

Borealign Kit

Measurement Kit for Bearing Ways and Bores

User Guide



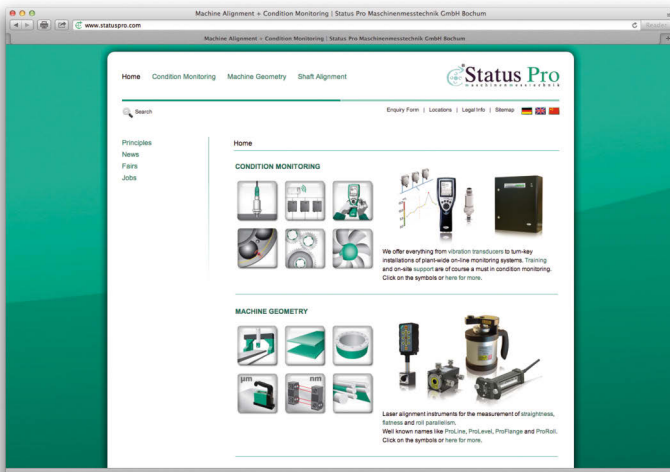
User Guide – English

Borealign Kit

We would like to congratulate you on the purchase of your Status Pro Borealign Kit. Before initial usage you should carefully read the safety instructions as well as the user guidelines contained in this manual. We wish you every success when using this Measurement Kit.

Please note: User Manuals can be amended when improvements or changes to the product range have been carried out. Use the link below to make sure you have the most up to date version of your User Manual:

www.statuspro.com/machine_geometry/documents/



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1. Safety instructions

1.1 Class of Laser

The laser light emitted from a Status Pro Laser has an Output Rating of $< 1,0$ mW. The Laser is placed in the category „Class 2“ and is classified as safe for the use as a Measurement instrument. There are however a few safety aspects to be observed:



Caution!

- Do not stare into the laser beam.
- Do not point the laser beam at other people.
- Observe the local safety guidelines on Site and if in doubt consult the Site safety Engineer.
- Do not use the equipment in damp or moist locations.
- Ensure shading of the equipment against direct sunlight or heat sources.
- Fluids or rain as well as extreme temperature conditions may damage the equipment.



Note

Do not violently shake the Laser or other sensors and always protect against falls. This can damage the structure or the optics of the instrument resulting in false measurements.
Do not touch rotating parts when in use!

1.2 Standards

All Status Pro Laser and Receiver Instruments are developed and manufactured according to the following CE Standards:

- EN 55 011
- EN 55 022
- EN 61 000-4-2
- EN 61 000-4-3
- EN 60 335



1.3 Advice on batteries / rechargeable cells

If the equipment is being stored for a longer period of time or being powered using Mains, then the batteries should be removed to prevent damage of the instrument through leakage.

When using rechargeable cells always observe the specific charging procedures for the cells.

Rechargeable cells can be recharged around 1000times when treated correctly, but there is no guarantee!



Caution!

Do not try to recharge normal batteries. Do not expose batteries or rechargeable cells to fire or excess heat (Danger of explosion).
Do not mix batteries and rechargeable cells.
Always use batteries and cells of the same kind.
Do not mix old and new batteries or cells.

**Note**

Help to protect the environment! Empty batteries do not belong in the household waste disposal system. Only deposit empty or damaged cells at a collection point specially designed for this purpose.

1.4 Instrument Care

Your measurement instrument is designed for use in an industrial environment and can withstand water splashes or light spray as well as dust. Clean the equipment using a soft cotton cloth and a mild soap solution. Laser apertures as well as sensor areas should only be cleaned using a soft, dry and dust-free cloth. Do not use paper towels to clean glass surfaces as they could scratch. Avoid contact with grease, oil or oil-based solutions when handling the equipment.

1.5 Maintenance

The mechanical components of your equipment are prone to natural wear and tear! If the Instrument appears to have a technical defect, contact the Manufacturer. Do not try to repair or open the sensor casing. Attempted repairs through unauthorised personnel makes the guarantee null and void! Always store the equipment under dry conditions and use the case for transportation.

To ensure trouble-free processing, simply fill in the form you will find using the following link: www.statuspro.com/machine_geometry/service_support/calibration_repair

**Advice**

To be able to identify the equipment when seeking advice always quote the serial number of the equipment. The Manufacturer does not accept any responsibility for damage incurred through incorrect maintenance carried out by non-authorized personnel.

1.6 Calibration and Repair



To guarantee measurement accuracy, and reliable operation of your Status Pro Measurement System, it is of utmost importance that the recommended Service Intervals be adhered to. The System should be checked for serviceability, and re-calibrated by the Status Pro workshops every 12 months.

Within the scope of the service checks, the complete system will also be examined for possible wear or damage, as well as receiving any software updates. The date of the next service check for your equipment is stamped on the Status Pro calibration sticker.

To ensure trouble-free processing of the service and calibration checks, simply fill in the form you will find using the following link

www.statuspro.com/machine_geometry/service_support/calibration_repair.

1.7 Liability Exclusion

The Status Pro GmbH does not accept responsibility for damage incurred through incorrect use or handling of the equipment. To ensure correct usage, a founded knowledge of the equipment is essential. It is of the utmost importance that you read and understand the Handbook!

No responsibility will be accepted for damage incurred through ignorance or disregarding of the operating instructions.

2. System Components

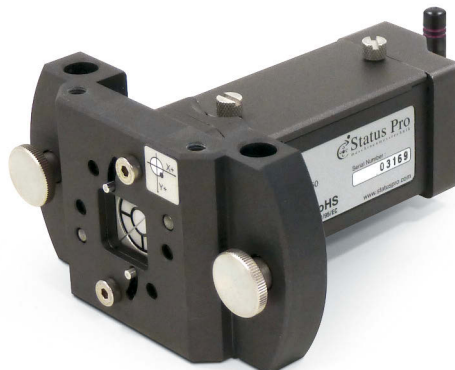
The complete system for measuring bore-holes, SP BOREALIGN, consists of several modular components. When correctly combined, the system components allow a measuring diameter range from as small as 60 mm to virtually any size diameter.

The System consists of the following components:

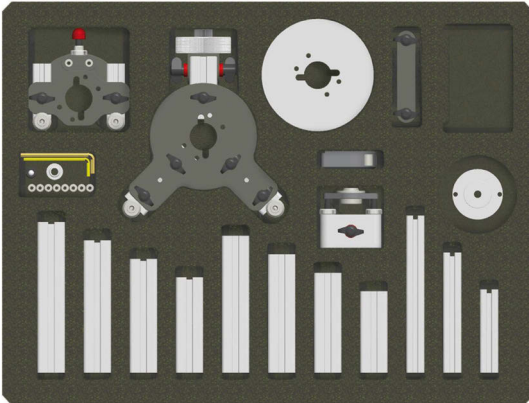
2.1 Laser Source T250



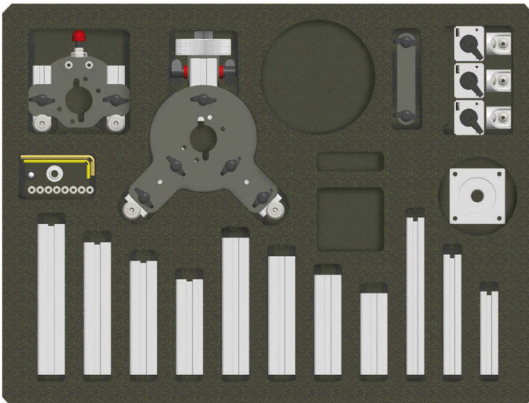
2.2 Laser Receiver R545



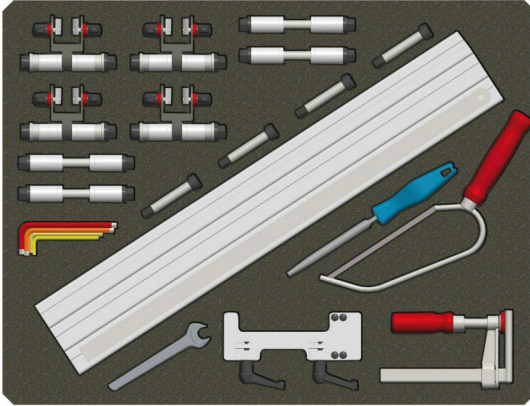
2.3 Borealign Kit 1 (BG 832060) - for R545 Laser Receiver



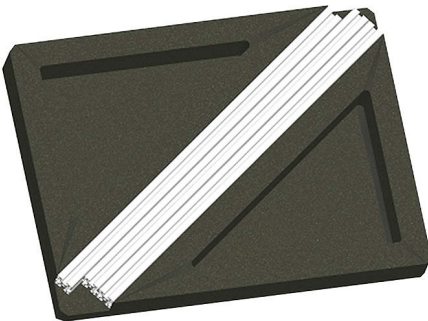
2.4 Borealign Kit 2 (BG 832070) - for T250 Laser Source



2.5 Borealign Kit 3 (BG 832080) - Ø 450 to 1200 mm



2.6 Borealign Kit 4 (BG 832090) - foam inlay with additional profiles



3. Preparation

3.1 Laser Source T250

There are three possible methods available using the T250 Laser:

1. Mount in combination with a tripod

The adapter has a 5/8" internal thread at the opposite end to the laser mounting surface.

The Adapter is fitted as shown when using the T250 Laser in combination with a tripod.



2. Mount in a bore using the Borealign attachment

The Adapter is fixed to the face-side when using with the borealign attachment.

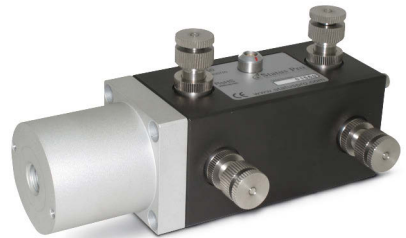


To mount the T250 laser source in a bore, you need to fix it to one of the attachments A, B or C (chapter 3) and adapt it into the bore.



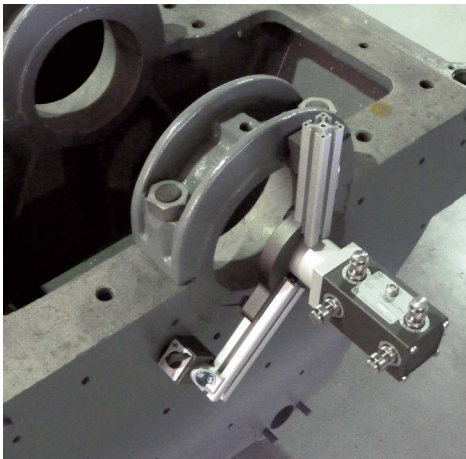
3. Mount in front of a bore using the Borealign Attachment

The Adapter is fixed to the face-side when using with the borealign attachment.



In the Borealign Kit 2 there are three magnets included. With these you have the possibility to adapt the T250 in front of a bore.

Just choose the appropriate legs and support strut with a bigger diameter than the bore, mount the magnets to the profiles and adjust them to the face side of the bore as shown in the example below.



3.2 Laser Receiver R545

To enable fixing of the R545 Receiver in the mounting attachment, the front adapter plate has to be removed.



The R545 receiver can now be prepared for measuring using one of three attachment modules as shown below:

1. R545 with **attachment A**
60 – 120 mm



2. R545 with **attachment B**
120 – 250 mm



3. R545 with **attachment C**
250 – 450 mm
(and >450 mm with Borealign Kit 3)

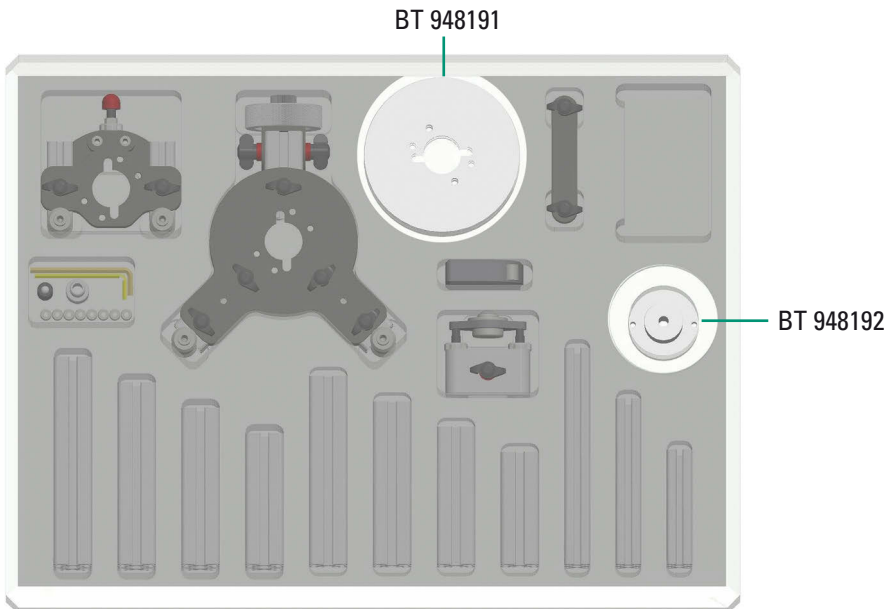
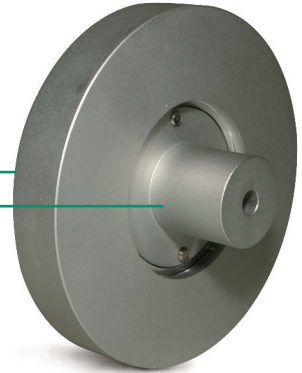


4. Attachment Types

4.1 Attachment A: 60 - 120 mm

For this diameter it is necessary to turn down the attachment disc to the bore diameter when measuring in the bore.

When mounting on a lathe, the adapter disc BT 948191 ——— has to be attached to the bore disc BT 948192. ———
Both discs are supplied in Borealign Kit 1.



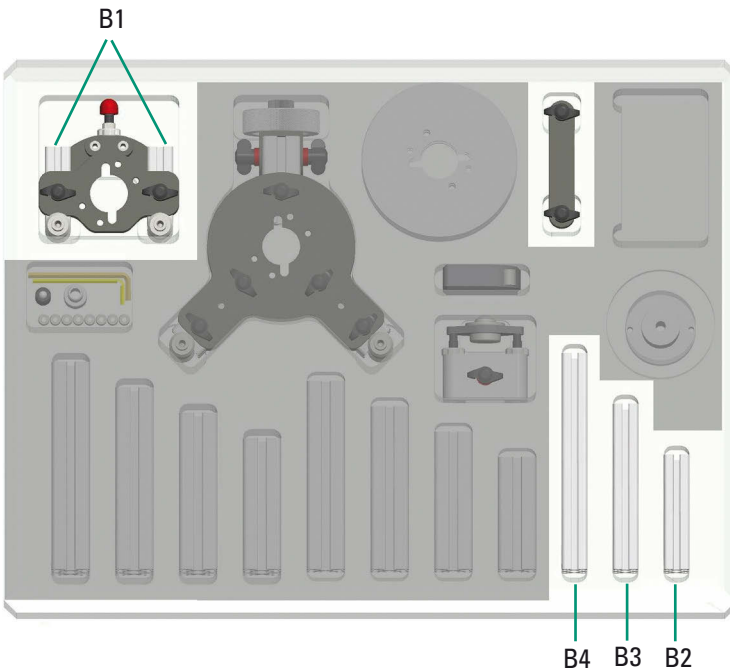
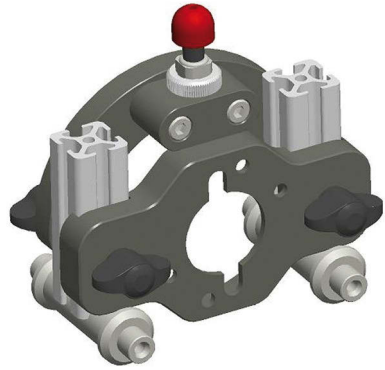
Two adapter discs BT 948191 are included in Borealign Kit 1 (R545). You simply order more through Status Pro when needed.

4.2 Attachment B: 120 - 250 mm

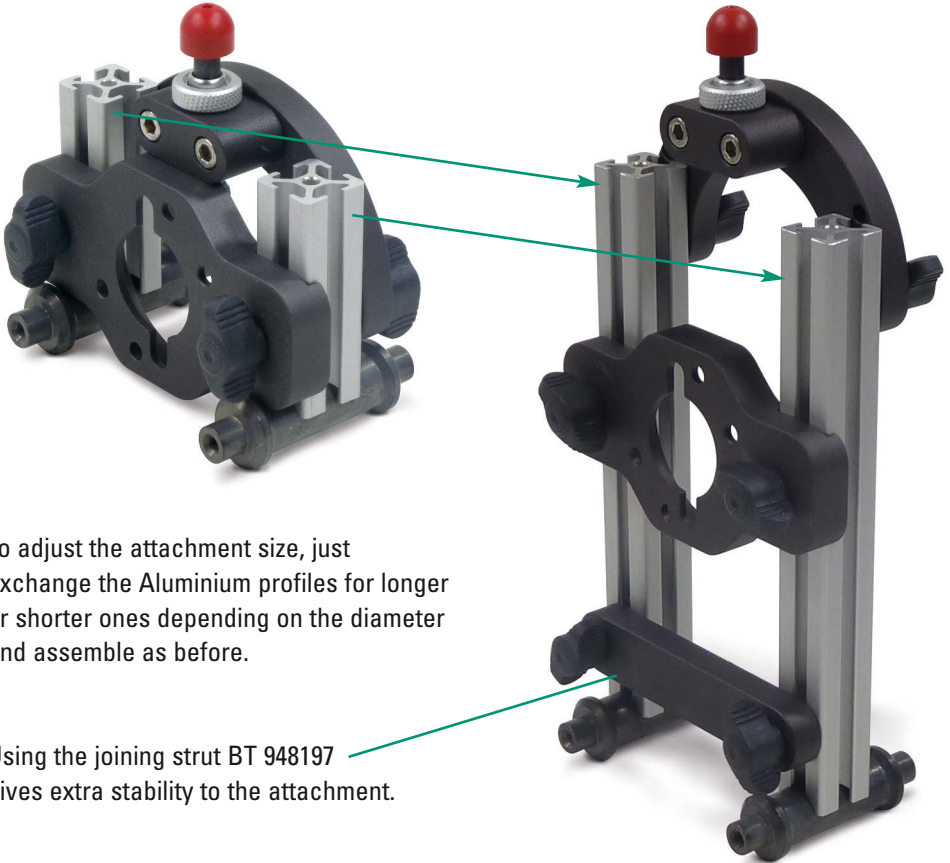
For this diameter range, choose accordingly from the four different profile lengths delivered.

The grid shows the possible diameter ranges and which legs are necessary to measure these:

Ø	Legs	Length
120-140	B1	60
140-170	B2	90
170-210	B3	130
210-250	B4	170



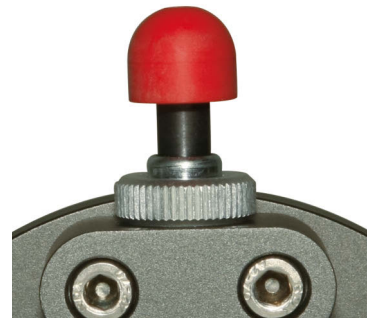
A ready made attachment with B1 = 60 mm „legs“ is included in the system case.



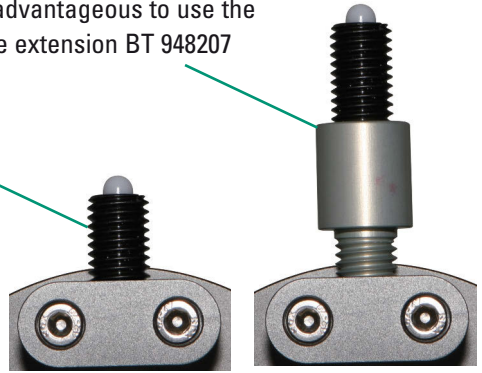
To adjust the attachment size, just exchange the Aluminium profiles for longer or shorter ones depending on the diameter and assemble as before.

Using the joining strut BT 948197 gives extra stability to the attachment.

To ensure concentricity and to support the attachment, we make use of a third spring-loaded contact point. The spring force can be adjusted by screwing in or out.



When measuring smaller diameters it can be advantageous to use the spring element BT 943094, and if necessary the extension BT 948207



The following graphic shows the „B“ attachment in its entirety:

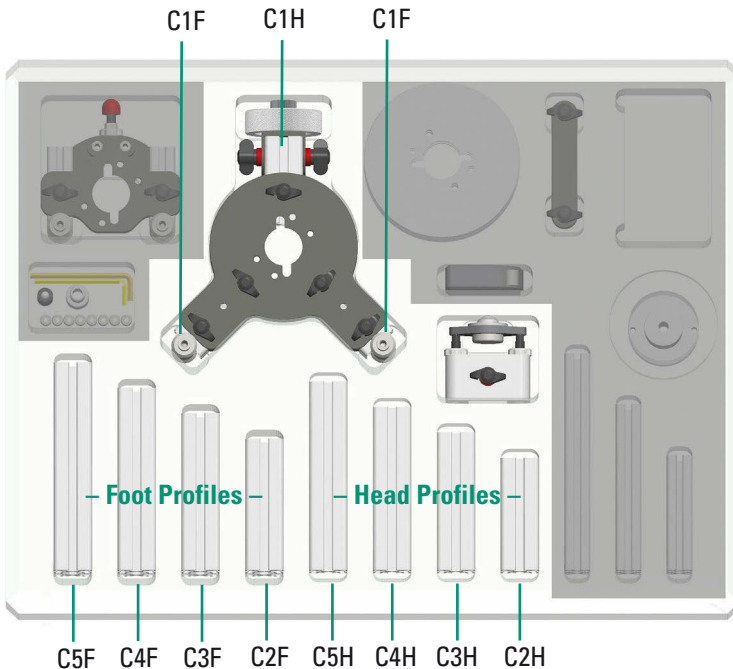


4.3 Attachment C: 250 - 450 mm

For this diameter range, choose accordingly from the five different profile lengths delivered.

The grid shows the possible diameter ranges and which combination of foot and support strut is necessary to measure these:

∅	Legs	Length	Head	Length
255-295	C1F	83	C1H	68
295-335	C2F	103	C2H	88
335-375	C3F	123	C3H	108
375-415	C4F	143	C4H	128
415-455	C5F	163	C5H	148



A previously assembled attachment with 83 mm foot profiles (C1F) and a support strut of 68 mm (C1H) is included in the system case.

To adjust the attachment size, just exchange the aluminium profiles for longer or shorter ones depending on the diameter and assemble as before.

The attachment “C” utilises 5 different aluminium profile sizes of 30 mm cross-section. For each attachment we use two “feet” (C1F – C5F) and one support strut (C1H – C5H).

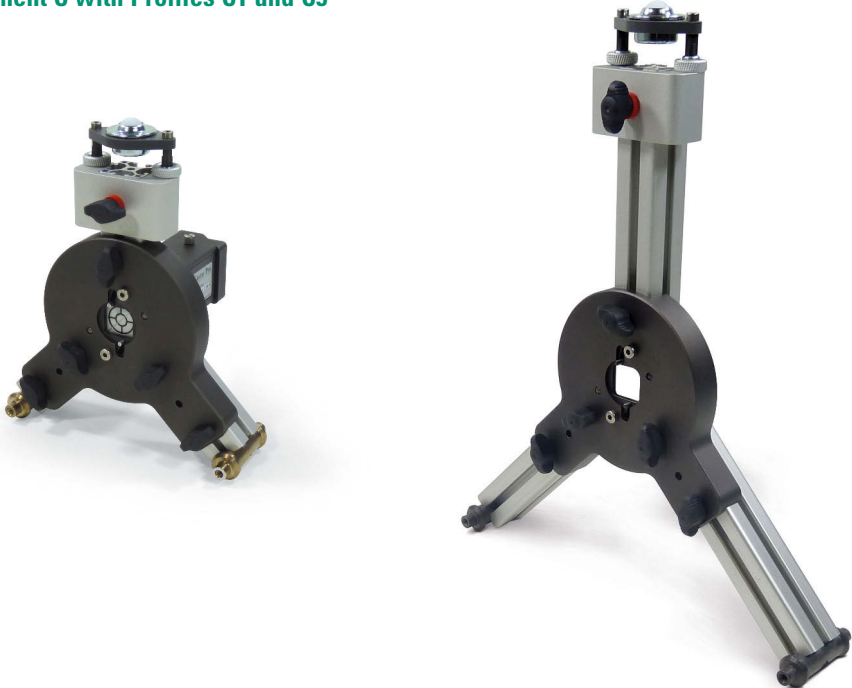
The profiles for the “feet” have a groove to facilitate the cam rollers.



The support struts are machine faced at both ends:

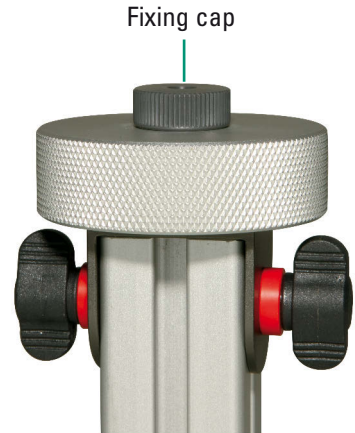


Attachment C with Profiles C1 und C5



Attachment C – Alternative Fixing

Attachment “C” is also supplied with a spring-loaded ball cap for use with the support strut, as well as a fixing cap.



R545: For ease of use when changing measuring points, the R545 attachment is fitted with the spring-loaded variation.

T250: The T250 Laser is usually adjusted before starting measuring and mounted using the fixed attachment.

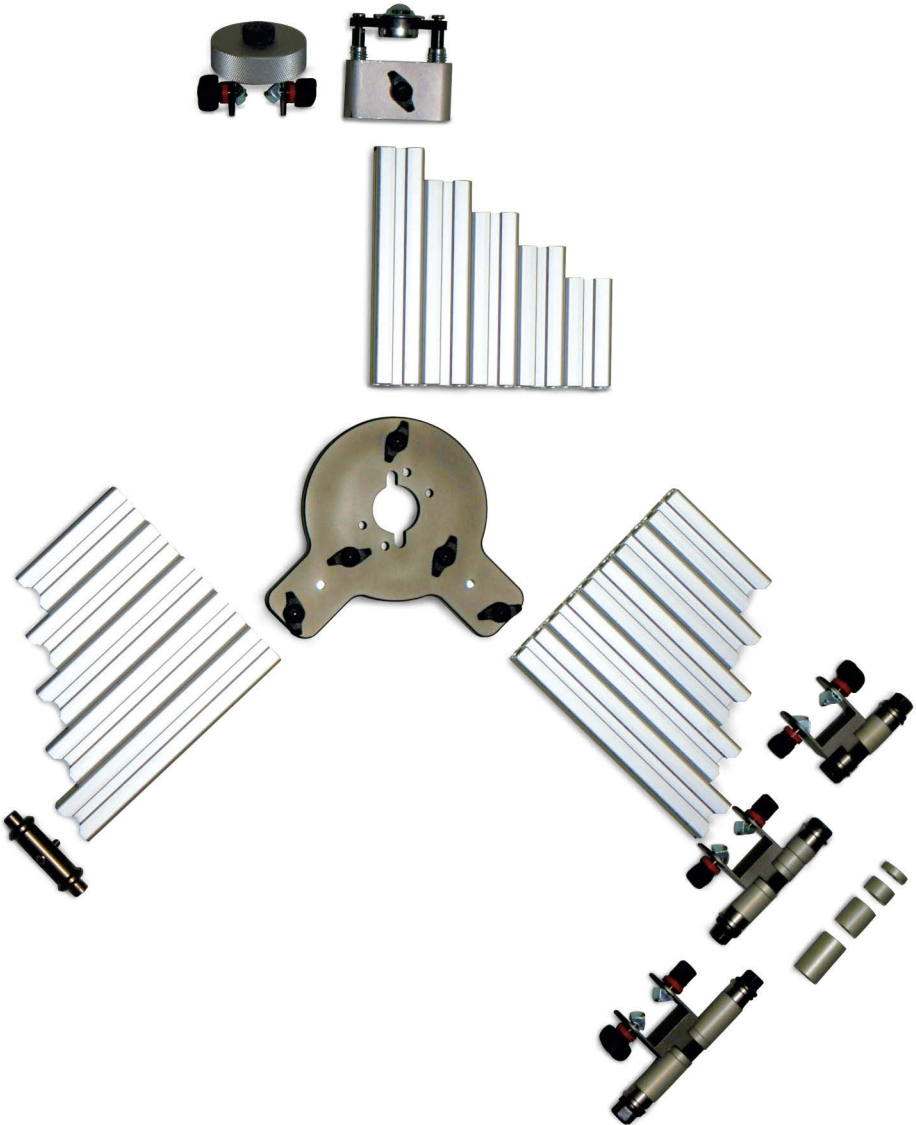


Note

With difficult measurement tasks such as vertical bores or very large diameters it can be of advantage to mount the R545 using the fixed attachment as well.

Simply change the attachment according to your needs!

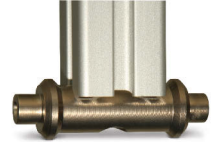
The following graphic shows the "C" attachment in its entirety:



4.4 Borealign Kit 3

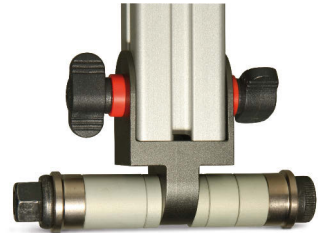
Borealign Kit 3 (BG 832080) is supplied with two different kinds of "feet" for Attachment C. They facilitate variable distances between the cams of the feet allowing measurement in bore-ways of differing depths.

Feet I: Foot variant BT 948205, included in Borealign Kit 1 and 2 have a fixed distance of 46 mm between cams. They are used with attachment B and C by default.

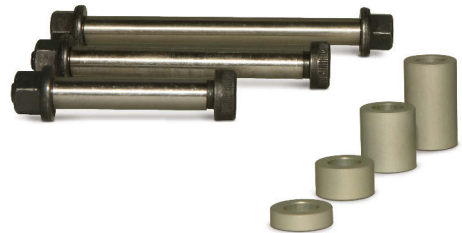


Feet II: With difficult measurement tasks such as bores with very small journal depth or very large diameters it can be of advantage to use the second type of feet with variable distance between cams.

They are mounted at attachment C replacing feet I.



Different lengths of axis bolts are supplied for use with the variable distance cam rollers.



Different lengths of tubing is supplied enabling adjustment of the axis distance.

These axes and cam-rollers can be combined as necessary to cover all eventualities such as stepped journals and journals of varying depth.



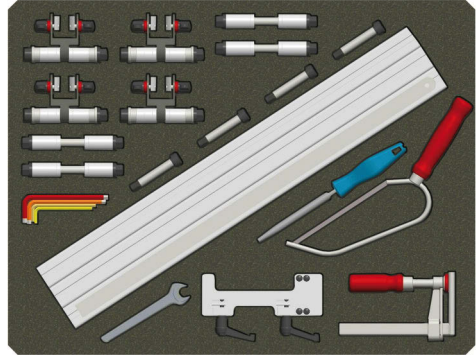
Borealign Kit 3 – Diameter > 450 mm

With diameters greater than 450 mm you need profiles which you lengthen accordingly, then assemble with Attachment "C" and feet II instead of using the shorter profiles.

There are 6 Aluminium profiles of 550 mm provided in the system case, enabling measurements in bore diameters of up to 1200 mm.

In the system case you will find a jig-saw and clamp-set enabling profile cutting anywhere.


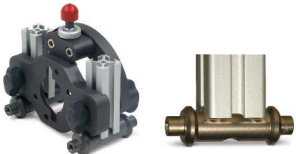
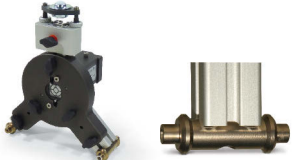

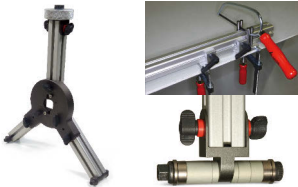
Please ask your Agent for available profile lengths!



5. Calculation table and figures

5.1

Table for included diameters - Attachment A - B - C

Bore diameter	Attachment type	Support strut	Feet profiles	Feet	
60-120	A	–	–	–	
120-140	B	–	B1	I	
140-170	B	–	B2	I	
170-210	B	–	B3	I	
210-250	B	–	B4	I	
255-295	C	C1H	C1F	I	
295-335	C	C2H	C2F	I	
335-375	C	C3H	C3F	I	
375-415	C	C4H	C4F	I	
415-455	C	C5H	C5F	I	
285-325	C	C1H	C1F-C2F	II	
325-365	C	C2H	C2F-C3F	II	
365-405	C	C3H	C3F-C4F	II	
405-445	C	C4H	C4F-C5F	II	
445-485	C	C5H	C5F-cut	II	
> 450	C	cut	cut	II	

5.2 Calculation for cutting profiles for diameters greater than 450 mm:

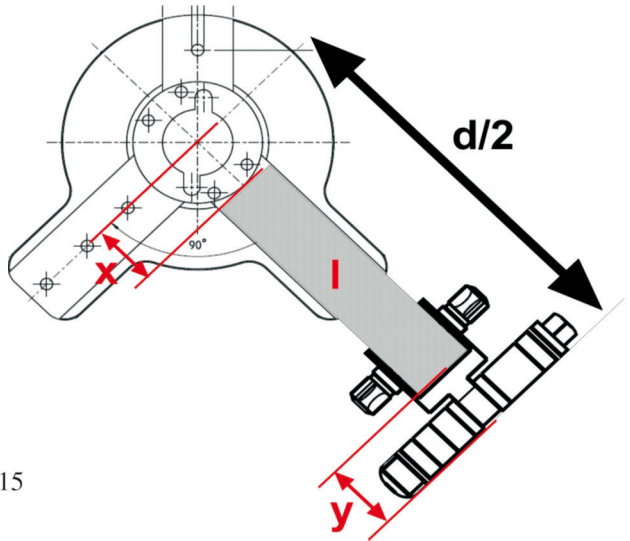
Bore diameter: d
 Bore radius: $d/2$
 Profile length: l
 Space x : 30 mm
 Foot y : 30 mm

Foot profile: $l = \left(\frac{d}{2} - 60 \right)$

You need 2 pieces.

Support strut: $l = \left(\frac{d}{2} - 60 \right) - 15$

You need 1 piece.



Example:

Bore diameter: 680 mm
 Bore radius: 340 mm
 Profile length: l
 Space x : 30 mm
 Foot y : 30 mm

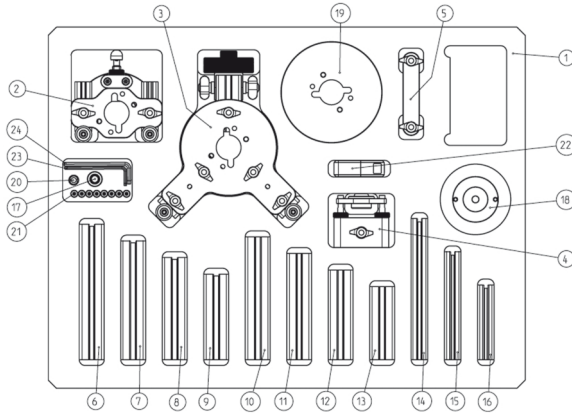
Foot profile: $l = \left(\frac{d}{2} - 60 \right) \rightarrow l = \left(\frac{680}{2} - 60 \right) \rightarrow l = 280$

Support strut: $l = \left(\frac{d}{2} - 60 \right) - 15 \rightarrow l = \left(\frac{680}{2} - 60 \right) - 15 \rightarrow l = 265$

Result: You need **2 x 280 mm** and **1 x 265 mm** profiles.

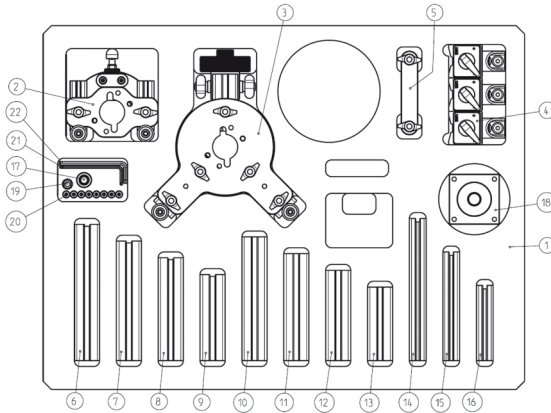
6 Parts list Borealign Kit

6.1 Borealign Kit 1 (BG 832060) for R545 laser receiver



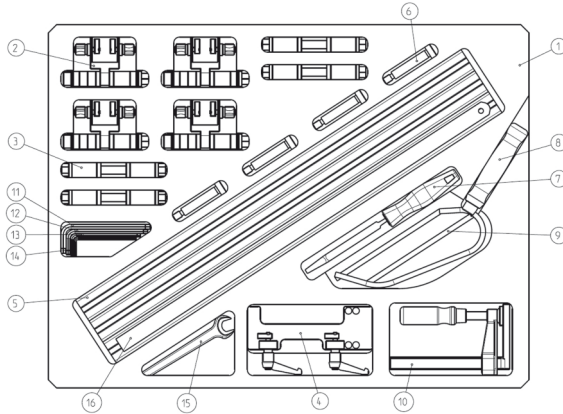
Item	Ref. Des	Description	Quantity
001	BT 990019	Foam inlay 1	1
002	BG 832061	Attachment Ø 120mm - 250mm	1
003	BG 832062	Attachment Ø 250mm - 450mm	1
004	BG 832063	Spring loaded ball cap	1
005	BG 832064	Joining strut	1
006	BT 948237	Profile 30 L=163 (Head)	2
007	BT 948221	Profile 30 L=143 (Head)	2
008	BT 948220	Profile 30 L=123 (Head)	2
009	BT 948219	Profile 30 L=103 (Head)	2
010	BT 948238	Profile 30 L=148 (Foot)	1
011	BT 948239	Profile 30 L=128 (Foot)	1
012	BT 948240	Profile 30 L=108 (Foot)	1
013	BT 948241	Profile 30 L= 88 (Foot)	1
014	BT 948217	Profile 20 L=170 (Head)	2
015	BT 948216	Profile 20 L=130 (Head)	2
016	BT 948215	Profile 20 L=90 (Head)	2
017	BT 948207	Extension for spring element	1
018	BT 948191	Bore disc	1
019	BT 948092	Adapter disc	2
020	BT 943094	Spring element M12	1
021	BT 946085	Cylinder head screw M5 x 16 DIN 7984	8
022	BT 989087	Measuring tape 2m	1
023	BT 989119	Cranked allen key 3mm	1
024	BT 989083	Cranked allen key 4mm	1

6.2 Borealign Kit 2 (BG 832070) for T250 laser source



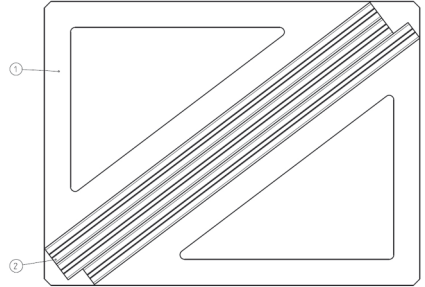
Item	Ref. Des	Description	Quantity
001	BT 990019	Foam inlay 1	1
002	BG 832061	Attachment Ø 120mm - 250mm	1
003	BG 832062	Attachment Ø 250mm - 450mm	1
004	BG 832068	Magnets	3
005	BG 832064	Joining strut	1
006	BT 948237	Profile 30 L=163 (Head)	2
007	BT 948221	Profile 30 L=143 (Head)	2
008	BT 948220	Profile 30 L=123 (Head)	2
009	BT 948219	Profile 30 L=103 (Head)	2
010	BT 948238	Profile 30 L=148 (Foot)	1
011	BT 948239	Profile 30 L=128 (Foot)	1
012	BT 948240	Profile 30 L=108 (Foot)	1
013	BT 948241	Profile 30 L= 88 (Foot)	1
014	BT 948217	Profile 20 L=170 (Head)	2
015	BT 948216	Profile 20 L=130 (Head)	2
016	BT 948215	Profile 20 L=90 (Head)	2
017	BT 948207	Extension for spring element	1
018	BT 948194	Mounting adapter T250	1
019	BT 943094	Spring element M12	1
020	BT 946085	Cylinder head screw M5 x 16 DIN 7984	8
021	BT 989119	Cranked allen key 3mm	1
022	BT 989083	Cranked allen key 4mm	1

**6.3 Borealign Kit 3 (BG 832080) -
Ø 450 -1200 mm**



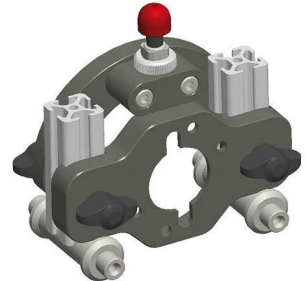
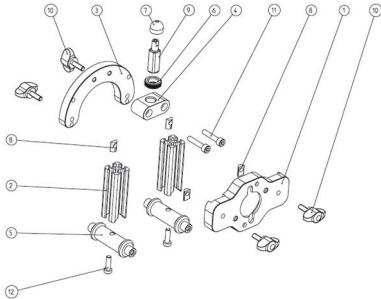
Item	Ref. Des	Description	Quantity
001	BT 990018	Foam inlay 2	1
002	BG 832066	Foot 30mm	4
003	BG 832067	Foot screw long	4
004	BG 832065	Saw attachment	1
005	BG 948222	Profile 30 L=550	6
006	BT 946126	Fit bolt M8 x 50	4
007	BT 989124	File 100mm	1
008	BT 989081	Saw "PUK"	1
009	BT 989091	Saw blades	1
010	BT 989082	C-clamp	2
011	BT 989085	Cranked allen key 6mm	1
012	BT 989084	Cranked allen key 5mm	1
013	BT 989083	Cranked allen key 4mm	1
014	BT 989119	Cranked allen key 3mm	1
015	BT 989086	Fork spanner	2
016	BT 989088	Open-end spanner 500mm	1

6.4 Borealign Kit 4 (BG 832090) - Foam inlay with additional profiles



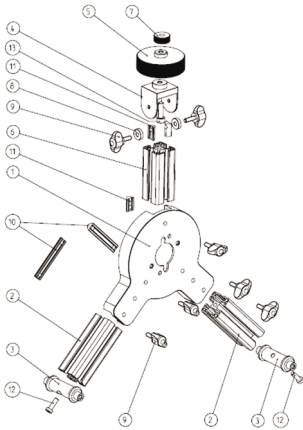
Item	Ref. Des	Description	Quantity
001	BT 990033	Foam inlay	1
002	BT 948223	Profile 30 L=625	3

6.5 BG 832061 - Attachment B - Ø 120 - 250mm



Item	Ref. Des	Description	Quantity
000	AZ 100000	Production, Assembly / Cleaning	5
001	BT 948190	Attachment for R545 (120mm)	1
002	BT 948214	Profile 20 L=60 (Foot)	2
003	BT 948195	Counter pressure strut (120mm)	1
004	BT 948204	Holder counter pressure strut	1
005	BT 948205	Foot Ø 20x50	2
006	BT 948199	Fixing screw M12	1
007	BT 948209	Cap	1
008	BT 943080	Sliding block 5 x M5	4
009	BT 943096	Spring catch M12	1
010	BT 946131	Butterfly screw Miniwing M5 x 15	4
011	BT 946141	Cylinder head screw, M5 x 25 DIN 912 / ISO	2
012	BT 946085	Cylinder head screw, M5 x 16 DIN 7984	2

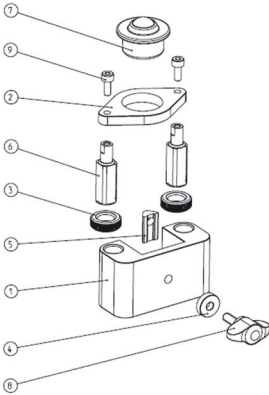
6.6 BG 832062 - Attachment C - Ø 250 - 450mm



Item	Ref. Des	Description	Quantity
000	AZ 100000	Production, Assembly / Cleaning	5
001	BT 948193	Attachment R545 (250mm)	1
002	BT 948218	Profile 30 L=83 (Head)	2
003	BT 948205	Foot Ø 20x50	2
004	BT 948211	Counter pressure strut (30mm Profile)	1
005	BT 948213	Pressure screw nut	1
006	BT 948242	Profile 30 L=68 (Head)	1
007	BT 948212	Cap for pressure screw nut	1
008	BT 948232	Shim	2
009	BT 946131	Butterfly screw Miniwing M5 x 15	7
010	BT 943082	Sliding block 62 x M5	2
011	BT 943081	Sliding block 6 x M5	3
012	BT 946085	Cylinder head screw, M5 x 16 DIN 7984	2
013	BT 946071	Cylinder head screw, M6 x 20 DIN 912 / ISO	1

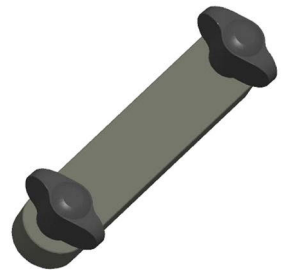
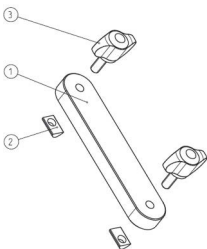
6.7 BG 832063

- Spring-loaded ball cap for attachment C



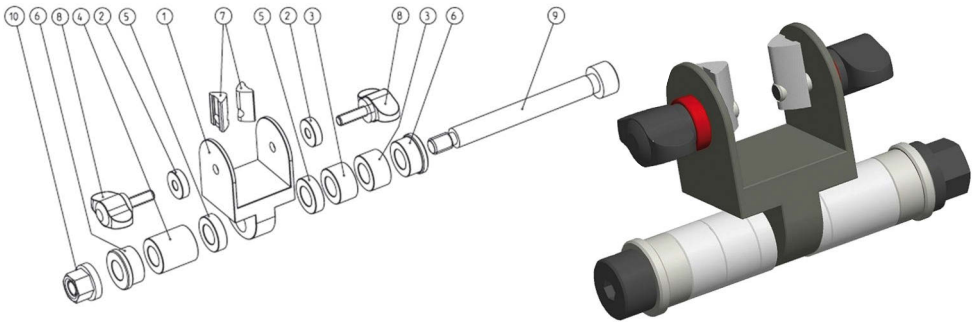
Item	Ref. Des	Description	Quantity
001	BT 948236	Main holder	1
002	BT 948234	Ball holder	1
003	BT 948199	Fixing screw M12	2
004	BT 948232	Shim	1
005	BT 943081	Sliding block 6 x M5	1
006	BT 943096	Spring catch M12	2
007	BT 943091	Ball cap	1
008	BT 946131	Butterfly screw Miniwing M5 x 15	1
009	BT 946022	Cylinder head screw, M4 x 10 DIN 912 / ISO 4762	2

6.8 BG 832064 - Joining strut



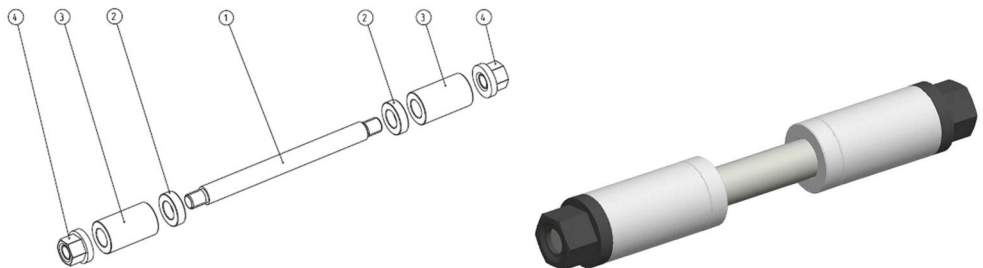
Item	Ref. Des	Description	Quantity
001	BT 948197	Joining strut	1
002	BT 943080	Sliding block 5 x M5	1
003	BT 946131	Butterfly screw Miniwing M5 x 15	1

6.9 BG 832066 - Foot 30mm



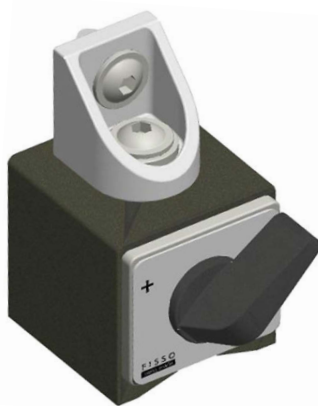
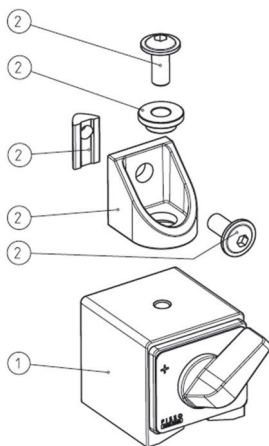
Item	Ref. Des	Description	Quantity
001	BT 948210	Roll holder (30mm Profile)	1
002	BT 948232	Shim	2
003	BT 948201	Spacing roller 10mm	2
004	BT 948202	Spacing roller 20mm	1
005	BT 948200	Spacing roller 5mm	2
006	BT 948206	Contact roller Ø 20x10	2
007	BT 943081	Sliding block 6 x M5	2
008	BT 946131	Butterfly screw Miniwing M5 x 15	2
009	BT 946125	Fit bolt M8 x 80	1
010	BT 946127	Collar nut M8 DIN 6331	1

6.10 BG 832067 - Foot roller long



Item	Ref. Des	Description	Quantity
001	BT 948208	Bolt 100mm	1
002	BT 948200	Spacing roller 5mm	2
003	BT 948203	Spacing roller 30mm	2
004	BT 946127	Collar nut M8 DIN 6331	2

6.11 BG 832068 - Magnet



Item	Ref. Des	Description	Quantity
001	BT 943105	Switchable magnet with prism S3 600N, 40 x 40 x 40mm	1
002	BT 948224	Bracket 6 x M6	1

7. Products and Service

Geometrical measurement techniques and alignment have been an issue since the pyramids.

Today the measurement and alignment of machinery components is an integral part of the assembly and quality control process. Be it linear guides, presses, flange connections, drive shafts or cylinder rolls, the precision of the alignment has a significant effect on the functionality of the component. The alignment of these machinery components will often affect the quality of the manufactured product and also the life-time of the machine components themselves. The use of a laser beam reference together with tradition industrial measurement techniques has made it possible to build tools which simplify these alignment procedures.

Status Pro develops and manufactures laser alignment equipment and we are committed to this process.

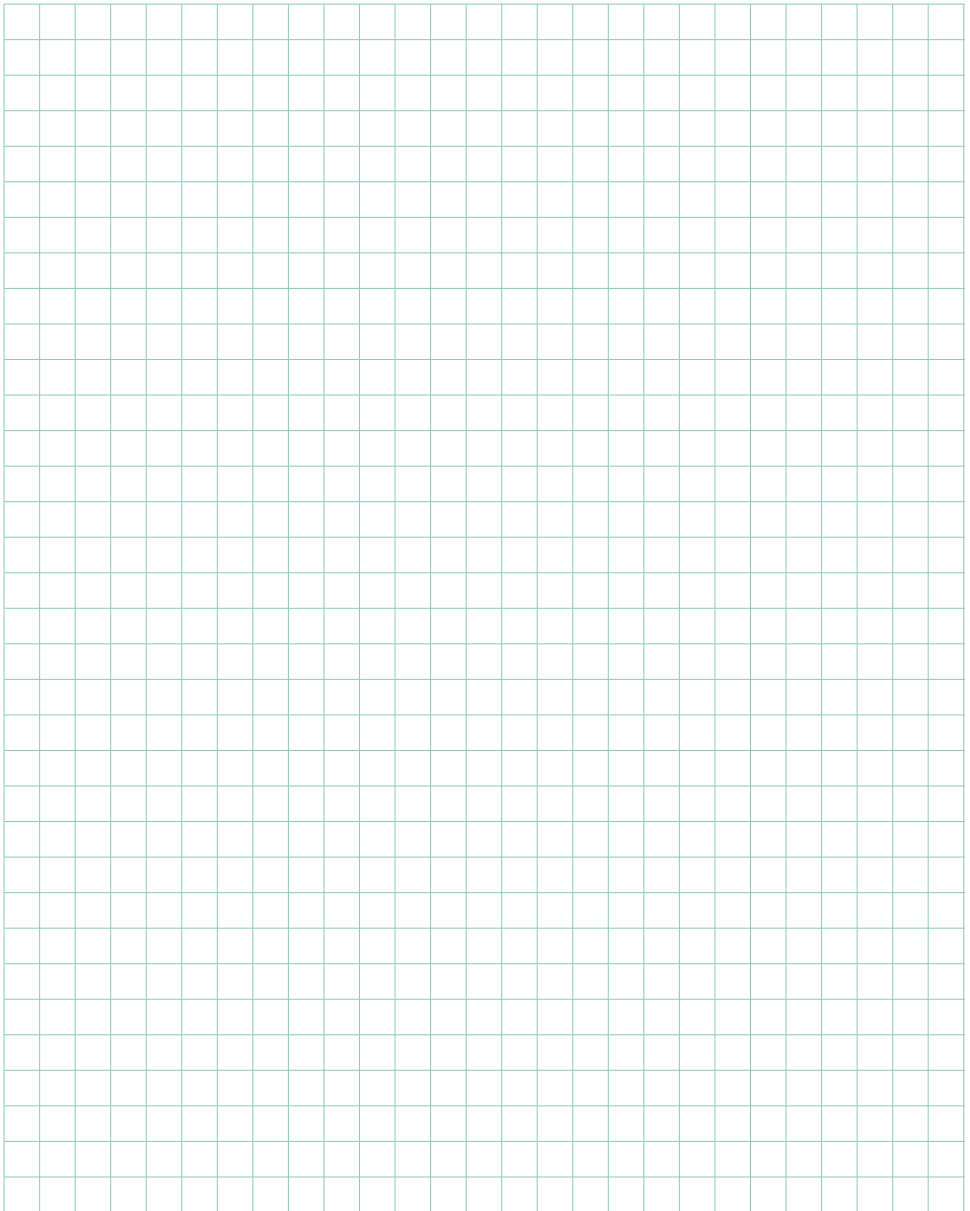
Most of our customers are machine builders, assembly and quality control people. Typically our customers require a complete solution package including on-site training and support. When a customised solution is required, modifications are often necessary, be it in software, mechanical adaptations or the sensor housing itself in order to meet customer requirements.

We and our partner companies all over the world also provide alignment and industrial surveying services.



We invite you to visit our web site www.statuspro.com
For more information just call us at + 49 (0) 2327 - 9881 - 0.

8. Memo





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