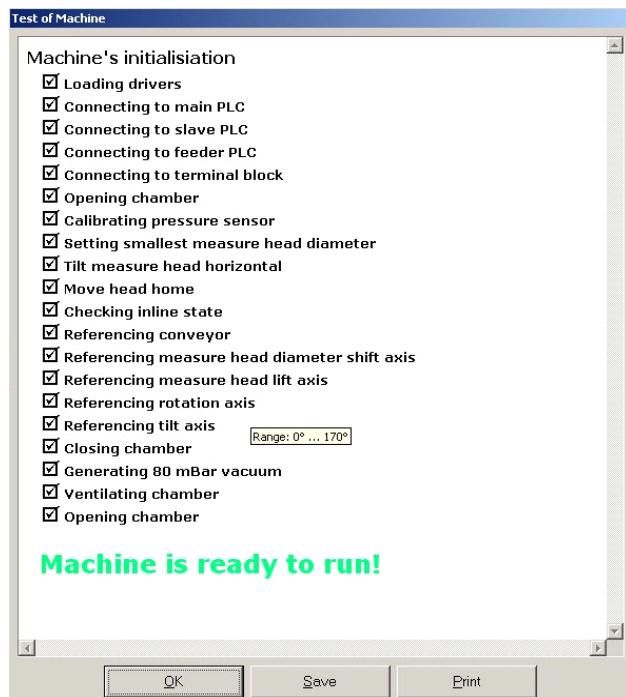


Available information:

1. The path of traverse of the measuring heads. The displayed data refers to the optical axis of the objective lens.
 - 1.1. Minimum spacing from the conveyor belt: here 68 mm
 - 1.2. Maximum spacing from the conveyor belt: here 570 mm.
2. The maximum dipping depth of the measuring heads into the tire.

11.4.6

Rotation axis

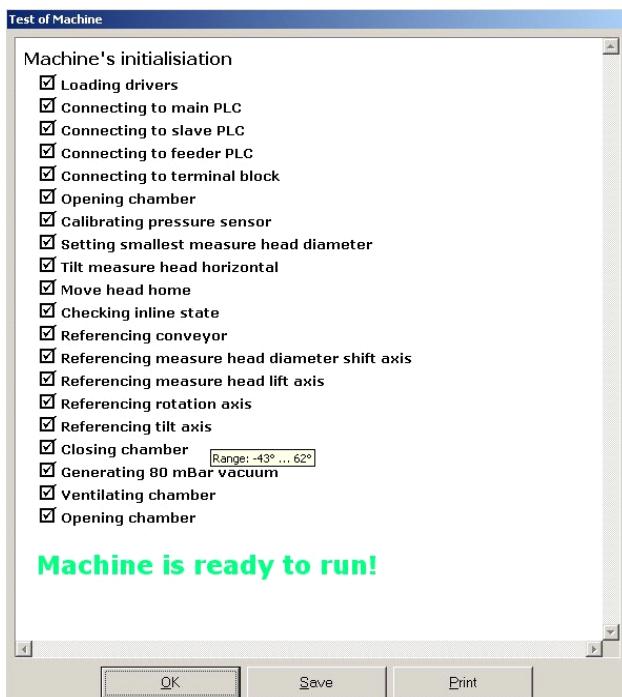


Available information:

1. The maximum range of rotation is displayed. For this machine it is 169°. Other machines have a rotation range up to 355°.

11.4.7

Tilt Axis



Available information:

1. The maximum tilting angle of the measuring heads is displayed.
 - 1.1. Upwards: here -43°
 - 1.2. Downwards: here 62°

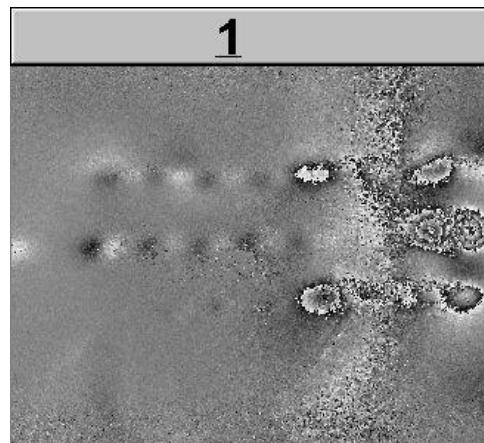
11.5 Noisy or Remain Dark

11.5.1

Mode Hopping of Single Diode Lasers

The diode lasers need a few minutes to reach a stable temperature range. If the temperature is still not stable, the operating point of some diode lasers may change erratically.

In the measuring heads, the diode laser segments are arranged in such a way that the diode lasers are to the left and right of the objective lens. The figure below shows clearly that a diode laser of the right segment has changed its operating point.



Mode hopping hides faults which are smaller than 5 mm. The measurement has to be repeated. Larger faults can be detected in spite of mode hopping, as you can see in the image above.

A function for detecting mode hopping has been integrated into the software. This function can be enabled or disabled according to customer requirements.

If the function is enabled, the image is taken again given detection of mode hopping.

11.5.2

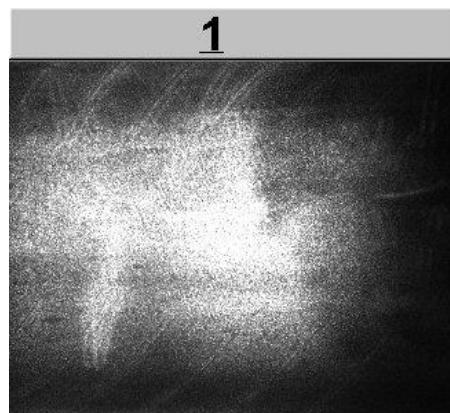
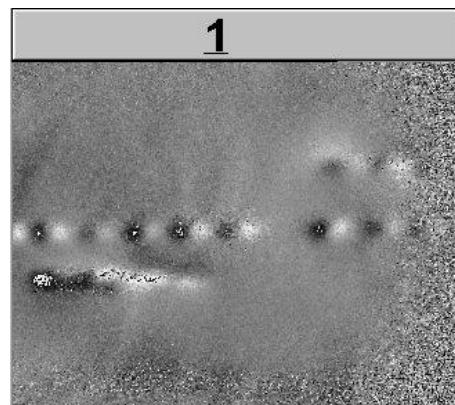
Tire Vibration

1. Was the measurement started too quickly after loading the tire in that the tire was still moving (creeping)?
2. Was the tire stored upright before the measurement?
3. If the tire is not centered on the loader, one of the measuring heads may touch the tire.
4. If the vacuum is too high (>70 mbar), tire deformations and vibrations might occur particularly with the testing of the beads and side walls. They will result in a poor measurement result.

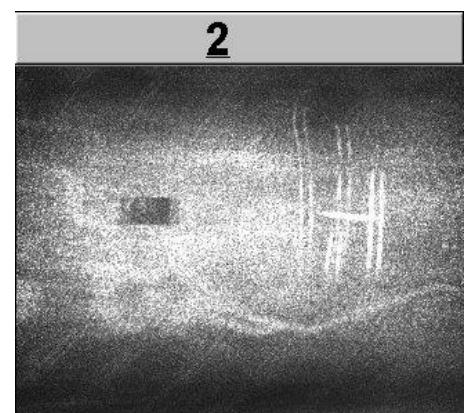
11.5.3

Single Diode Lasers Defective

In the measuring heads, the diode laser segments are arranged in such a way that the diode lasers are to the left and right of the objective lens. In the image below, two diode lasers to the right of the objective lens have failed. The result image and the two video images show clearly that it is easy for the operator to determine whether a diode laser is defective and which one it is.



Video image with defective diode lasers



Video image with all diode lasers

The segment with the failed diode lasers has to be replaced. How this is done is described in Service Manual, Section **Exchange of Defective Diode Lasers**.

11.6 Errors During Image Capture

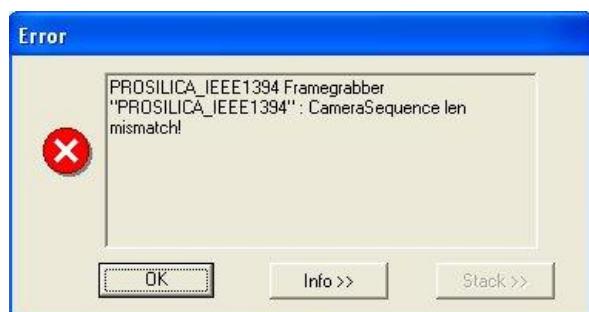
CCD ProSilica EC1380

One or more measuring heads - depending on machine type - are fitted in the tire testing machines. Each of them is equipped with its own camera. The Firewire camera video signals are combined in an amplifier and directed to the computer.

Trouble at the amplifier or camera may arise during the operation. The most frequent reason is down to a cable having worked itself loose at the amplifier or at a camera. However, damage to the cables can also come about from frequent tilting movements. A description is given in Service Manual Chapter **Exchanging the Firewire Cables** on how to change them.

As the cameras are registered in the operating system Equipment Manager, it may be necessary on having resolved the problem to reinstall the driver. Usually the problem can be resolved by unplugging and plugging in the cable at the camera or amplifier a number of times.

One of the cameras is not properly plugged in leading to a failure of the machine's self-diagnosis.



Either the plug of a camera has worked loose or the cable is damaged.



How to check on whether it is necessary to reinstall the driver:

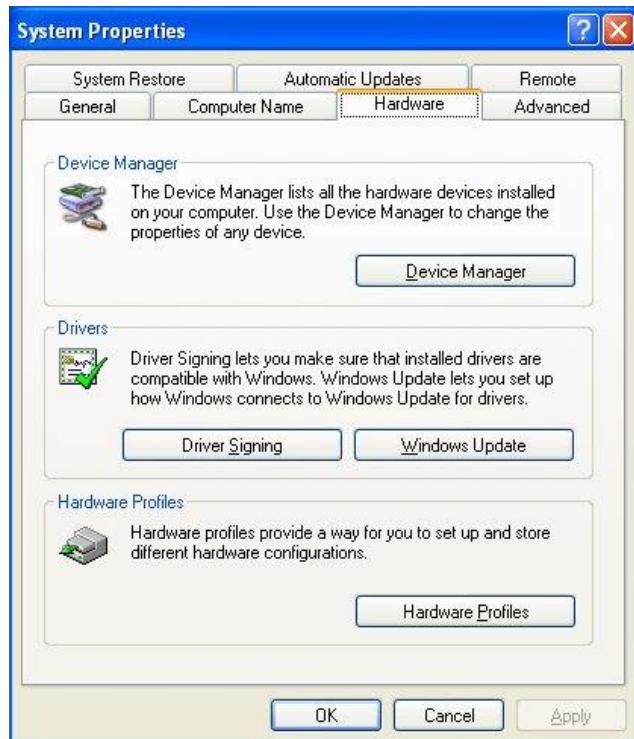
1. Close the INTACT software and click on **Log Off** so as to log in as an administrator.
2. Enter the **Administrator** user name and password in the dialog box. Click on **OK** to log in.
3. The **Viewer** icon is on the Windows interface. Double-click the icon to start the software tool for the cameras.
4. All the camera serial numbers are displayed in one of the software boxes. One or two of them are shown - depending on machine type. The driver for the camera must be reinstalled if not all the serial numbers are displayed.



Displaying the serial numbers in the Viewer camera tool.



Dialog box with the System Properties. Here you can select the Device Manager.



- To install the driver, click on **Start** in the task bar and select **Control Panel**.
- You are provided with a window with all the functions which are available in the **Control Panel** menu. Select the **System** function.
- In the **System Properties** dialog box, select the **Hardware** tab. You are then able to open the **Device Manager**.
- In the **Device Manager** you will find the **Imaging Devices (DCAM)** entry. Select it. You should now see the entries for the Prosilica cameras. One or two entries should be the case - depending on machine type.
- Click on an entry with the right mouse button. A list box is provided from which you select the **Update Driver** function.
- In the hardware update assistant, select **No, not this time** and click on **Next**.

11. Another window is provided in which you select the **Install from a list or specific location (Advanced)** command and then **Next** is clicked.

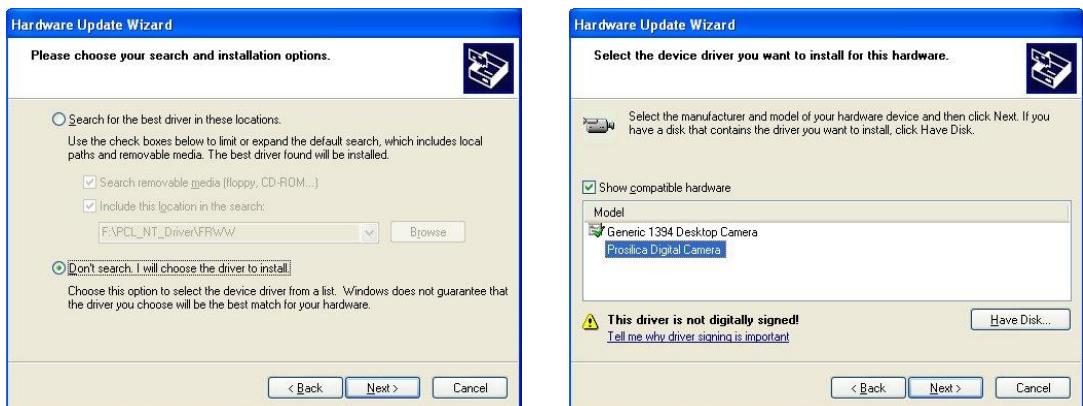
Hardware update Wizard.



12. In the following window, select the **Don't search. I will choose the driver to install** command and click on **Next**

13. You are now provided with a window in which the driver for the camera is suggested. Select the suggestion and click on **Next**.

Hardware update Wizard.



14. Installation of the driver is started. Following successful conclusion, click on **Finished**. You can now restart the INTACT software.

As already mentioned above, the video signals of the cameras are bundled in the amplifier and passed onto the computer. Our INTACT software has a special function permitting the camera images to be shown in the correct sequence. This function makes the assignment possible with the help of the camera serial numbers.

To this end, it is up to you to determine the sequence of the serial numbers in the software. It is extremely difficult to assign the camera images to the tire if they have been mixed up.

How to determine the sequence of the cameras:

Close the INTACT software.

```
[PROSILICA_IEEE1394]
Gain = 15
Shutter=150
Brightness=0
CameraSequence=2,1
FlipTopBottom=False
FlipLeftRight=False
Debug=True
```

Open the Explorer and go to the **D:\INTACT\directory**.

Open the **INTACT.ini** file with the textpad.

In Section **Prosilica_IEEE1394** you will find the CameraSequence parameter. Here you can set the sequence of the cameras. The camera with the lower serial number is entered first.

1 = Camera at Measuring Head **No. 1** (0°)

2 = Camera at Measuring Head **No. 2** (180°)

Save the file following the change and start the INTACT software.

CCD Prosilica GC1380

In newer Machines cameras with Cat5.e Ethernet cables are directly connected with the PC via a network card.

Installation of driver and tools is analogous to Firewire cameras (see above). The tools have names with „GigE“.

To define the order of the cameras:

Exit INTACT Software.

Open Explorer and change to directory: **D:\INTACT**.

Open file **INTACT.ini** using Textpad.

In section **Prosilica_GigE** find Parameter **CameraSequence**.

Specify the cameras in increasing order.

1 = camera of measuring head # **1** (0°)

2 = camera of measuring head # **2** (clockwise)

3 = camera of measuring head # **3**

4 = camera of measuring head # **4**

Save the file and INTACT software.

11.7 Monitor Remains Dark

11.7.1 Monitor Check

1. Is the monitor switched on?

The LED of the monitor has to shine. Further information is provided in the monitor manual. You will find it in a folder labeled **Manuals**.

11.7.2 Supply Voltage

1. Is the power supply cable connected properly? Check whether it is plugged in at the monitor and at the socket provided in the control cabinet.
2. Check the supply voltage (220V; 110V) at the socket and at the monitor. Further details are given in the wiring plan on page **40**.

11.7.3 VGA Signal

1. Is the video cable properly connected to the monitor?
2. Is the cable properly connected to the computer?
The card for the VGA signal has a 15-pin D-sub connector.
3. Check whether a pin might be bent.

11.7.4 Is the Computer Switched on and Started?

The computer has been configured to start up automatically when the machine is switched on. This also applies to the monitor. If the configuration was changed, the computer must be switched on manually at the main switch.

1. At least one LED has to shine at the front of the computer when it is on.
2. Check whether the switch provided at the top on the back of the computer is in the ON position. If it is still in the OFF position, please set it to ON.
3. Press the main switch on the front of the computer. Further information is provided in the machine manuals.

4. The computer is equipped with an uninterrupted power supply (UPS).
 - 4.1. Check whether the serial cable is properly connected to the COM port and screwed tight.
 - 4.2. Check whether the power cable is properly connected to the UPS and the power supply unit of the computer.
 - 4.3. LEDs are provided on the front of the UPS and indicate the operating state. For further information, please refer to the UPS manual.

11.8 Errors Loading the Tire

11.8.1

No Tire Detected

The message shown in the figure on the left appears if no tire is detected during loading or if the tire has not been measured properly.

By clicking on the **More** button, you can display further details on the cause of the error, as shown in the figure below.

Click on **OK** to acknowledge the error.



Possible causes:

1. The eccentricity of the tire is too great. Put the tire back on the loader and ensure that it is placed in the center.
2. No tire has been loaded. Check whether a tire is in the machine or on the loader.
3. One of the photoelectric beams at the lead-in lid has not supplied a clear signal.
 - 3.1. The reflector is dirty. Clean the reflector and the sensor with a soft cloth.
 - 3.2. The photoelectric beam is misaligned. If this is the case, the red LED will light up. To set the photoelectric beam, proceed as described in Section **6.8.4 Retro-Reflective Sensors at the Lead-In Lid**.
4. Does the input light up at the DOS-PLC? For each of the three photoelectric beams at the lead-in and lead-out lids, one input is provided at the PLC. Further information find in the wiring plan.

11.8.2

The Loader is not Ready

This message appears if conveying a tire back onto the loader is not possible.

Click on **OK** to acknowledge the error.



Possible causes:

1. A tire is already on the loader.
2. The PLC checks whether the loader is free. This is done by actuating the motor for a few seconds and moving the conveyor belt. Wait until the conveyor belt has stopped, then restart the loading process.
3. One of the photoelectric beams on the loader does not supply a clear signal.
 - 3.1. The photoelectric beam is misaligned. If this is the case, the red LED will light up. To realign the photoelectric beam, proceed as described in Section **6.8.4 Retro-Reflective Sensors at the Lead-In Lid**.
 - 3.2. The reflector is dirty. Clean the reflector and the sensor with a soft cloth.
4. The loader is controlled and monitored by a PLC.
 - 4.1. Check the PLC. Section **11.3.1. Connecting to PLC** provides further information.
 - 4.2. Check whether the signals of the photoelectric beams reach the inputs of the PLC. The LED of the corresponding input lights up.
 - 4.3. Check whether the outputs for the loader motor are actuated. You can see from the LED whether the output is transmitting a signal. For further information and assistance, refer to the wiring plan.
5. Problems with the cable or the plug.
 - 5.1. Is the plug properly connected?
 - 5.2. Is the cable damaged?

11.8.3

The Unloader is not Ready

This message appears if the tire cannot be unloaded.



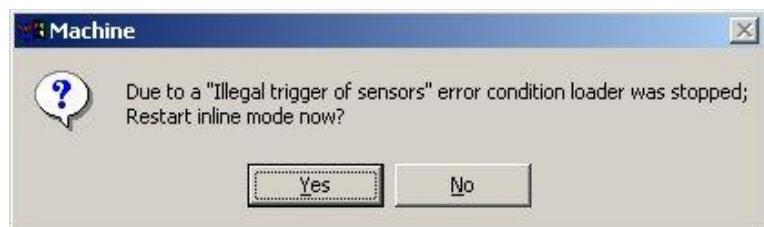
Possible causes:

1. A tire is still on the unloader. Remove the tire and restart the unloading process.
2. The photoelectric beam of the unloader is not supplying a clear signal.
 - 2.1. The photoelectric beam is not properly aligned. Please readjust the photoelectric beam. Instructions on how you adjust are provided in Section **6.7. Installation of the Loader and Unloader**. The message disappears and the loader starts to run.
 - 2.2. The reflector is dirty. Clean the reflector and photoelectric beam with a soft cloth.
3. The loader is controlled and monitored by the PLC.
 - 3.1. Check the PLC. Section **7.3.1. Connecting to PLC** provides further information.
 - 3.2. Check whether the signals of the photoelectric beams reach the inputs of the PLC. The LED of the corresponding input lights up.
 - 3.3. Check whether the outputs for the loader motor are actuated. You can see from the LED whether the output is transmitting a signal. For further information and assistance, refer to the wiring plan.
4. Problems with the cable or the plug.
 - 4.1. Is the plug properly connected?
 - 4.2. Is the cable damaged?

11.8.4

Illegal Interruption of a Sensor

This message appears if a photoelectric beam at the loader or unloader is interrupted and the interruption does not comply with the normal test sequence. This message will only be displayed if the machine is integrated in a customer's conveyor system. No tire is transferred from the conveyor system.



Possible causes:

1. A tire was again removed from the loader. Before you can start the next test, you need to again place a tire on the loader. Click on **Yes**. The message disappears and the loader starts to run.
2. The photoelectric beam was interrupted several times when placing a tire on the loader. Click on **Yes**. The message disappears and the loader starts to run.
3. The photoelectric beam is not properly aligned. Please readjust the photoelectric beam. Instructions on how you adjust are provided in **Section 6.7. Installation of the Loader and Unloader**. The message disappears and the loader starts to run.
4. A person on the loader itself has interrupted the photoelectric beam. Request the person to leave the loader.

Yes: The loading system is reset to the state in which it can take on tires.

No: A tire will only be taken on again when the next test is started or when a tire is loaded manually.

11.9 Correction of Problems with the Lids

11.9.1

The Lids Do not Move

1. Are the valves correctly piloted (electrically/pneumatically)? For further information, see Section **11.3.4. Opening and Closing the Test Chamber**.
2. Do the two limit switches at the cylinders (open and closed) light up? This points to a defect in one of the limit switches. Further details are given in Section **11.3.4. Opening and Closing the Test Chamber** and in the wiring plan.
3. Has the transport safeguard at the lids been removed? For transport, each lid is secured with two screws which are screwed into the rectangular tubes below the lids. Remove the screws.
4. Are the lids pressed outwards when opening? Before the lids can move down, they have to be pushed outwards. This is done by two cylinders under the vacuum chamber. Check whether these cylinders are functioning properly. Further details are given in Section **11.3.4. Opening and Closing the Test Chamber**.
6. Is the compressed air switched on, and is the pressure sufficient? The pressure must not drop below 6 bar. Pressure is indicated on the manometer at the maintenance unit.

11.9.2

Lids Do not Close Completely

1. Pneumatic System
 - 1.1. Is the compressed air switched on, and is the pressure sufficient? The pressure must not drop below 6 bar. The pressure is indicated on the manometer at the maintenance unit.
 - 1.2. Is the choke of the cylinders adjusted correctly? The choke is next to the valves on the pneumatic system panel. To close the choke, turn it clockwise. Further information is provided in the pneumatic diagram.
 - 1.3. Is the end-of-travel damping of the cylinders adjusted correctly? End-of-travel damping is adjusted with a small screw provided at the upper and lower cylinder ends.
 - 1.4. Is the lid pulled correctly onto the gasket? When the lids have reached the top position, they are pulled towards the chamber by cylinders. Only then are the lids completely closed. Further details are given in Section **11.3.4. Opening and Closing the Test Chamber**.
2. Are the valves correctly piloted (electrically/pneumatically)? For further information, see Section **11.3.4. Opening and Closing the Test Chamber**.
3. Do the limit switches of the cylinders switch too early? The limit switches are fixed in position with a grub screw. Loosen the grub screw and move the limit switch until the small LED lights up. This indicates that it is switching. Then tighten the grub screw again.

4. Do the limit switches switch at all?
If they do not, the lid will not be pulled inwards and the function will be stopped.
5. The lids rub against the rectangular tube.
6. The lids and the frame are out of true. For a description of how to realign the frame, see Service Manual, Section **Alignment of the Lids**.

11.9.3

Lids Set down too Hard

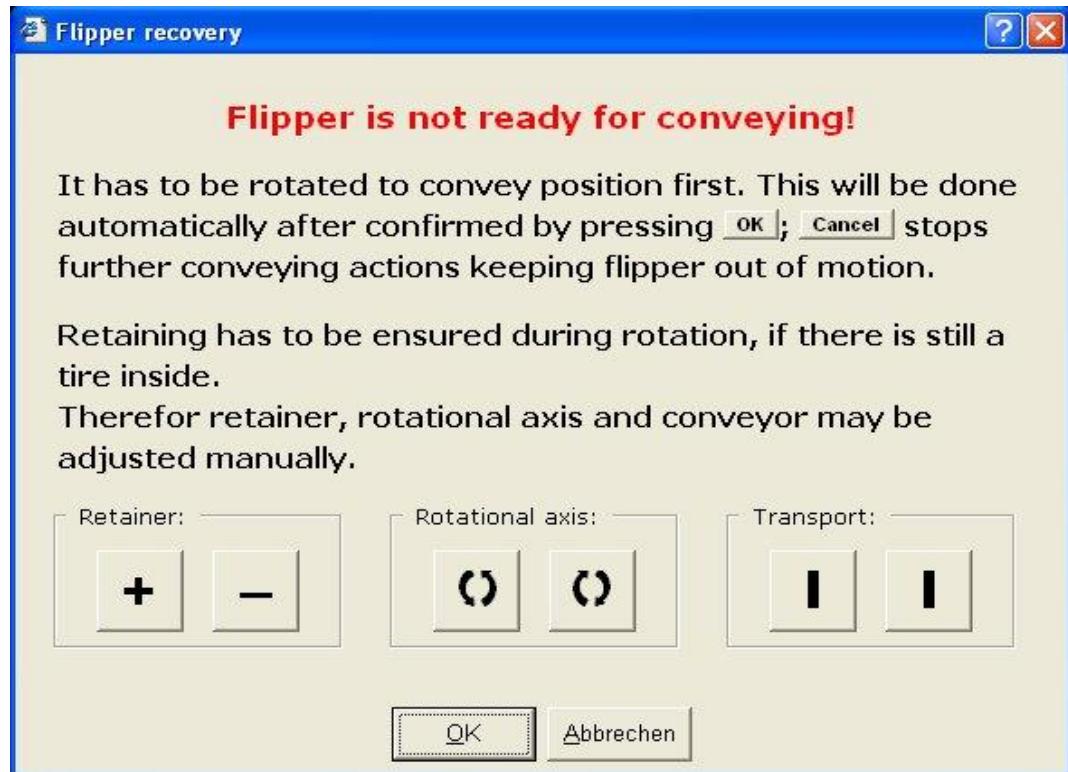
1. Pneumatic System
 - 1.1. Is the pressure reducer at the maintenance unit adjusted properly?
The pressure must be set to 6 bar. The pressure is indicated on maintenance unit manometer.
 - 1.2. Is the choke of the cylinders adjusted correctly? The choke is next to the valves on the pneumatic system panel. To close the choke, turn it clockwise. Further information is provided in the pneumatic diagram.
 - 1.3. Is the end-of-travel damping of the cylinders adjusted correctly? End-of-travel damping is adjusted with a small screw provided at the upper and lower cylinder ends.
2. Are the valves correctly piloted (electrically/pneumatically)? For further information, see Section **11.3.4. Opening and Closing the Test Chamber**.
3. Do the limit switches of the cylinders switch correctly? The limit switches are fixed in position with a grub screw. Loosen the grub screw and move the limit switch until the small LED lights up. Then tighten the grub screw again.

11.10 Correction of Problems with Tire Flip Device

11.10.1 Incorrect Position of the Tire Flip Device

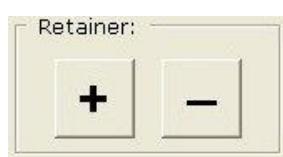
To convey or flip a tire, the tire flip device must be set up in the correct position. If this is not the case and a conveying function is called, a dialog box appears where you can adjust the position of the tire flip device.

Dialog box for positioning the tire flip device.



When you carry out the following manual traverse commands, you need to be particularly careful if there is still a tire in the tire flip device. Incorrect positioning movements can cause the tire to fall out and get wedged in the tire flip device, thereby damaging the flip device.

How to move the roller conveyors together:

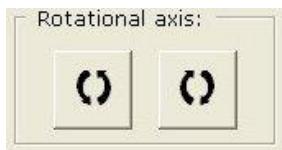


Click the “+” button to move the roller conveyors apart for as long as you keep the mouse button pressed.

Click the “-” button to move the roller conveyors together for as long as you keep the mouse button pressed.

The roller conveyors will stop moving immediately when you release the button.

How to rotate the tire flip device:

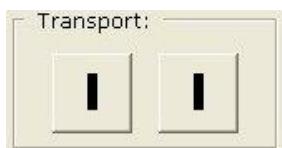


Click the left button to rotate the tire flip device counterclockwise.

Click the right button to rotate the tire flip device clockwise.

The tire flip device will stop moving immediately when you release the button.

How to move the transport rollers:



Click the left button to rotate the rollers counterclockwise.

Click the right button to rotate the rollers clockwise.

The rollers will stop moving immediately when you release the button.

How to move the tire flip device automatically to home position:

1. Click on the **OK** button. All the axes of the tire flip device are moved to home position and the dialog box is closed.

The previously called conveying function is executed.

- or -

Click on the **Cancel** button to close the dialog box. The tire flip device is not moved to home position.

The previously called conveying function is not executed.

11.10.2

Errors Conveying the Tire

Errors can occur while transporting the tire to the tire flip device or back to the tire testing machine.

1. The tire is not transported to the tire flip device.
 - 1.1. Check if there is already a tire on the tire flip device.
 - 1.1.1. Use the **Unload** function of the **Machine** menu to remove it.
 - 1.2. Check if the photoelectric beams have been correctly adjusted.
 - 1.2.1. The photoelectric beam has an LED that is lit when the photoelectric beam is free.
 - 1.2.2. Check whether the signal of the photoelectric beam reaches the PLC. For more details see the wiring diagram of the tire flip device.
 - 1.2.3. Clean the reflector.
 - 1.2.4. Check whether the toothed belt that drives the rollers is properly tensioned.
Particularly when testing large and heavy tires, the toothed belt might slip during transport. Tension the toothed belt with the provided tension rollers.
 - 1.3. Check whether the tire flip device is in the correct position.
 - 1.3.1. If the tire is to be conveyed, the holders have to be up and point towards the machine.
 - 1.3.2. If the tire is to be flipped, the holders have to be down and point away from the machine.
 - 1.3.3. Check whether the signals of the inductive switches reach the PLC.
There are two inductive switches that monitor the **0°** and **180°** positions. For more detail see the wiring diagram of the tire flip device.
2. The tire is not transported back to the tire testing machine.
 - 2.1. The tire flip device failed to reach the end position while flipping.
 - 2.1.1. Check the Movitrac for an error message. The Movitrac is in the control cabinet. For detailed information, please see the Movitrac manual and the tire flip device wiring diagram.
 - 2.1.2. Check whether the roller conveyors have been moved together.
An encoder is provided at the spindle that moves the roller conveyor together. These signals are passed to the PLC. For more details see the wiring diagram of the tire flip device.
 - 2.1.3. The spindle has two limit switches. One is for open and the second for completely closed. For more details see the wiring diagram of the tire flip device.
 - 2.2. Check whether the synchronous pulley is properly fastened.
 - 2.2.1. Each synchronous pulley is fixed with a grab screw. Check if it is really fixed.

- 2.3. Check the toothed belt.
 - 2.3.1. If the toothed belt is broken.
 - 2.3.2. Check the tension of the toothed belt for each roller conveyor and the toothed belt which is connected to the motor.
The toothed belt for the roller conveyor is equipped with two tension roller. One can shift horizontal and the other one vertical.

11.11 Further Notes on Trouble Shooting

11.11.1 Measuring Head Cannot be Moved to Home Position

One of the axes cannot be traversed. The axis concerned may be either the tilt or the shift axis. The lift axis can be moved to the home position, if desired and if you are sure that nothing is in the way.



How to move the lift axis to home position:

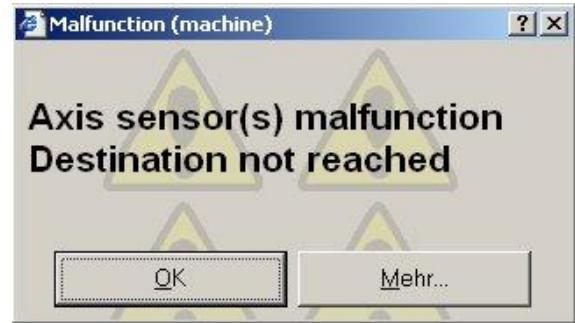
1. Click on **Yes**. The axis is moved up and self-diagnosis is terminated.

- or -

Click on **No**. The window closes and the screen displays further information on the cause of the error.



Caution: Moving the axis up may damage the measuring head. It is better to terminate self-diagnosis and remove the cause of the error first.



Possible causes:

1. An inductive switch at one of the axes mentioned above is defective or misaligned.
2. The expected position could not be reached. The drive of the axis may be defective.
3. The axis is blocked mechanically, e.g. by a tire.

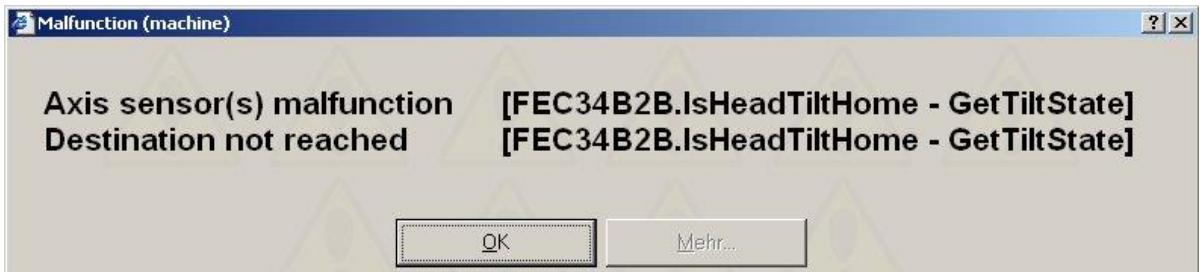
How to find out which axis is affected:

1. Click on **OK** to terminate the process and look for the error yourself.

- or -

Click on **More**. The screen displays further details.

2. In this example, the tilt axis has caused the error. It could not be tilted to the home position.



11.11.2

Service Door is Open or has been opened or light barrier has been interrupted / blocked or is still blocked

If the service door is opened before or during a test, the emergency stop circuit is interrupted and the message shown below is displayed. A test is not possible. Close the service door and press the start button at the control cabinet. You can now start another test.

If the light barrier has been interrupted / blocked before or during operation, the emergency stop circuit is interrupted and the message shown below is displayed. A test is not possible. Remove the item from the light barrier and press the start button at the control cabinet. You can now start another test.



The fact of the service door not being open may be due to one of the following:

1. A contact problem has occurred in the door safety switch.
2. The safety switch is defective. Please replace the key if it is broken or replace the switch.
3. The cable is disconnected.
4. The input terminal for the safety switch is defective.. For more information see the wiring plan.

If the machine cannot be restarted even though no light barrier is blocked, it is due to one of the following:

1. one or more light curtains are not properly connected. Please check cable connections and try again.
2. One or more light barrier devices are defective. Please replace the exact type if it is broken (consider the correct type transmitter or receiver)
3. The light barrier transmitter and receiver do not match with their transmitting light. (mechanical alignment incorrect). Realign light barrier transmitter to receiver correctly that the laser light from the transmitter encounters the receiver centered.
4. The input terminal for the safety switch is defective.. For more information see the wiring plan.

How to resume the test:

1. Remedy the cause of the error or close the service door or remove item from light barrier.
2. Restart the test by clicking on the **Arrow**.

-or -

Press the **F5** key.

3. A tire which is in the vacuum chamber must be unloaded and then re-loaded into the chamber.

11.11.3

Rolling shutter blockade

Roller Shutter is open / has been opened while Flipper is rotating (or about to rotating)

If the roller shutter is opened during a rotation movement (flip of tire) or if a rotation (flip) movement is being started while the roller shutter is still open, the safety circuit will block any movement.

An error message will be displayed in the INTACT software (**zuklären... ggf. Wird das später in der BA geändert***), and also no movement will be carried out. (except transport of tire through flipper)

The safety circuit prohibits any rotation or clamping movement while the rolling shutter is open.

The fact of the rolling shutter being open, while an rotation movement is demanded by the tire inspection process may be due to one of the following:

1. The pressured air supply for the rolling shutter has been disconnected or has a problem, so the roller shutter was not closed.
2. The rolling shutter is mechanically blocked.
3. The software process was interrupted.
4. One or more limit switches are defect (end positions at the top and bottom are detected – one of these limit switch could be defective). Please replace the limit switch if it is broken.
5. One or more cables are disconnected.
6. The input terminal for the safety switch or for the limit switches is defective.. For more information see the wiring plan.

If the rolling shutter is actually fully closed and still, the error message appears that the rolling shutter is open and no rotation or clamping movement is carried out, it can be due to one of the following:

1. A contact problem has occurred in the safety switch. (Safety switch that check whether the rolling shutter is fully closed)
2. The safety switch is defective. Please replace the key if it is broken or replace the switch.
3. The cable of the safety switch is disconnected.

4. The input terminal for the safety switch is defective.. For more information see the wiring plan.

How to resume the test:

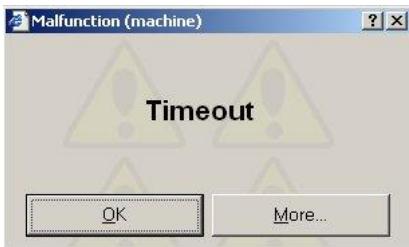
1. Remedy the cause of the error and/or close the rolling shutter with the service tool.
2. Restart the test by clicking on the Arrow.

11.11.4

Timeout

If the execution of a function takes too long, it is terminated by a **Timeout** as shown in the figure on the left. This simplifies removing the cause of the error, which would otherwise be much more difficult to do.

The errors which lead to a **Timeout** may concern various parts (vacuum, axes, etc.) of the machine.



Click on **OK** to exit the error message.

- or -

Click on **More** to display a detailed description of the error.

A timeout may have manifold reasons which are illustrated using the failure to generate the required vacuum as an example.

1. The sealing profile of the vacuum chamber is defective. Check the sealing profile of the service door and of the lids for signs of damage.
2. The vacuum hose is loose or has a leak. Check the hose clips at the bottom and at the connectors of the vacuum chamber to see whether they are properly fastened.
3. The vacuum pump is dirty and therefore does not work properly. The vacuum pump contains sound absorbers that may become dirty. Unscrew the vacuum hose from the pump to clean the sound absorbers.
4. The vacuum pump is piloted by means of a converter.
 - 4.1. Check whether Protective Switch and Relay are switched on. If so, then the voltage must be present at the converter. For further information, see the wiring plan.
 - 4.2. Check at the output of Converter as whether the voltage is on hand and is available at the vacuum pump motor.
5. Check whether the fast ventilation closes properly. Further details are given in Section **11.3.12. Generating an 80 mbar Vacuum**.



12 Disassembly



Please read the safety instructions in chapter 2 before carrying out the work described here.

12.1 Disconnection of Supply Voltage

12.1.1

Dismounting the Protective Grating

1. Switch off the main switch and Protective Switch **3Q2**.
2. The cable for the supply voltage has to be disconnected from the main switch **3Q1** in the control cabinet.
Further details are given in the wiring plan.

12.2 Deconstruction of the Loader and Unloader

12.2.1

Dismounting the Protective Grating

1. Unscrew the holder for the photoelectric beam to the grating of the unloader.
2. Unscrew the protective grating from the floor. The protective grating is the same for the loader and the unloader.
3. Plug off the cable at the back of the control panel and unscrew the control panel from the protective grating. The control panel for the loader has to be removed for transport.

12.2.2

Dismounting the Tilting Table to the Vacuum Chamber

The steps described here only need to be carried out if your machine does not have a loader.

1. Remove the plug which sets up the connection to the tilting table into the corresponding jack. The jack is on the bottom plate of the machine.
2. Unfasten the tilting table (8 hexagon socket screws, 4 on each side).

12.2.3

Disassembly and Disconnection

The photoelectric beams and reflector must be dismounted at the loader; they have to be attached for transport.

1. Unscrew the holders for the photoelectric beam and reflector.
2. If the loader is provided with a tilting table, the Control of the tilting table needs to be disconnected from the hub in the control cabinet.
3. If the loader of your tire testing machine is provided with a tilting table, you need to disconnect the compressed air hose.
4. Disconnect the plugs for the loader to the corresponding jacks. The jacks are provided on the bottom plate of the machine.

12.3 Deconstruction of the Tire Testing Machine

12.3.1

Disconnection of Computer and Accessories

You will find a detailed, fully illustrated description of the plug-in points in the supplied computer documentation.

12.3.2

Deconstruction of the Measuring Heads

The measuring heads have to be secured with the provided tie-downs.

12.3.3

Pneumatic Disconnection

Disconnect the fast coupling at the maintenance unit of the pneumatic system on the back of the machine.

12.3.4

Dismounting the Feet

The feet have to be removed prior to transport and packed in a box.

1. With a fork lifter, lift the machine high enough to unscrew the feet. The machine should be about 13 cm above the floor.
2. Pull the disks firmly off the plates of the feet.
3. Pack the feet in the original packaging materials for Transport or equivalent packaging.

13 Disposal

Disposal and recovery of waste electrical and electronic equipment (WEEE, RoHS, ElektroG).

Take-back program of Carl Zeiss Optotechnik GmbH:



All devices of Carl Zeiss Optotechnik GmbH are manufactured using high-quality components and materials, which also contain a high percentage of stainless steel, aluminum, plastic, glass, and other valuable materials.

The legal requirements and the consciousness of the responsibility towards the shared environment make it imperative that Zeiss Optotechnik ensures long lifetime, avoidance of hazardous materials, and highest possible recyclability or usability as early as the design stage of the devices and components.

We are fully aware of the enormous responsibility for our environment and this is why we are committed to meet the highest environmental standards and have opted for an increased responsibility by Zeiss Optotechnik.

This requirement is also fulfilled by our take-back and recycling program:

- Free take-back and recovery of used devices and components of Carl Zeiss Optotechnik GmbH.
- The take-back program is always available for each of our customers.
- Maximization and continuous improvement of the recycling rate of reusable materials.
- Continuous improvement of the ecological balance during the entire product life cycle.
- Originating from a business management aiming at sustainability, we are already working on tomorrow's waste and recycling streams and are thereby providing the basis for closed-loop recycling.

We offer free take-back to end customers who cannot consign the devices and components directly to recovery by themselves. Thereby, they can

contribute, in a decisive way, to protect the environment and to fulfill the legal regulations.

To do so, please send us the following data:

- The exact designation and number of the devices
- Where appropriate, the serial number(s) of the devices
- If known, the purchase date
- Your contact data

Request for take-back of used devices and recycling:

- By phone: +49 (0)8035-8704-0
- Fax: +49 (0)8035-1010
- E-mail: support-opt.metrology.de@zeiss.com

You will then automatically receive a RMA number together with a returns form that entitles you to send in the devices.

Do you have any questions? Please feel free to contact us. Together we will find the best solution acting entirely on the shared responsibility for our environment.

Disposal of other materials: For disposal, the applicable national regulations shall be observed.

14 Appendix

14.1 Verify Body

14.1.1 Phase image

