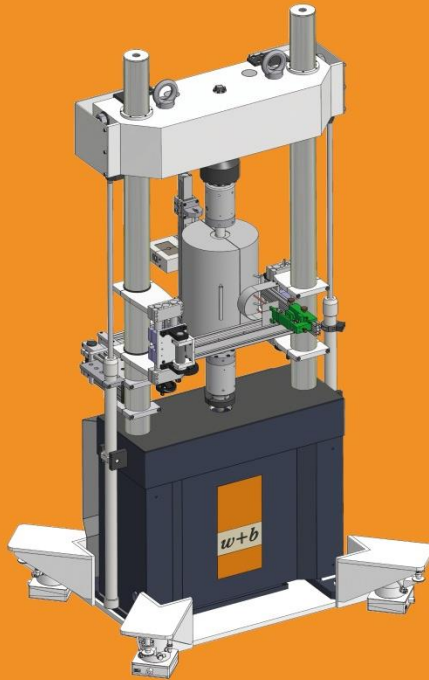


Prüfmaschinen

Testing Machines

40 years of experience



Perfect solutions for:

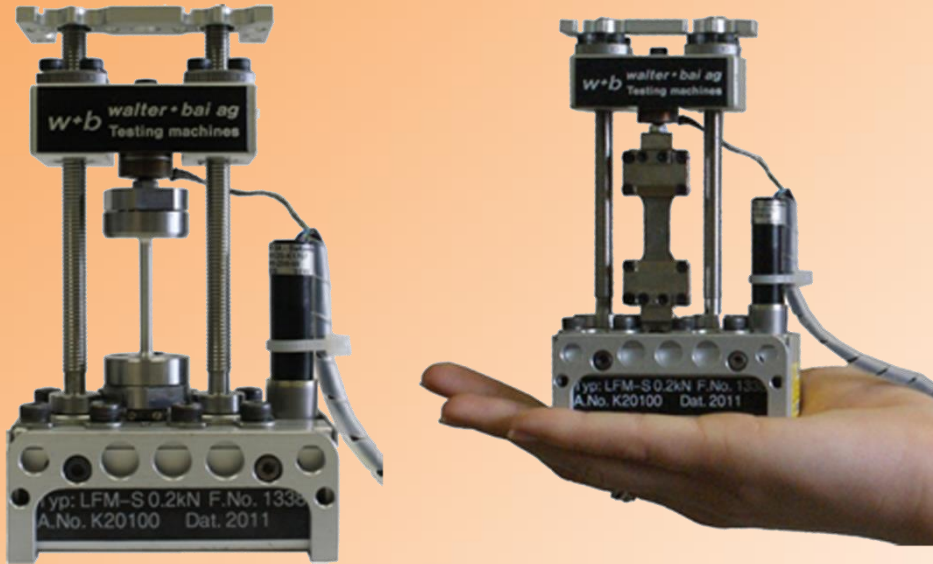
- Static materials testing
- Dynamic materials testing
- Component testing
- Customized solutions
- Modernisation, Service

Alexandr Dolgikh

Branch deputy director

Customized Testing Machines for Beamlines

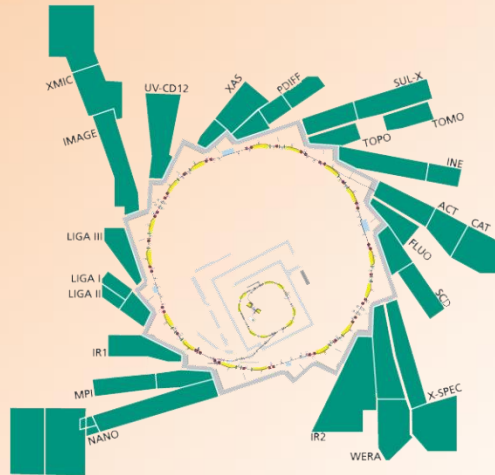
Electromechanical Universal Testing
Machine **LFM-S 0.2 kN**



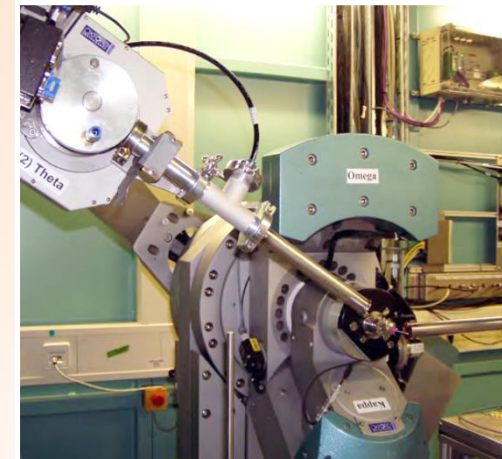
Tensile-compressive miniature testing machine **±0.2kN**
dedicated for static and cyclic loading tests on cylindrical and
flat samples at X-ray and neutron beamline.

Synchrotron Radiation Facility ANKA

Karlsruhe Institute of Technology (KIT), Germany



ANKA Synchrotron Radiation
Facility for national and
international user operation.



Powder Diffractometer (PDIF
beamline) is dedicated for in-situ
phase, strain and microstructure
analysis on bulk polycrystalline
materials.

w+b

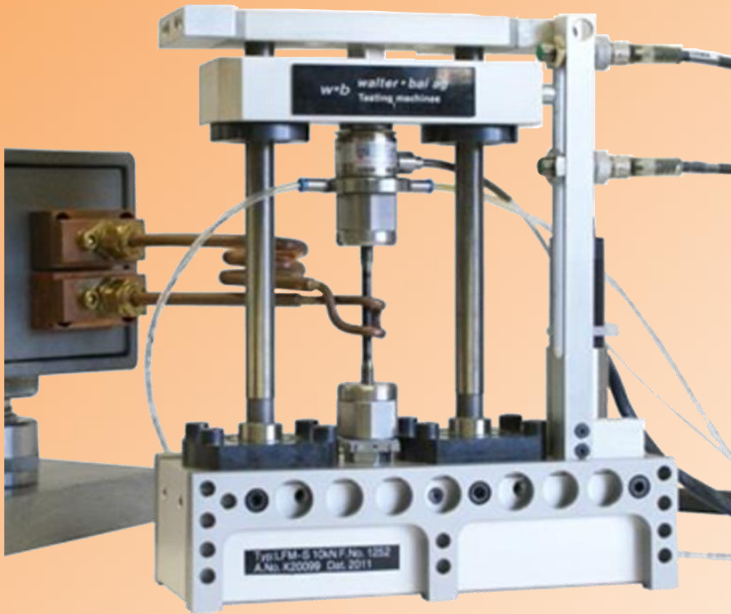
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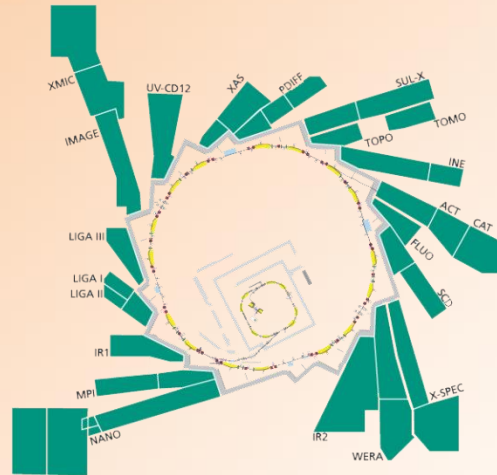
Electromechanical Universal Testing Machine **LFM-S 10 kN**



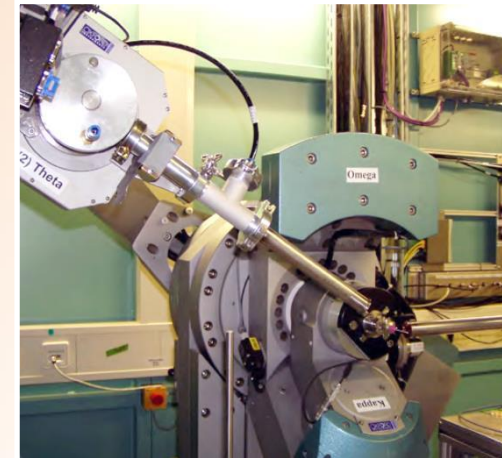
Tensile-compressive miniature testing machine **±10kN** in combination with inductive furnace **900°C** for static and cyclic loading tests at X-ray beamline.

Synchrotron Radiation Facility **ANKA**

Karlsruhe Institute of Technology (KIT), Germany



ANKA Synchrotron Radiation Facility for national and international user operation.



Powder Diffractometer (PDIFF beamline) is dedicated for in-situ phase, strain and microstructure analysis on bulk polycrystalline materials.

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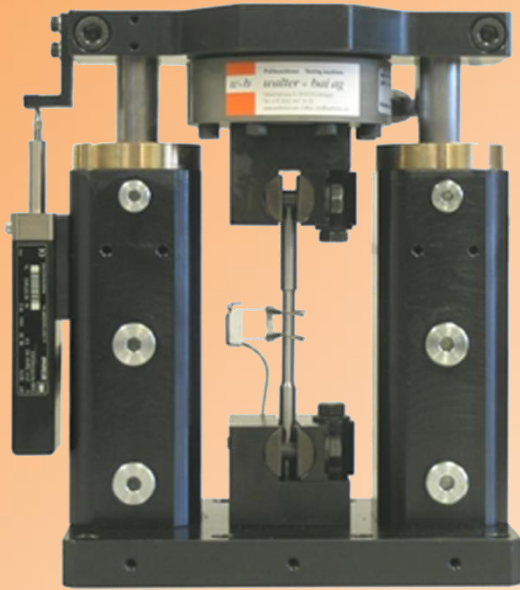
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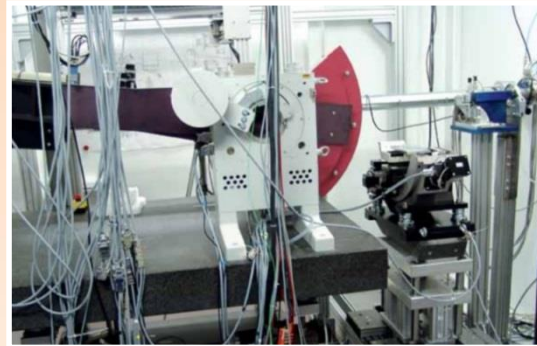
Servohydraulic Dynamic Testing Machine **LFV-S 20 kN**



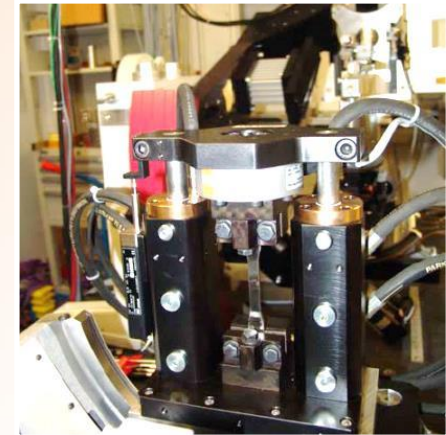
Tensile-compressive testing machine **± 20 kN** used in combination with furnace up to **1100°C** for dynamic tensile and cyclic loading tests at radiation beamlines.

Photon Source **BESSY II**

Hahn-Meitner-Institut, Berlin, Germany



Energy Dispersive Diffraction (EDDI) beamline.



Machine at the **EDDI beamline** for in-situ mechanical experiment.

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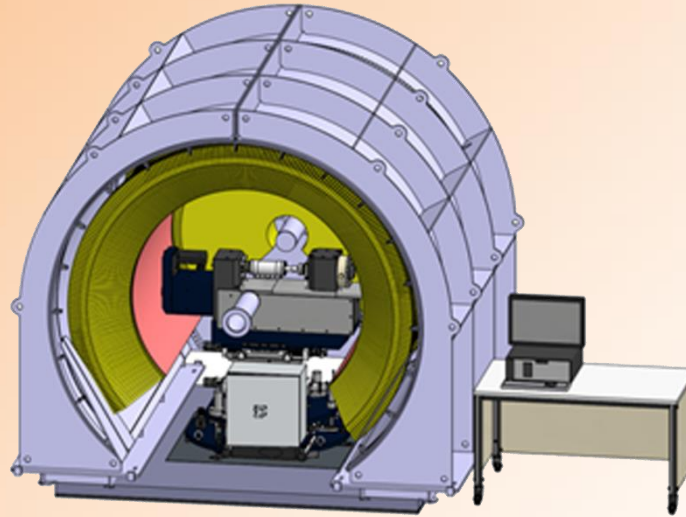
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Electromechanical Testing Machine **LFM-S 200 kN**

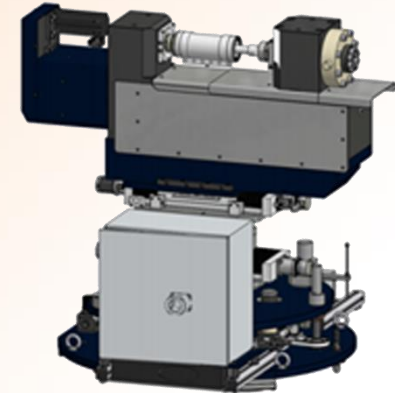
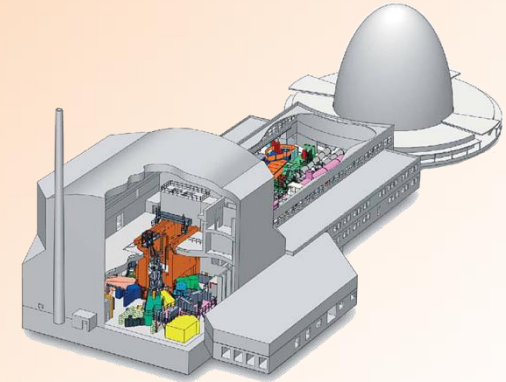


Electromechanical testing machine **± 200 kN** is designed for in-situ deformation tests in combination with rotatable furnace up to **1800°C** temperature and a cryostat.

Technical University of Munich & FRM II Neutron Facility, Garching, Germany



The machine is surrounded by detector at **POWTEX beamline** for in-situ deformation and texture analysis experiments.



Deformation machine with horizontal spindle drive and a triaxial cell between the pistons.

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**Axial-Torsional Electromechanical
Testing Machine LFM-15-T20**
for application on Synchrotron Beamlines



**University of Science and Technology
(USTB) in Beijing & Shanghai Synchrotron
Radiation Facility (SSRF), China**



SSRF is the China's largest synchrotron research facility, and at the same time one of the advanced third generation light sources in the world.

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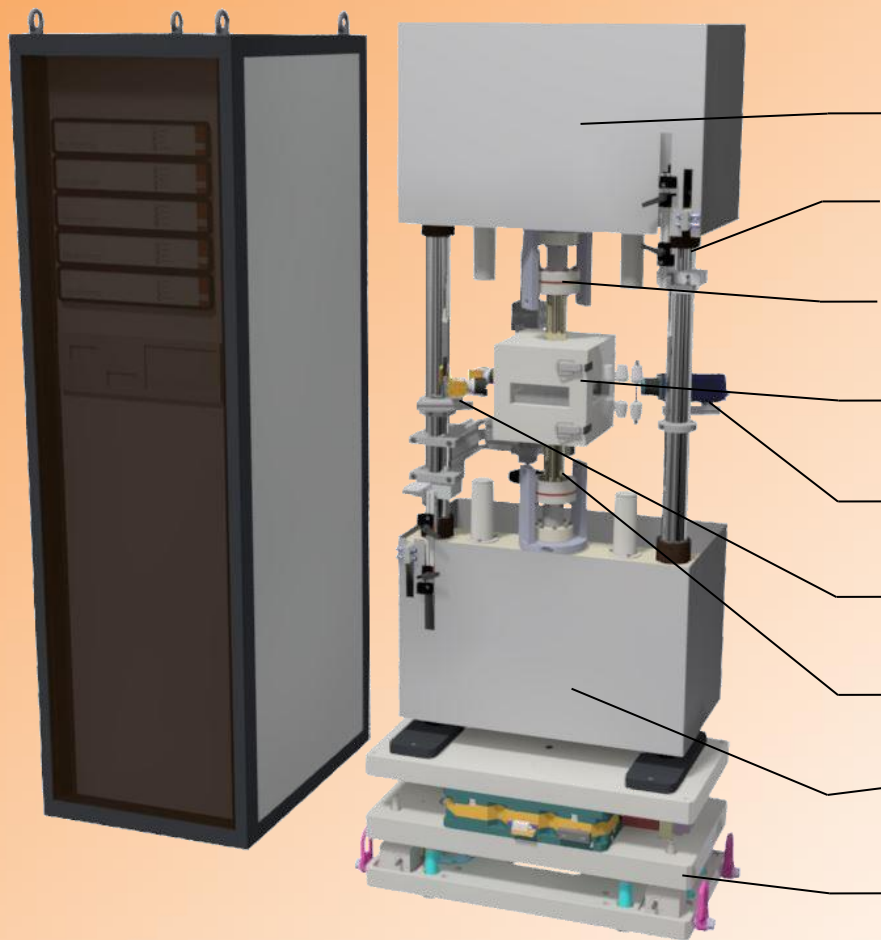
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Customized Testing Machines for Beamlines

Mechanical components



upper drive unit

machine frame

electrical isolation

chamber inert gas

pyrometer

video extensometer

mount. brackets; area electrical resistance heating

lower drive unit

high accuracy XYZ translation table

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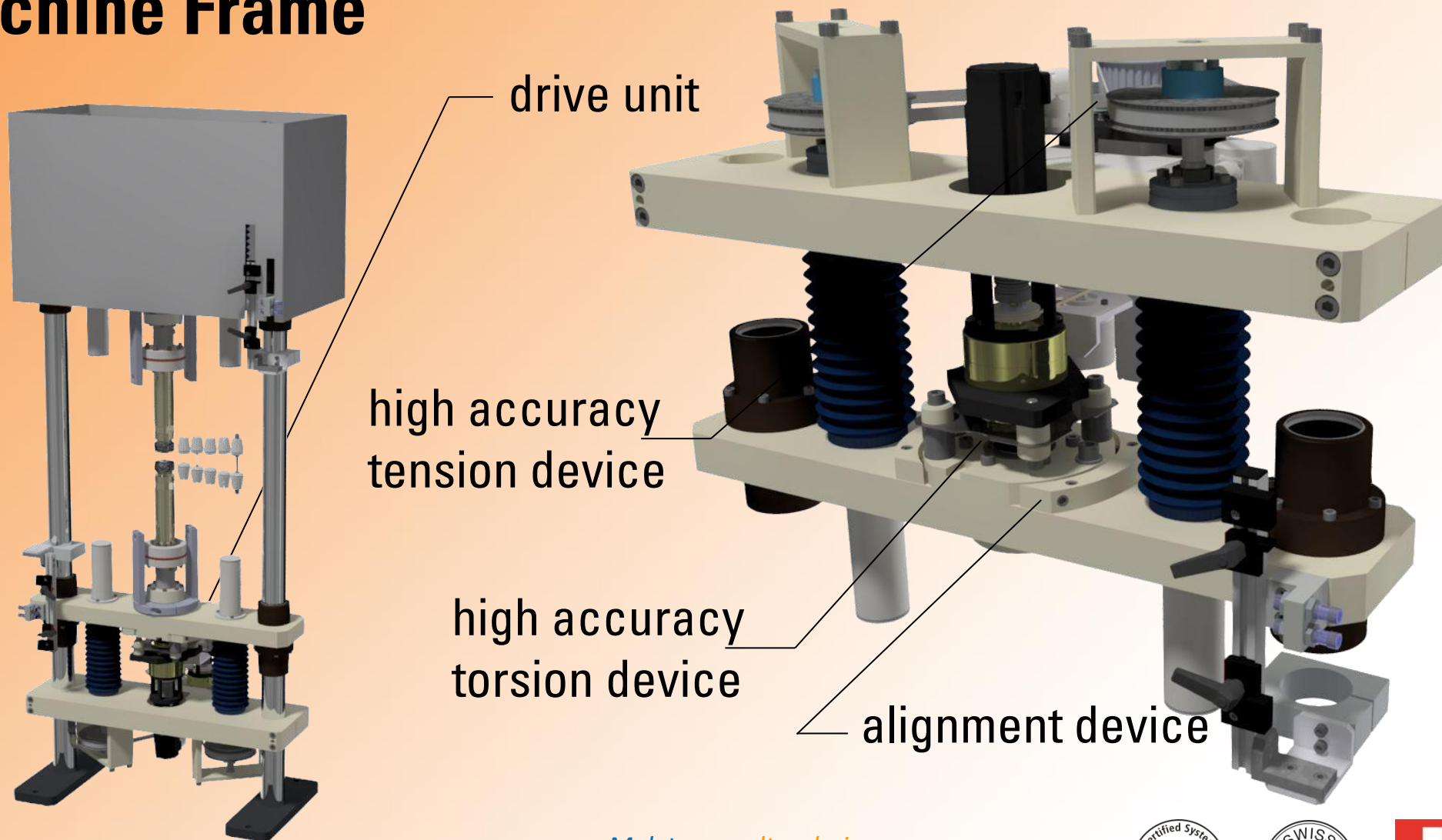
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Machine Frame



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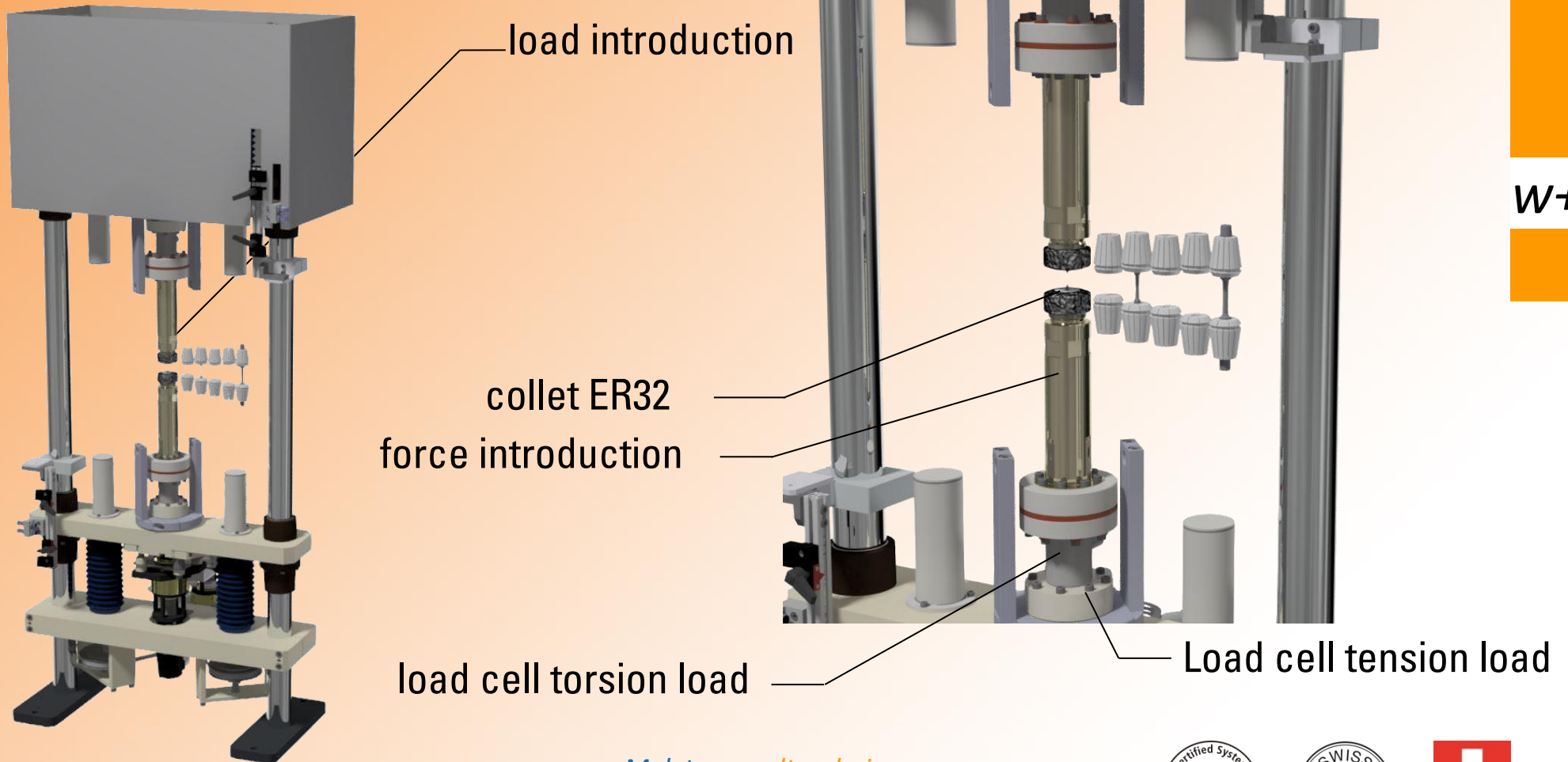
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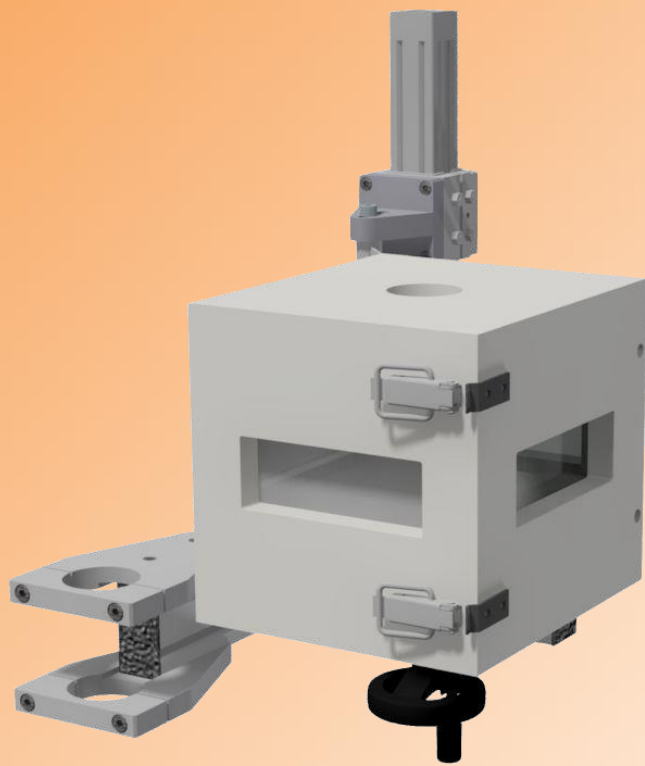


Machine Frame

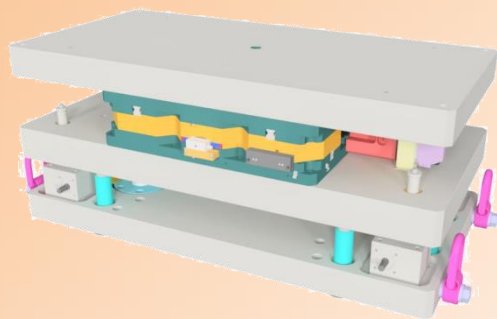


Sample Environment

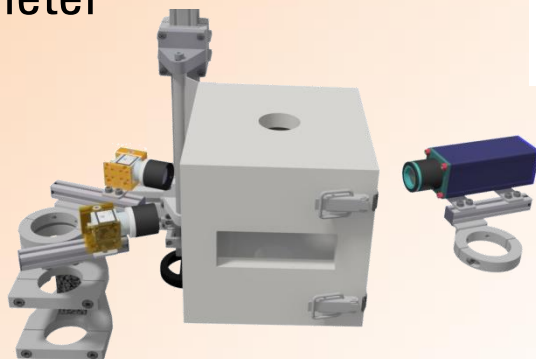
Inert gas chamber
(water cooled)



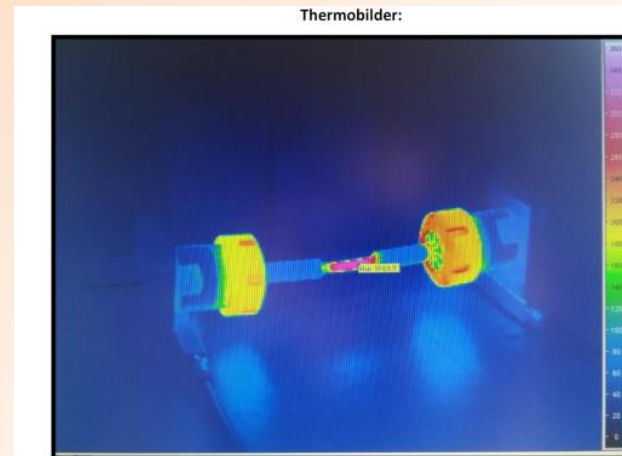
High accuracy move table xyz
(floor stand)



Videoextensometer and
Pyrometer



Electrical resistance
heating



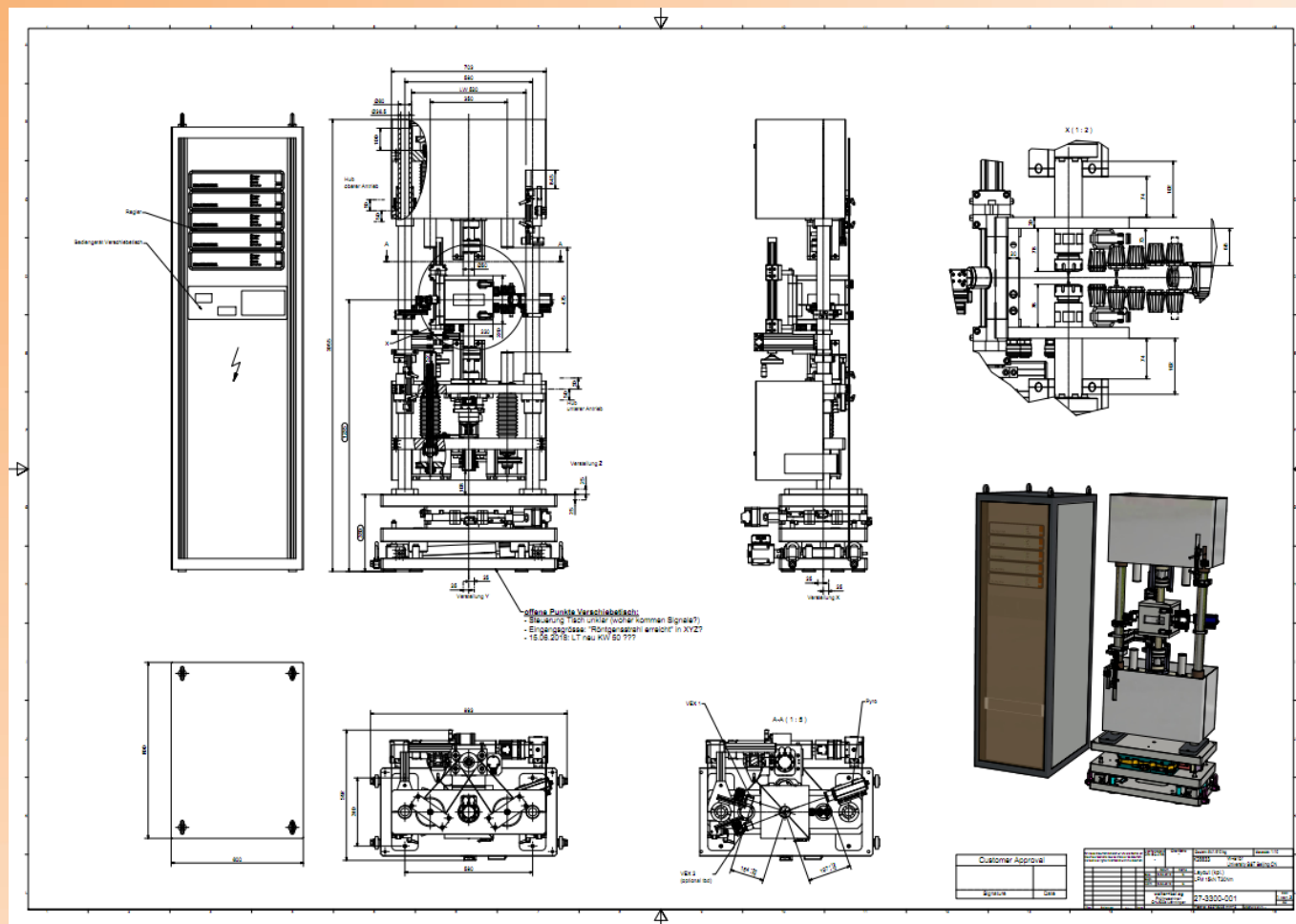
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Current Project with DLS

- Static Deformation Machine

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Customized Testing Machines for Beamlines

LFM-10-T

for DIAD and JEEP beamlines at DLS



Diamond Light Source (or Diamond) is the UK's national synchrotron light source science facility located at the Harwell Science and Innovation Campus (Oxfordshire).



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Customized Testing Machines for Beamlines

Overview of testing machine

Electromechanical Testing Machine LFM-10-T

Force max.	±10 kN
Torque max.	0 N (measurement 10 Nm)
Force measurement accuracy according to	EN ISO 7500-1
0.5 – 1% rated range	Grade 1
1 – 100 rated range	Grade 0.5
Testing height between grips	200 mm
Distance between columns	460 mm
Dimensions WxDxH	602 x 457 x 1655 mm
Weight	450 kg
Sound level	50 dbA
Nominal voltage	230V + N + PE
Current	16A

Controller Type PCS8000-T4

Weight	43.6 kg
Nominal voltage	230 V
Current	16 A



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Customized Testing Machines for Beamlines

Overview of machine

Upper housing

Load frame (cpl.)

Lower housing

Concentricity
measurement
unit

Remote

control

DLS base stage

Add. load
cell 20N

Monitor

PC

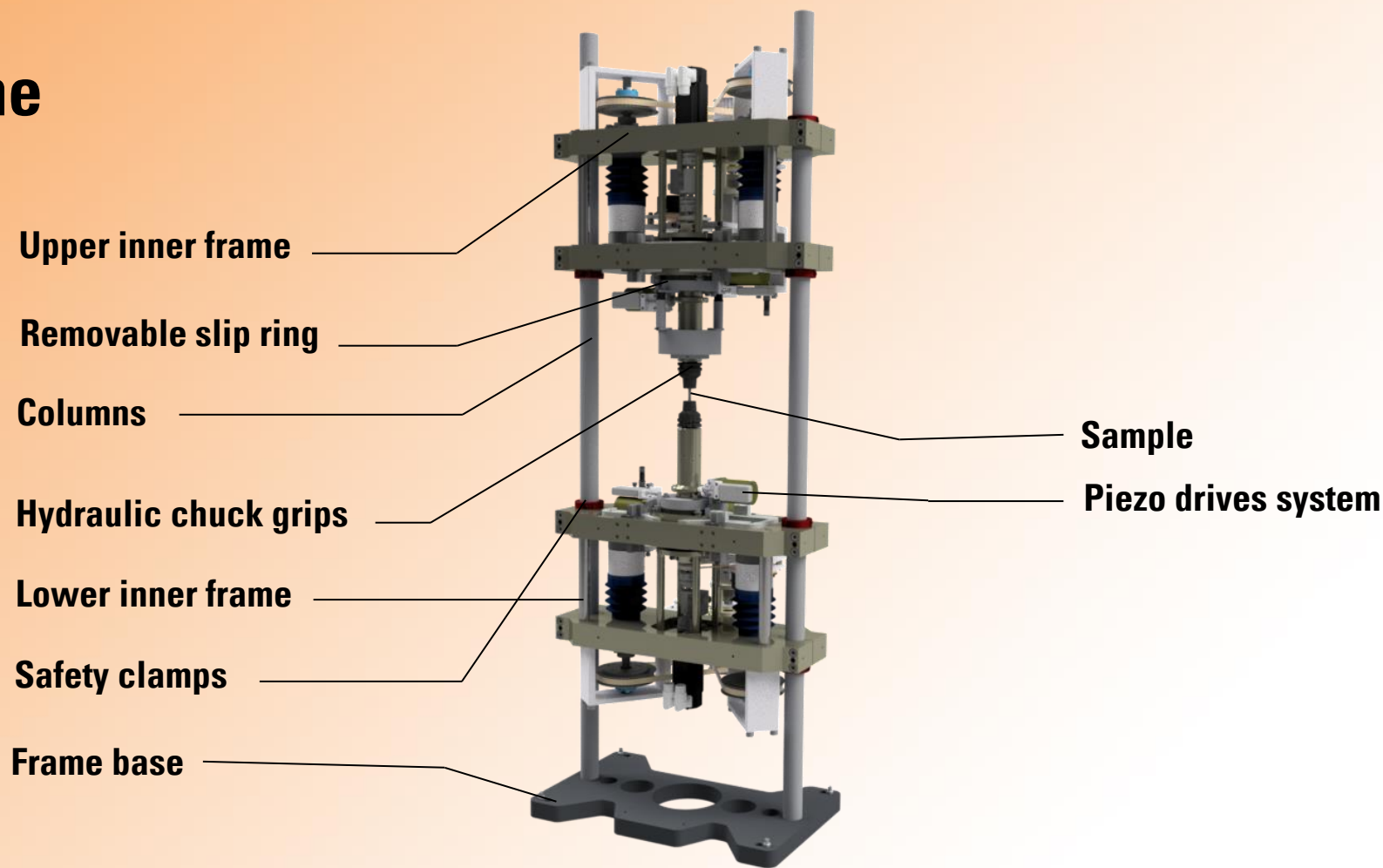
4xPCS8000

Rack 25HE
(H=1215 mm)

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Customized Testing Machines for Beamlines

Load frame



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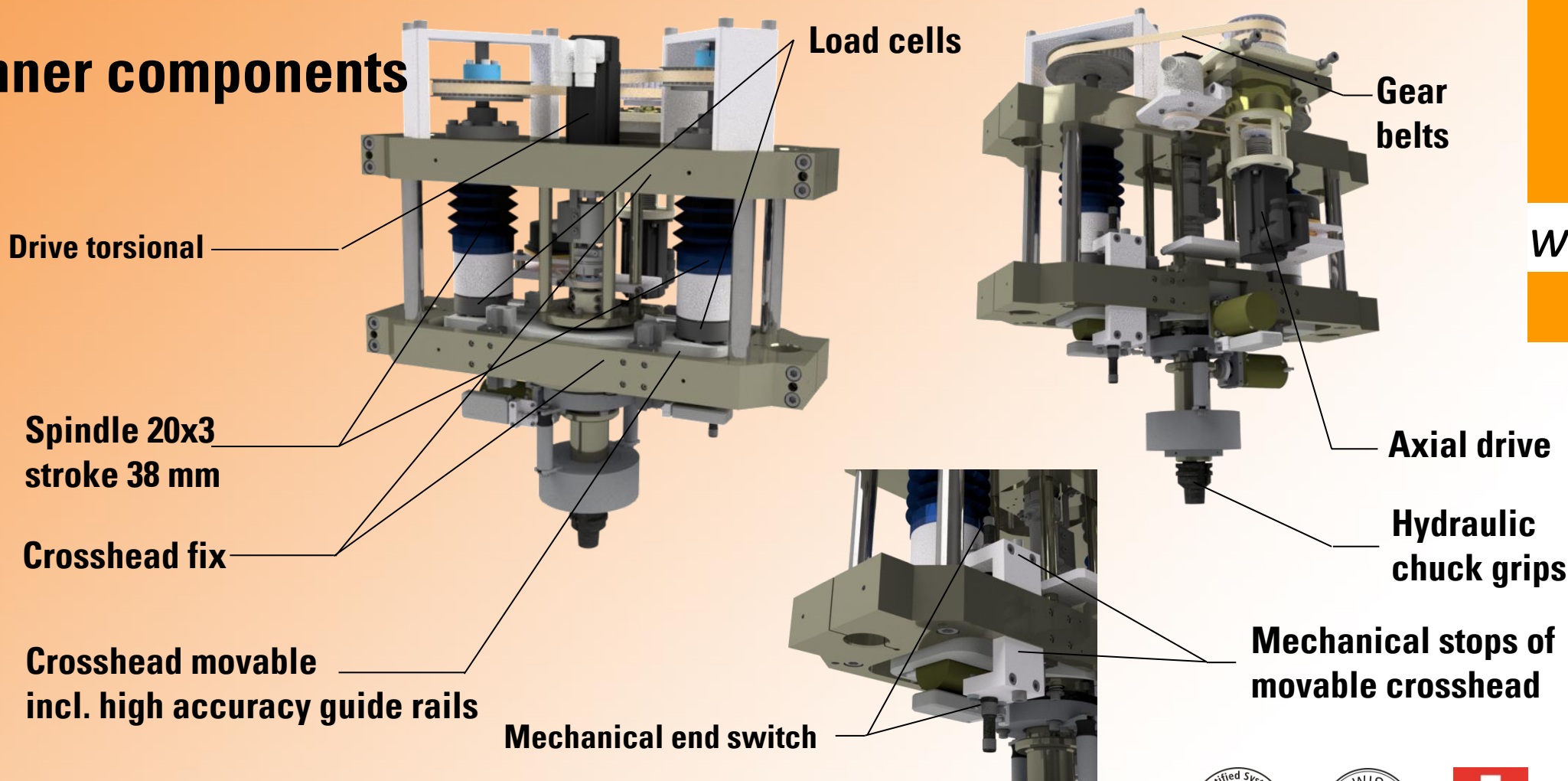
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Customized Testing Machines for Beamlines

Inner components



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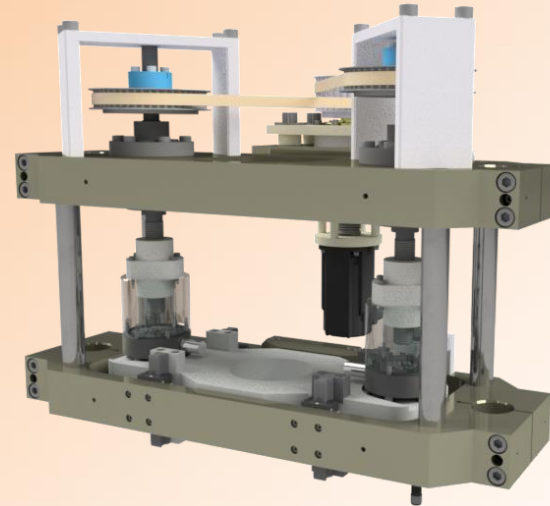
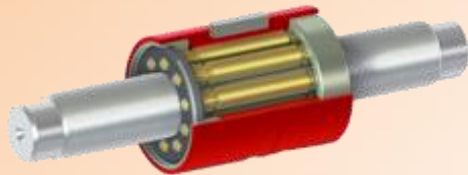
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Customized Testing Machines for Beamlines

Axial spindle system

- centered motor Kollmorgen with double synchronous belts up to 10kN
- high accuracy pre-tightened guide rail
- roller screw spindle up to 7.5kN (2x)
- optical position measurement with 1:1 belt transfer to SSI



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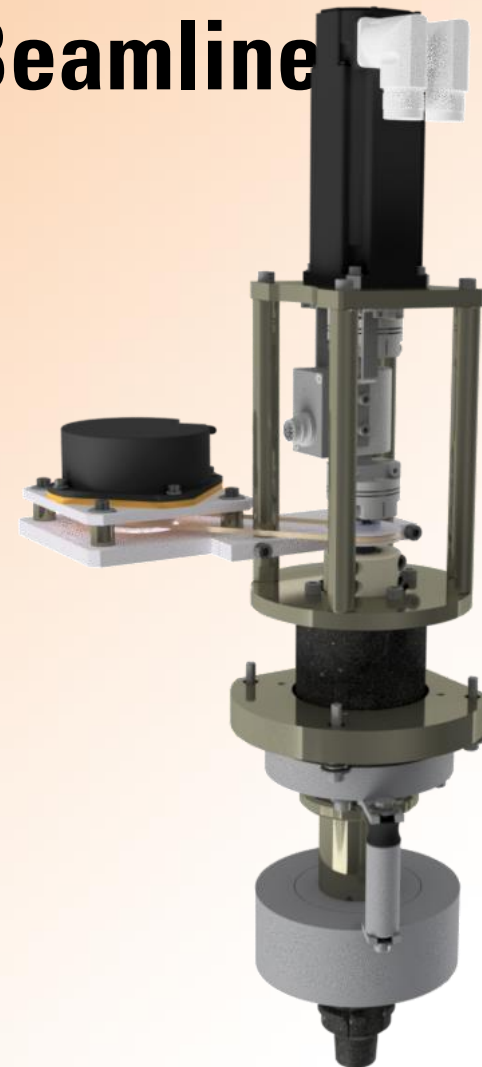
Customized Testing Machines for Beamline

Torsion system

- center axis torsion motor Kollmorgen (max 1Nm)
- mechanical disconnected from axial load
- high acc. angle encoder with 1:1 belt transfer to TTL
- Torsional load cell up to 10Nm

A110

PHOTOELECTRIC
ANGLE ENCODER



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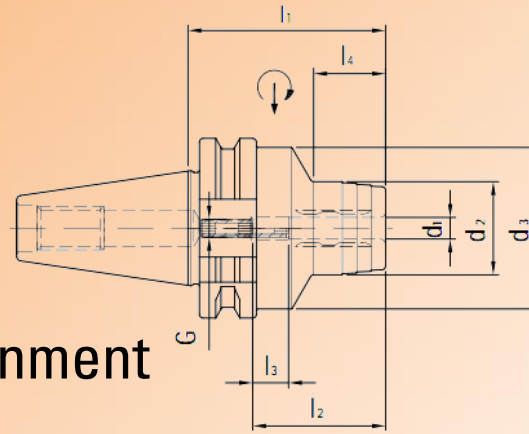
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Customized Testing Machines for Beamlines

Sample clamping system

- hydraulic chuck grips
- minimum effort on sample alignment



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Nenngröße SK/ISO	Baumaße							G	sw	Gewicht [kg]	Bestell-Bezeichnung	Bestell-Nr.
	d_1	d_2	d_3	l_1	l_2	l_3	l_4					
30	6	26	45	55	37	10	20	M5	2.5	0.6	15.507.30.06.Z	30336701
30	8	28	45	55	37	10	20	M6	3	0.6	15.507.30.08.Z	30336702
30	10	30	45	55	41	10	21	M8x1	3	0.6	15.507.30.10.Z	30336703
30	12	32	45	55	46	10	22	M8x1	3	0.6	15.507.30.12.Z	30336704
30	14	34	45	90	46	10	42	M8x1	3	0.7	15.507.30.14.Z	30336705
30	16	38	45	90	49	10	50	M8x1	3	0.7	15.507.30.16.Z	30336706
30	18	40	45	90	49	10	50	M8x1	3	0.7	15.507.30.18.Z	30336707
30	20	42	45	90	51	10	50	M8x1	3	0.7	15.507.30.20.Z	30336708

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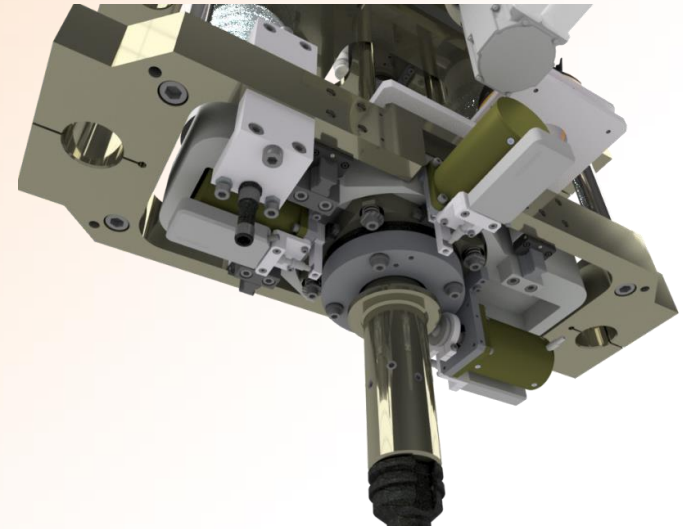
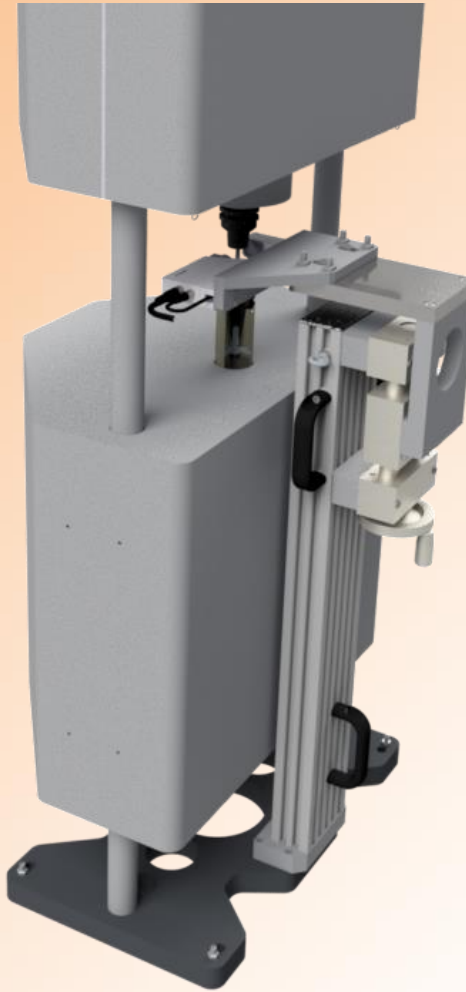
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Customized Testing Machines for Beamlines

Optical alignment system

- LED optical measurement system (removable)
- ultra stiff mounting bracket for optical alignment system
- spring pre-loaded setup modus
- ultrafine piezo drives $<1\text{nm}$ / 300N
- encoder system with resolution $0.2\mu\text{m}$
- translation in X, Z and angle
- mini guide rails included



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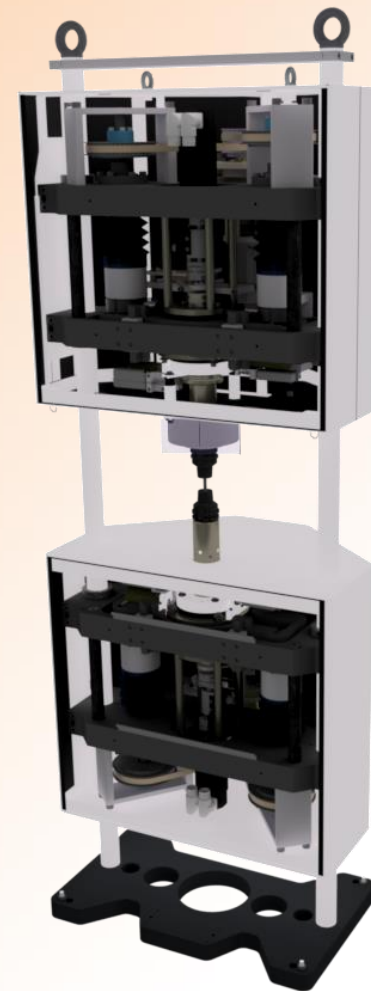
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Construction of housing



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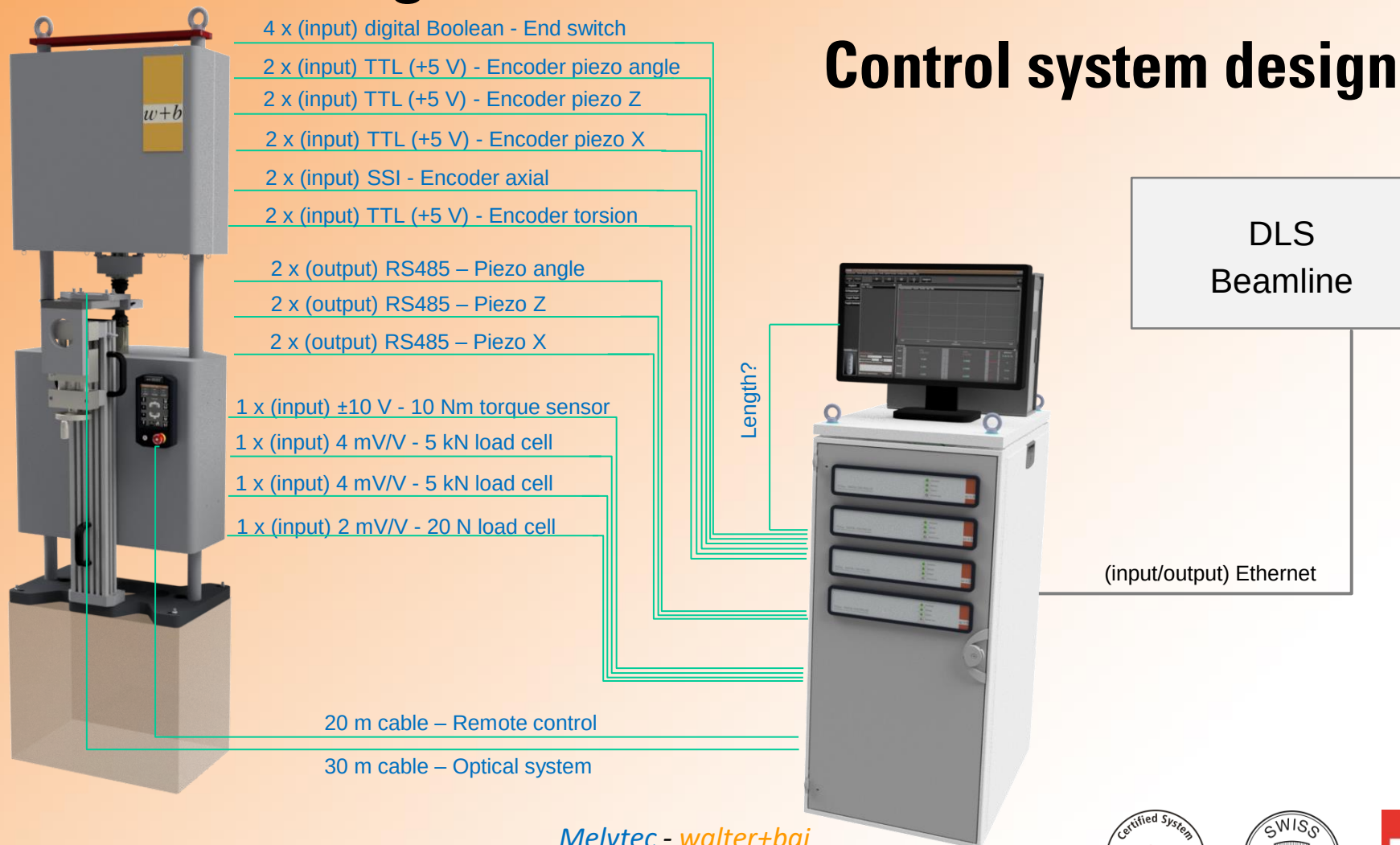
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Control system design



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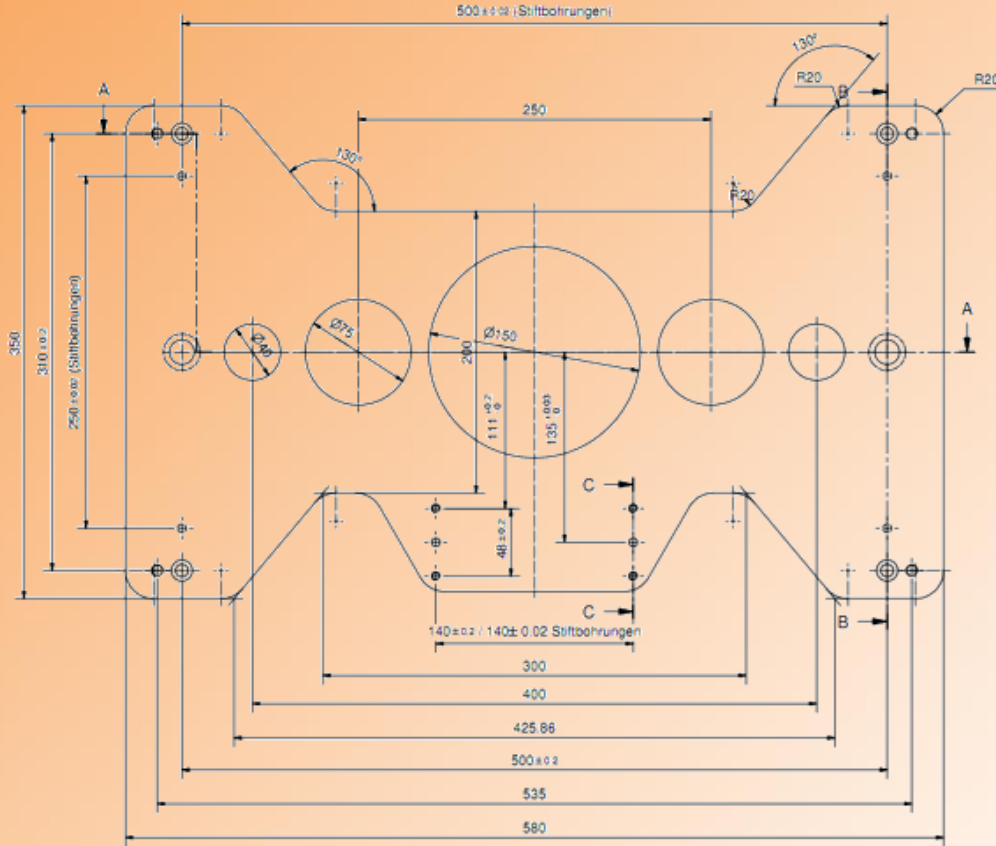
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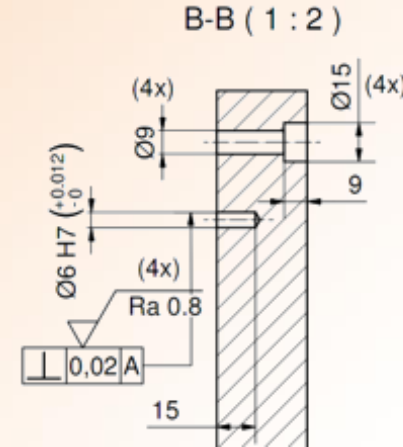


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Mechanical interface to DLS



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