Gentile Prof.ssa Bontempi,
con riferimento alla Vostra gentile richiesta siamo lieti di offrirvi il sistema

**D8 DISCOVER With Davinci Design**


**L'apparecchiatura ha regolarmente conseguito il marchio CE**

Apparecchiatura soggetta alla legislazione nazionale relativa all’impiego di macchine radiogene (D.Lgs. 230/95 e successive modifiche); l’apparecchiatura è classificata a “protezione totale” secondo la legislazione della Germania Federale; in condizioni di normale funzionamento all’esterno di qualsiasi punto della struttura dell'apparecchiatura, l’equivalente di dose ambientale risulta essere non superiore a 0,5 \( \mu \text{Sv/h} \) al netto del fondo naturale di radioattività.

**Nota:** Ai sensi dell’art. 26 del TU 81/2008 il Cliente è tenuto a fornire dettagliate informazioni sui rischi specifici esistenti in materia di sicurezza; il personale Bruker potrà astenersi dall’effettuare l’intervento qualora riscontri anomalie nelle misure di prevenzione e protezione.
### RIEPILOGO TECNICO-ECONOMICO

<table>
<thead>
<tr>
<th>Posizione</th>
<th>Codice</th>
<th>Descrizione</th>
<th>Prezzo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D10_A01_3</td>
<td>D8 DISCOVER, large cabinet and enclosure</td>
<td></td>
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<tr>
<td></td>
<td>D10_A02_B</td>
<td>3kW Generator, tube housing, with internal cooling unit</td>
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<tr>
<td></td>
<td>D10_A03_3</td>
<td>Tube mount adapter incl. optical bench position for point/line focus optics Cr, Co, Cu</td>
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<tr>
<td></td>
<td>D10_A05_3</td>
<td>Vertical goniometer for UMC</td>
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<td></td>
<td>D10_A06_C</td>
<td>INT, international version, international operating system</td>
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<td></td>
<td>D10_A07_4</td>
<td>220V(-10%) - 240V(+6%) 3p 50/60Hz (Standard EU, China, India)</td>
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<tr>
<td></td>
<td>D10_A08_C</td>
<td>Manual D8 DISCOVER</td>
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<td></td>
<td>D10_B01</td>
<td>Divergence slit assembly, primary</td>
<td></td>
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<td></td>
<td>D10_B14</td>
<td>Mount for UBC collimator, affixed to optical bench</td>
<td></td>
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<td></td>
<td>D10_P14</td>
<td>compact Eulerian cradle, Chi and Phi motorized (2 free ports on E03 required)</td>
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<td></td>
<td>D10_P24</td>
<td>XY-Stage, manual, for compact Eulerian cradle</td>
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<td></td>
<td>D10_P32</td>
<td>Scatter screen for P01, P02, P04, P08, P26</td>
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<td></td>
<td>D10_S01</td>
<td>Optical bench, secondary</td>
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<td></td>
<td>D10_S02</td>
<td>Anti-scatter slit assembly</td>
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<td></td>
<td>D10_D01</td>
<td>Dynamic scintillation counter, NaI</td>
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<td></td>
<td>D10_M03</td>
<td>Spacer for measurement height 258mm, primary beam path</td>
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<td></td>
<td>D10_M06</td>
<td>Spacer for secondary beam path</td>
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<td></td>
<td>D10_M07</td>
<td>Universal detector mount with plug-in slit</td>
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<td></td>
<td>D10_M13</td>
<td>Spacer for universal detector mount, measurement height 258mm</td>
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<tr>
<td></td>
<td>D10_K02</td>
<td>Axial Soller - 2.5°</td>
<td></td>
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<tr>
<td></td>
<td>D10_K99</td>
<td>Set of Plug-in slits</td>
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<td></td>
<td>D10_K18</td>
<td>Cu absorber 0.1mm</td>
<td></td>
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<tr>
<td></td>
<td>D10_K23</td>
<td>Ni filter for Cu-Kβ radiation, 0.0125mm</td>
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<tr>
<td></td>
<td>D10_K28</td>
<td>Cu absorber 0.2mm</td>
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<td></td>
<td>D10_K36</td>
<td>Micro mask 1mm diameter</td>
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<td></td>
<td>D10_K37</td>
<td>Diagonal slit 1mm</td>
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<td></td>
<td>D10_K47</td>
<td>V filter for Cr-Kβ radiation, 0.02mm</td>
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<tr>
<td></td>
<td>D10_K80</td>
<td>UBC collimator, short, 2.0mm</td>
<td></td>
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<tr>
<td></td>
<td>D10_K81</td>
<td>UBC collimator, short, 1.0mm</td>
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<tr>
<td></td>
<td>D10_R04</td>
<td>Twist tube, long fine focus, Cu, 2.2 kW</td>
<td></td>
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<tr>
<td></td>
<td>D10_R15</td>
<td>Twist tube, long fine focus, Cr, 1.9 kW</td>
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<tr>
<td></td>
<td>D10_E01</td>
<td>Detector Interface Board</td>
<td></td>
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<td></td>
<td>D10_E03</td>
<td>4-axis motor driver board</td>
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<td></td>
<td>D10_V05</td>
<td>Tube mount, one degree of freedom</td>
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<td></td>
<td>D10_V10</td>
<td>Storage rack for optical components</td>
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<td></td>
<td>D10_V12</td>
<td>Control terminal</td>
<td></td>
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<td></td>
<td>D10_V16</td>
<td>Goniometer podium, 110 mm</td>
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<tr>
<td></td>
<td>D10_V21</td>
<td>Tracks Theta-Theta (DISCOVER), incl. Theta-Theta ring for vertical goniometer and distance detection system</td>
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<td>D10_V26</td>
<td>Counter balances for D8 Theta-Theta, tube and detector circle, measurement circle &gt;600mm</td>
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<td></td>
<td>D10_V35</td>
<td>Double-laser unit</td>
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<td>144-035001</td>
<td>FIREFIX/BEAM ALIGN VERIFICATION</td>
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<td></td>
<td>A100B146</td>
<td>Base segment</td>
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<tr>
<td></td>
<td>A100B250</td>
<td>Magnet mount for laser mounting</td>
<td></td>
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<td></td>
<td>A24D25</td>
<td>Cable UOIB 2xRS232 RS485</td>
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<td></td>
<td>P500A101</td>
<td>DIFFRAC. MEASUREMENT CENTER</td>
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<td></td>
<td>P500B101</td>
<td>DIFFRAC.EVA, 2 users</td>
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<td>P500L101</td>
<td>DIFFRAC.LEPTOS S, 2 users</td>
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<td>P500M101</td>
<td>DIFFRAC.MULTEX, 2 users</td>
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<td></td>
<td>WIB-1001-01-130</td>
<td>WIBU Dongle for DIFFRAC.SUITE</td>
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<td>Prezzo € 296,600.00</td>
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<td>A24B260 POLYCAP, parallel, beam spot diameter &gt;4mm</td>
<td>€ 27,780.00</td>
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<tr>
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<td>842-094500 VÅNTEC-500 detector including controller 19''</td>
<td>€ 120,410.00</td>
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<td>472-071700 Mount for VÅNTEC-500, measurement height 258mm</td>
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<td></td>
<td>A30D4 Accessory kit for 2-D detector</td>
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<td>A24B227 Ni filter for Cu-Kß radiation, 0.02mm</td>
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<td>843-024300 DIFFRACT.PILOT</td>
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<td>A25B39 Controller mounting rail 755mm cpl.</td>
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<td>K340C19 LINE CORD 3m 3030 0409</td>
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<td>4</td>
<td>TaeVo10 Water Chiller</td>
<td>€ 5,000.00</td>
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<td>Prezzo speciale Pos. 1-4 strumento ricondizionato pari al nuovo</td>
<td>€ 180,000.00</td>
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</tbody>
</table>
DESCRIZIONE TECNICA

Pos. 1  

D8 DISCOVER DIFFRACTOMETER SYSTEM

The D8 DISCOVER is an all purpose X-ray analyzer which can be configured for all diffraction-based material research applications, including qualitative and quantitative phase analysis, structure analysis, high-resolution X-ray diffraction, reflectometry, reciprocal space mapping, gracing incidence diffraction (in-plane GID), gracing incidence small angle X-ray scattering (GISAXS), stress and texture analysis, and micro-diffraction, depending on accessories.

DAVINCI design

The D8 DISCOVER facilitates a new, pioneering plug & play diffractometer design for true plug & play operation, making the instrument ideal for changing needs, multiple user environments as well as high-end research: DAVINCI design.
- Extremely easy switch of all beam path components from the X-ray tube, through optics and sample stages to detectors
- Alignment- and tool-free change of optics (SNAP-LOCK)
- Foolproofness: Fully automatic component recognition with conflict detection and fully automatic instrument configuration.
- All purpose: Unparalleled adaptability to any conceivable X-ray powder diffraction application with one instrument

The D8 DISCOVER comes with the new DIFFRAC.SUITE software package. Its most outstanding feature is the DIFFRAC.DAVINCI plugin, the unique Virtual Goniometer software solution, showing all beam path components of the actual goniometer and their status. The automatic validation of the instrument configuration with real-time conflict detection provides for easy, intuitive, and fail-safe operation by any users, including novice users.

Safety:

The D8 DISCOVER is the safest instrument available on the market, requiring minimum efforts to obtain operation permission by the local authorities. Please refer to your local regulations concerning X-ray analysis instruments and radiation safety.

Goniometer:

The main component of the D8 DISCOVER is its highly-accurate, high-precision, two-circle goniometer with independent stepper motors and optical encoders for the Theta and 2Theta circles. The goniometer can be positioned horizontally or vertically and is available in Theta/2Theta and Theta/Theta configurations, all depending on the accessories.

Alignment-Guarantee:

The D8 DISCOVER comes with an unique alignment guarantee as detailed in the "Instrument Verification Booklet": The accuracy of each peak position is equal or better than ±0.01° 2Theta over the whole angular range. Before delivery and at installation each instrument has to pass a strict test based on the internationally accepted Standard Reference Material SRM1976a by NIST. This standard is always included with each instrument, to additionally enabling the user to monitor instrument performance at any time.

Included in delivery:
- Radiation Safety Enclosure
- Base cabinet
- NIST Standard Reference Material SRM1976a

Outstanding innovations, optional:
- TWIN/TWIN setup: Push-button, motorized switch between Bragg-Brentano and parallel beam geometries for primary and secondary beampath
- **TWIST-TUBE**: Easy switch between line and point focus applications without disconnecting cables or unscrewing the X-ray tube
- **PATHFINDER**: triple beam path analyzer, motorized and software-controlled switch between channel-cut monochromator and TWIN optics
- **TURBO-X-RAY SOURCE**: fully integrated rotating anode generator for point, line and micro focus applications with unique source alignment by means of a highly sophisticated 5 degrees-of-freedom stage
- **VANTEC-500**: large area 2-D detector based on Bruker AXS' proprietary MikroGap technology for achieving high resolution and low detector noise with a very high dynamic range.

**SPACIOUS RADIATION SAFETY ENCLOSURE**
The spacious radiation safety enclosure combines a maximum of operating convenience and ergonomics with excellent goniometer and sample visibility. Via a patented mechanism the two doors can be used either as sliding doors or as swing doors and provide excellent access to the goniometer. Clearly visible LED lights indicate the X-ray status. Smart screen key displays show the status of the instrument and ensure an intuitive operation. The enclosure is illuminated by a series of dimmable, white LEDs. Depending on configuration racks mounted inside the enclosure provide easy access and storage space for optics and accessories. The enclosure offers an X-ray tight labyrinth for feeding-through cables and hoses.

The enclosure hosts the controller interface to the goniometer and offers room for additional 19" control electronics. A series of eight internal sockets assures a safe and clean cable management.

**Safety:**
The instrument complies with the requirements of the Machinery Directive 2006/42/EC. In addition, the instrument is in conformity with the EC Directives 2006/95/EC relating to electrical equipment and 2004/108/EC relating to electromagnetic compatibility. Maximum X-ray safety is guaranteed due to two independent fail-safe safety circuits. The maximum radiation level is significantly below 1 micro-Sievert/h under measurement conditions.

**Dimensions:**
Height x Width x Depth: 202 cm x 168 cm x 129 cm
Weight: 950 kg (depending on configuration and accessories)

**3KW GENERATOR WITH INTERNAL COOLING UNIT**
High stability, medium frequency design high voltage power supply for the X-ray tube. The generator is provided with a routine for the automatic-burn-in of X-ray tubes to facilitate maximum tube lifetime.

**Technical data:**
- Maximum continuous power: 3 kW
- High voltage: 20-50 kV, adjustable in steps of 1 kV
- Current: 5-60 mA, adjustable in steps of 1 mA
- Power required: 4 kVA (20 A max.)
- Stability: < 0.005% for high voltage and current with 10% variation of main supply

**Internal water/water cooling unit**
The internal cooling unit needs to be connected to an external water supply for cooling purposes. The external circulation of the cooling water is automatically stopped when the generator is switched off, or if the detected internal cooling water temperature is below a defined value. This prevents water condensation at the tube and reduces the water consumption.
The water unit is equipped with a de-ionization filter to avoid the growth of algae. The filter needs to be exchanged from time to time. No additional space is required, because the unit fits into the D8 cabinet.

**Requirements for the external water supply:**
- Inlet pressure of the water: 3 - 6 bar
- Outlet water connection: pressureless
- Temperature of the water: 8 - 20° C

**TUBE MOUNT ADAPTER FOR POINT / LINE FOCUS OPTICS**
Tube mount adapter with optical bench for line focus optics and point focus optics for Cr, Co, and Cu radiation.

**VERTICAL GONIOMETER FOR UMC**
High-accurate, high-precision, two-circle goniometer with independent stepper motors and optical encoders for the Theta and 2Theta circles. The goniometer is available in Theta/Theta configuration.

**Technical data:**
- Vertical goniometer, Theta/ Theta
- Measurement circle diameter (depending on UMC type and accessories): any intermediate setting between 600 mm and 720 mm
- Angular range: 360° (without accessories)
- Max. useable angular range: -110° to 168° (depending on accessories)
- Angular positioning: stepper motors with optical encoders
- Smallest addressable increment: 0.0001°
- Maximum angular speed: 20°/s (depending on accessories)
- Accuracy: 0.005°
- Reproducibility: 0.0002°

**PC, INTERNATIONAL VERSION, INTERNATIONAL OPERATING SYSTEM**
Desktop-PC.

**ELECTRIC SUPPLY: 220-240V, 50/60HZ, THREE-PHASE**
Electric supply: 220V (-10%) - 240V (±6%), 50/60Hz, three-phase.

**FIXED SLIT ASSEMBLY, PRIMARY**
Incident beam optics with position for plug-in slits. Fully integrated into the DAVINCI design plug & play concept.

**MOUNT FOR UBC-COLLMATOR, OPTICAL BENCH FIX**
Mount for UBC-Collimator for mounting at the optical bench. Fully integrated into the DAVINCI design plug & play concept.

**COMPACT EULERIAN CRADLE**
The compact Eulerian Cradle integrates Chi and Phi rotations and Z translations into one sample stage with minimum space requirements. Common texture or residual stress samples, powder samples, as well as thin films and small wafers can be mounted by selecting an appropriate sample fixture. The compact design of the Eulerian Cradle allows short sample-to-detector distances advantageous for many applications. The Chi- and Phi-rotations are motorized and can be used for positioning as well as scanning.

Minimum measurement circle diameter required is 560 mm. Fully integrated into the DAVINCI design plug & play concept.

**Included into delivery:**
Set of alignment tools containing glass slit, fluorescence screen, corundum sample, micro mask 0.3 mm diameter, diagonal slit 1 mm, and sample fixture of flat samples.
XY-STAGE, MANUAL, FOR COMPACT EULERIAN CRADLE
Compact device for a manual adjustment of thin samples in X- and Y-direction when mounted to the compact Eulerian cradle.

Technical data:
- Travel: 12 mm
- Installation height: 27 mm
If mounted to the compact Eulerian cradle the maximum possible sample height is 1 mm (±1 mm supplied by the Z-travel of the compact cradle)

ANTI SCATTER SCREEN
Anti-scatter slit assembly to reduce air scattering. Recommended when employing a 1-dimensional detector, particularly for low angle measurements.

OPTICAL BENCH, SECONDARY
Optical bench for secondary beam path. Spacer for respective measurement height required.

FIXED SLIT ASSEMBLY, SECONDARY
Diffracted beam optics with position for plug-in slit. Fully integrated into the DAVINCI design plug & play concept.

DYNAMIC SCINTILLATION COUNTER, NAI
NaI(Tl) scintillation detector for X-ray detection. Long life time, maintenance free. Maximum count rate up to 2x10^6 cps, maximum linear count rate depends on the software selected shaping time. Fully integrated into the DAVINCI design plug & play concept.

SPACER FOR MEASUREMENT HEIGHT 258MM, PRIMARY BEAM PATH
Primary beam path spacer for 258mm measurement height.

SPACER FOR MEASUREMENT HEIGHT 258MM, SECONDARY BEAM PATH
Secondary beam path spacer for 258mm measurement height.

UNIVERSAL DETECTOR MOUNT WITH PLUG-IN SLIT
Universal detector mount with beam optics with position for a plug-in slit. Fully integrated into the DAVINCI design plug & play concept.

SPACER FOR UNIVERSAL DETECTOR MOUNT, MEASUREMENT HEIGHT 258MM
Mount for universal detector mount, measurement height 258mm

AXIAL SOLLER SLIT - 2.5°
Axial Soller slit - 2.5° Fully integrated into the DAVINCI design plug & play concept.

SET OF PLUG-IN SLITS
Set of plug-in slits.

CU ABSORBER 0.1MM
Cu foil, thickness 0.1 mm, attenuation about 1:89 for Cu-, 1:80 for Mo-radiation. Fully integrated into the DAVINCI design plug & play concept.

NI FILTER FOR CU-Kß RADIATION
Ni-foil, thickness 0.0125 mm, to suppress Cu-Kß-radiation down to about 1.5% of Cu-K-alpha level. Fully integrated into the DAVINCI design plug & play concept.

CU ABSORBER 0.2MM
Cu foil, thickness 0.2 mm, attenuation about 1:7900 for Cu-, 1:6300 for Mo-radiation. Fully integrated into the DAVINCI design plug & play concept.

MICRO MASK 1MM DIAMETER
Plug-in pinhole microslit, 1mm. Fully integrated into the DAVINCI design plug & play concept.
**DIAGONAL SLIT**
Plug-in diagonal slit, 1mm.
Fully integrated into the DAVINCI design plug & play concept.

**V FILTER FOR CR-Kß RADIATION (LYNXEYE DETECTOR)**
V-foil, thickness 0.02 mm, to suppress Cr-Kß-radiation down to about 0.5% of Cr-K-alpha level.
Fully integrated into the DAVINCI design plug & play concept.

**SHORT UBC-COLLIMATOR, 2.0 MM**
UBC-Collimator with 45 mm length and 2 mm diameter.

**SHORT UBC-COLLIMATOR, 1.0 MM**
UBC-Collimator with 45 mm length and 1 mm diameter.

**CERAMIC TUBE KFL CU 2KDC, LONG FINE, 2.2KW CU, TWIST-TUBE**
Cu-anode, long fine focus, 2.2 kW, one exit window for line spot and one for spot focus. Focus sizes: 0.04 x 12 mm and 0.4 x 1.2 mm respectively. Ceramic insulation body.
TWIST-TUBE: Easy switch between line and point focus applications without disconnecting cables or unscrewing the X-ray tube.
Fully integrated into the DAVINCI design plug & play concept.

**CERAMIC TUBE KFL CR-2KC, LONG FINE, 1.9KW CR, TWIST-TUBE**
Cr-anode, long fine focus, 1.9 kW, one exit window for line spot and one for spot focus. Focus sizes: 0.04 x 12 mm and 0.4 x 1.2 mm respectively. Ceramic insulation body.
TWIST-TUBE: Easy switch between line and point focus applications without disconnecting cables or unscrewing the X-ray tube.
Fully integrated into the DAVINCI design plug & play concept.

**DETECTOR INTERFACE BOARD**
Detector interface board for scintillation counter or SOL-XE detector.

**4-AXES MOTOR DRIVER BOARD**
Stepper motor controller with encoder readout for a maximum of four motors.

**TUBE MOUNT, ONE DEGREE OF FREEDOM**
Tube mount, one degree of freedom.

**STORAGE RACK FOR OPTICAL COMPONENTS**
Storage rack for storing of optical components, mounted inside of the enclosure.

**CONTROL TERMINAL**
Control terminal for D8 ADVANCE and D8 DISCOVER (DAVINCI design)

**GONIOMETER PODIUM, 110 MM**
Dedicated socket to rise a vertical goniometer by 110 mm. Required for Theta/2Theta systems, Theta/Theta instruments operating in transmission geometry (horizontal sample).

**TRACKS FOR THETA-THETA GONIOMETER - D8 DISCOVER**
Tracks for vertical Theta-Theta goniometer for D8 DISCOVER including distance detection system.

**COUNTER BALANCES FOR D8 THETA/THETA, TUBE AND DETECTOR CIRCLE**
Counter balance for tube and detector circle of the D8 Theta/Theta goniometer with measurement diameter larger than 600 mm.

**DOUBLE-LASER UNIT**
The double-laser unit is an assembly for alignment of a sample to the center of a vertical Theta-Theta goniometer. The unit consists of two red-light lasers and a camera. The lasers are mounted to the primary and secondary track of the goniometer, respectively. The camera is mounted
to the primary track.
The intersection of both laser spots is aligned in a way that for a correct position of the sample the diameter observed by the camera is at a minimum. This optical view allows a simple and easy height alignment of the sample.

The lasers can be switched on and off using the DIFFRAC.MEASUREMENT software.

**Included in delivery:**
- Two laser, 635 nm, <1 mW, class 2
- Mounting and alignment base for long D8 goniometer tracks
- USB camera (2 Megapixel sensor) with manual focus from 10 mm to 500 mm, magnification ratio 20x to 200x, integrated 8 LED white light source, mounting and alignment base, USB connection cable
- Polarization filters for adjustment of the laser brightness
- Accessories: cables, fluorescent sample, alignment documentation

**Requirements**
- D8 ADVANCE or D8 DISCOVER with DAVINCI design
- Vertical Theta-Theta goniometer

**FIXT/BEAM ALIGN VERIFICATION**

**BASE SEGMENT**

**MAGNET MOUNT FOR LASER MOUNTING**

**CABLE UIOB 2XRS232 RS485**

**DIFFRAC.MEASUREMENT CENTER**

DIFFRAC.MEASUREMENT CENTER is a software package providing a most convenient control and navigation center for the D2 PHASER and D8 (with DAVINCI design) diffractometer families comprising a set of measurement and maintenance plug-ins:
- COMMANDER: The control center for managing interactive as well as background measurements and display of all status information of the diffractometer system
- DAVINCI: The intelligent virtual goniometer providing for true plug & play X-ray diffraction analysis for the D8 (with DAVINCI design) diffractometer family
- JOBLIST / STARTJOBS: Comfortable job controller with build-in scheduler and history. Jobs can be stopped, deleted, resumed, restarted and prioritized.
- CONFIG: Easy and intuitive instrument configuration
- DB MANAGEMENT: Centralized user's management and full audit trailing
- LOG: Comprehensive logging of all instrument events

The MEASUREMENT CENTER can access and control any number of D2 PHASER and D8 (with DAVINCI design) diffractometers within a customer's network. Licensing includes installation of the MEASUREMENT CENTER on all customer's PCs to enable unlimited networked operation.

Either Windows XP (32 Bit) or Windows 7 (32 Bit / 64 Bit) is required for operation.

**DIFFRAC.EVA**

DIFFRAC.EVA is a software for easy, fast and convenient X-ray powder diffraction data evaluation and presentation. Unique to EVA is its full-pattern-approach to phase identification with an integrated, quantitative phase analysis module. Optionally, elemental data (e.g. XRF) can be loaded for simultaneous analysis to successfully handle even the most complex mixtures and trace phases readily.

EVA is multi-lingual; English, German, Japanese and French are supported. The user can switch between these languages.

**General data evaluation options:**
- Peak search and creation of peak data, e.g. for phase identification
- Manual and fully automatic background subtraction
- Data smoothing (Savitzky-Golay method or Fourier filtering)
- Kα2-stripping (Rachinger method)
- 2θ-offset and sample displacement corrections
- Calculation of profile parameters such as line position, center of gravity, integrated area, half width and more
- Crystallite size determination (Scherrer method)
- Addition, subtraction, scaling, normalisation and merging of scans
- Simultaneous evaluation of multiple scans
- Undo / redo operations
- Support of variable counting time data

**Phase identification and quantitative analysis options:**

In combination with reference databases further powerful options are available:

- The following database are supported:
  - ICDD PDF2, PDF4+, PDF4/Organics, PDF4/Minerals
  - Crystallography Open Database (COD)
  - User-defined databases
- Simultaneous search in multiple reference databases
- Search working on full-pattern and peak data
- Search for solid solutions and isostructural phases
- Highly sophisticated residual search
- Automatic consideration of 2θ-offset and sample displacement errors
- Search by various selection criteria such as chemical composition, card quality marks, subfiles, and more
- Graphical adjustment of peak positions via tuning of lattice parameters e.g. to describe solid solutions
- Interactive overlay of the search results with the measurement data for easy evaluation
- Display of stick patterns as well as "Rietveld-type" tick marks with hkl-indices, if available
- Quantitative analysis based on RIR (reference intensity ratio) and spiking methods
- Degree of crystallinity determination
- "Combined XRD-XRF analysis": Validation and improvement of search as well as quantitative phase analyses results using elemental analysis results; direct access to SPECTRAplus XRF databases, formatted ASCII-files, and more.

**Data display and reporting options:**

- Extremely powerful data highlighting and zooming options including advanced picture-in-picture (PIP) and vertical-in-place (VIP) zooms
- Advanced data / results presentation using tables and charts (pie, stacked-bar, bar)
- 2D and 3D data representations (waterfall plots, iso-intensity plots)
- Creation of high quality analysis reports for direct printing
- Free customization of any plot and text properties for creation of publication-ready figures
- Data exchange options to and from any other Windows application: copy and paste, Windows bitmaps and metafiles
- Display and printout of all reference database patterns

The Crystallography Open Database is part of the DIFFRAC.EVA distribution and can be optionally installed from the CD.

Licenses for any ICDD PDF reference databases are not included and have to be
ordered separately.
Either Windows XP (32 Bit) or Windows 7 (32 Bit / 64 Bit) is required for operation.

**DIFFRAC.LEPTOS S**

DIFFRAC.LEPTOS S is the software suite for residual stress 1D and 2D data analysis. LEPTOS S combines easy-to-use graphical evaluation, simulation and fitting of stress measurements in one program. The interpretation is based on up-to-date stress evaluation approaches utilizing both the classical sin2y method and fundamental 2D stress equation. The graphical user interface is designed to conveniently work with experimental data, simulate and automatically fit residual stresses using a sample model.

**General layout**
- Organization of data in folders
- Storage of entire evaluation in a single XML project file
- Convenient 4-workspaces and project tree layout
- Undo/Redo operations
- Area Mapping of residual stresses

**Evaluation of one-dimensional data sets**
- Display complete set of measured and corrected data.
- Correction and smoothing of data
- Diversity of peak evaluation methods
- Regression curve for calculated residual stresses

**Working with two-dimensional data sets (frames from 2D detectors)**
- Display complete set of measured data
- Selection of integration area, subregions and peak rejection parameters
- Correction, smoothing of data
- Diversity of peak evaluation methods
- Calculated residual stresses and evaluated/simulated Debye ring
- sin2y method for 2D data

**Multiple HKL measurements:**
- Use of multiple \{hkl\} reflections for constant stress
- Stress gradients
- Evaluation of 1D and 2D data

**Output and documentation of the results**
- Every graphic can be saved, printed or copied to other applications. Possible file formats: Windows Metafiles, Bitmap, GIF, JPEG, PNG and PCX.
- All the data can be saved or exported via the clipboard. Possible formats: ASCII, XML, HTML or Excel table.
- The complete evaluation can be saved in a project file (XML format) and continued at a later time.
- A log file saves the most important steps.
- The user defined settings of the program are saved for next evaluation
- Pre-defined Print Reports, which can be printed or saved to PDF file

**Material data base**
- Pre-defined data base of elastic constants for most common materials, Bragg reflections, and X-ray sources
- Imperial and SI units

**Simulation**
- sin2y method and fundamental equation for evaluation of 1D data
- fundamental 2D equation for 2D data
- Simulation of theoretical Debye ring for 2D data
- Ellipsoid Lame view

**Automation:**
- Script interface to stress evaluation

Either Windows XP (32 Bit) or Windows 7 (32 Bit / 64 Bit) is required for operation.

**DIFFRACT.MULTEX**

MULTEX combines the design of intelligent measurement strategies with a visual and quantitative evaluation of all essential texture information. It features planning of measurement strategies, calculating and analyzing of pole figures, and the quantification of the Orientation Distribution Function (ODF) by texture components.

MULTEX' pole figure module reads all Bruker AXS data covering 0D, 1D and 2D detectors. All data are automatically structured such that pole figures can be easily calculated. Large amount of data are handled quickly. This is especially necessary for materials with low crystal symmetry or thin films, which require high directional resolution in the pole figures.

MULTEX calculates background, defocussing and absorption for 1D and 2D measurements automatically.

MULTEX imports and exports pole figure data in text format and exports pole figure data to TexEval and POPLA.

MULTEX does not have any restrictions concerning the grids of sample directions in the pole figures. The user can also adapt the pole figure resolution to the expected sharpness of the material's texture. The regular grid is provided as well for backward compatibility.

MULTEX provides a measurement planning tool for 2D detectors. The program makes a suggestion on how to collect the frames. Optionally, the user can tweak the goniometer angles by using mouse navigation.

MULTEX will directly quantify all the texture components in a user defined texture model. Volume parts, preferred orientations and average deviations from ideal orientations can simply be determined after fast interactive texture modelling providing better and more relevant results than other methods for texture analysis.

MULTEX performs the component fit directly in pole figure space. This makes it easy to understand and an excellent method for introducing texture analysis to beginners. It relates maxima in pole figures directly to preferred orientations or directions (fibers) and is therefore easy to visualize.

MULTEX can be applied to modern poly-phase materials with all types of crystal or sample symmetry like metals, compounds, ceramics, rocks etc. It calculates the complete ODF for each crystalline phase.

MULTEX displays complete pole figures for arbitrary (hkl) values and inverse pole figures for normal, transverse and rolling direction (x,y,z of the sample coordinates) based on the calculated texture components. Either Windows XP (32 Bit) or Windows 7 (32 Bit / 64 Bit) is required for operation.

**CM-STICK(USB) SOFTWARE-DONGLE**
Pos. 2  PARALLEL BEAM POLYCAP, SPOT DIAMETER >4 mm

The POLYCAP is an assembly of a huge number of single glass tubes with inner diameters of about 1µm, which are mounted into a metal holder. The individual glass tubes serve as X-ray guides using the effect of total external reflection. The inner surfaces are of extremely low roughness and unevenness to ensure high X-ray reflectivity and therefore transmission. The assembly works as a half lens. On the entrance side the bundle of glass tubes collects a large angle of the divergent beam emitted by the X-ray source (the X-ray focus lies in the focal point of the half lens). On the exit side this beam is converted into a pseudo parallel beam.

The POLYCAP needs a spot focus X-ray tube. It works with all common X-ray wavelengths, from Mo to Cr. The advantage of the POLYCAP is the provided intensity gain compared to slit optics. The full intensity gain of a factor of several hundred is obtained if the whole beam size provided by the POLYCAP can be used to illuminate the surface of the sample. The intensity gain is higher when a longer wavelength is used. The provided beam has a divergence which correlates slightly with the critical angle of total external reflection of the used wavelength. It is recommended to use a parallel beam optics on the diffracted beam side to obtain best performance.

The typical applications of the POLYCAP are high speed and high quality texture measurements or high speed stress or phase identification investigations.

Technical data:
- Output beam divergence: 0.25° for Cu
- Spot diameter: >4.0 mm

Pos. 3  VÅNTEC-500 DETECTOR

The VÅNTEC -500 is a revolutionary photon counting X-ray detector designed for XRD experiments in the very low, medium or high flux regime. It is based on Bruker AXS’ proprietary MikroGap technology. MikroGap™ technology achieves high resolution and low detector noise with a very high dynamic range by combining the advantages of a gaseous detector with the new resistive anode micro-design. The detector uses an inert counting gas, making it extremely radiation hard.

Thanks to these detector properties and the large active area, the VÅNTEC -500 will enhance applications such as Phase ID, Phase Quantification, Texture, Stress, SAXS, SCD, High-Throughput Screening, MicroDiffraction, Mapping, Reciprocal Space Mapping and more.

Fully integrated into the DAVINCI design plug & play concept.

Technical data:
- Active window: 13.5 cm diameter
- For Cu, Co or Cr radiation. Factory settings are optimized for Cu-K-alpha
- Background noise: < 5 x 10^-4 cps/mm²
- Spatial resolution (pitch): 68 micrometer x 68 micrometer
- Gas fill: Xe-CO₂, no operating gas purge required
- Operational conditions:
  - Temperature: 15°C - 30°C (avoid rapid changes)
  - Humidity: max. 80% rel. H. (avoid any condensation)

MOUNT FOR VÅNTÉC-500
measurement height 258 mm
ACCESSORY KIT FOR 2D DETECTOR
Kit contains tools needed for alignment of 2-dimensional detectors as well as sample holders:
- pin with 300 micrometer sphere for alignment of goniometer center
- amorphous Fe foil for detector calibration with Cu radiation
- fixture with different sized Cu wires and Fe and Cu foils of different thicknesses for beam alignment verification
- clamp for holding samples up to 2" (50.8 mm) thick
- pin stubs for Ø 0.5" (12.7 mm) and Ø 1" (25.4 mm) samples

NI FILTER FOR CU-Kβ RADIATION, 0.02MM

DIFFRACT.PILOT
CONTROLLER MOUNTING RAIL 755MM CPL.
LINE CORD 3M 3030 0609

Pos. 4

EXTERNAL CHILLER

External closed cooling-water circuit for cooling of X-ray generator and X-ray tube for outdoor use. Technical data:
- cooling capacity: 4.4 kW (at ambient temperature of 25 °C and 20°C temperature of inlet cooling water)
- stability of water temperature: +/- 1°C
- tank capacity: 25 l
- power supply: 230V / 50 Hz +/-10%
- power consumption: 1.32 kW
- dimensions (w x d x h): 575 x 652 x 805 mm
- weight: 113 kg
- Protection class: IP33

CE LABEL
Technical specifications can be changed with additional parts.
**Termini e condizioni:**

**Consegna:** 2-3 mesi dalla conferma dell’ordine;  
**Rresa:** CIP Vs. Laboratorio (INCOTERMS 2010); il posizionamento della strumentazione all’interno dell’edificio, eventuali opere murarie, stesura cavi e posa interruttori, sono da ritenersi a carico del Cliente.  
Con anticipo di almeno 30 giorni dalla consegna verranno fornite le istruzioni di pre-installazione necessarie al corretto funzionamento della macchina.  
**Installazione e training:** Inclusi nel prezzo del sistema, comprendente:  
- montaggio completo, messa in opera e collaudo finale;  
- istruzione Hardware e Software, presso il vostro laboratorio, utilizzata alla familiarizzazione con la tecnica e all’utilizzo dello strumento.  
**Garanzia:** La garanzia è di 12 mesi dalla data di consegna. Durante detto periodo Bruker si impegna a riparare o sostituire gratuitamente e nel più breve tempo possibile quelle parti che, per difetto di lavorazione o per imperfetto montaggio, mostrassero un malfunzionamento, sempre che ciò non dipenda da imperizia, casi di forza maggiore o da interventi non autorizzati.  
**Ritardi:** In caso di ritardo nella consegna per motivi indipendenti da Bruker, legati al non approntamento del luogo di destinazione delle strumentazione, la fatturazione della quota relativa alla consegna sarà comunque effettuata alla data di avviso di merce pronta.  
**Fatturazione:** 100% alla consegna  
**Pagamento:** 60 gg. dalla data della fattura  
**Modalità:** Mediante bonifico bancario su Deutsche Bank Filiale 3 di Milano  
Codice IBAN: IT96A031040160300000021175  
IVA: esclusa  
**Validità:** 3 mesi

**Bruker Italia S.r.l.**  
AXS Business Unit  
Dr.ssa Lucia Robba
1. GENERAL.

Orders are accepted by Bruker AXS GmbH and Subsidiaries ("Seller") subject to these terms and conditions.

These terms and conditions apply to the exclusion of all other terms. In case of a conflict, inconsistency or addition not expressly accepted in writing by Seller, the terms and conditions of sale provided herein shall be considered as superseding the conflicting, inconsistent or additional terms stated in Buyer’s purchase order, order form, contract or otherwise.

The acceptance of an order will supersede all prior communications and constitute a complete and binding contract between the party purchasing equipment hereunder ("Buyer") and Seller, which contract cannot be modified or canceled without the written agreement of both parties.

2. OFFER / CONCLUSION OF CONTRACT.

Seller’s quotations shall be non-binding and subject to change unless expressly indicated otherwise.

Buyer’s order constitutes a legally binding offer to enter into a contract.

The acceptance of an order shall be by way of a written contract confirmation by Seller (including by email). If no written confirmation is issued, a contract (subject to these terms and conditions) shall take effect by placing at disposal the goods. In this case, Buyer shall waive the receipt of a written confirmation.

3. SHIPMENT.

Seller shall attempt to comply with, but will not guarantee, shipping date and loading and routing instructions. Seller reserves the right to allow or prorate shipments against all orders whenever, in its judgment, an oversold condition exists as to any particular product manufactured or sold by it. In the event of a default by Buyer, Seller may decline to make further shipments without waiving any of its rights under such order. If, despite such default, Seller elects to continue to make shipment, its action shall not constitute a waiver regarding, or otherwise diminish, Seller’s legal remedies with respect to such default or any future default.

Any claims of Buyer for compensation due to the inability to deliver goods, or due to delays in delivery, shall be limited as set forth in Section 15 of these terms and conditions.

4. TITLE AND DELIVERY.

All sales are made EXW factory, Incoterms 2010 and Buyer shall pay all freight, duties, cartage and handling. Title and risk of loss or damage shall pass from Seller to Buyer upon Seller’s putting the material purchased hereunder in good condition into the possession of a common carrier, such carrier acting as Buyer’s agent.

5. PRICES.

Irrespective of any prices quoted by Seller or listed on Buyer’s order, an order is accepted only at the prices shown on Seller’s written quotation (the “Quotation”). Installation of utilities required for equipment is not included in the specified price.

6. PAYMENT TERMS.

(a) Unless agreed otherwise, payment terms shall be as set forth in Seller’s quotations.

(b) Buyer shall be automatically deemed in default upon expiration of the applicable period for payment under the preceding paragraph (a) without the need for a default notice to be issued. During any period of default, the price shall bear interest at the applicable statutory rate for default interest. Seller reserves the right to claim additional damages for default.

(c) All orders are subject to credit approval by Seller. The amount of any credit extended by Seller to Buyer may be changed, and such credit may be withdrawn by Seller. With respect to an order on which credit is not extended by Seller or, if extended, is subsequently withdrawn, shipment or delivery shall be made, at Seller’s election, cash with order (in whole or in part), C.O.D., letter of credit or Sight Draft attached to Bill of Lading or other shipping documents, with all costs of collection for the account of Buyer. If, in the judgment of Seller, the financial condition of Buyer does not justify continuation of production or shipment on the terms of payment originally specified, Seller may require full or partial payment in advance. In the event any proceeding is brought by or against Buyer under any bankruptcy or insolvency laws, Seller shall be entitled, in addition to any other remedies at law or in equity, to (i) stop or divert any shipment in transit, (ii) cancel any order then outstanding and/or (iii) receive reimbursement for its cancellation charges.

(d) Seller shall be entitled to partial performances to the extent that (i) the partial performance can be used by Buyer in the context of the contractually intended purpose, (ii) the performance of the remaining parts is ensured and (iii) Buyer does not incur any additional costs as a result. Each shipment shall be considered a separate independent transaction, and payment therefor shall be made accordingly.
If for any reason the delivery is delayed at Buyer’s request, Seller may store the goods at Buyer’s expense and risk in the name of Buyer.

7. TAXES.

Quoted prices do not include federal, state or local excise, sales, use or similar taxes. Accordingly, in addition to the prices specified on the Quotation, the amount of any applicable excise, sales, use and/or similar taxes will appear as separate items on the invoice and will be paid by Buyer unless prior to shipment Seller receives an appropriate tax exemption certificate from Buyer.

8. ACCEPTANCE / CUSTOMER SPECIFIC ACCEPTANCE (“CSA”).

8.1 Where it has been expressly agreed that Buyer’s acceptance (in the meaning of § 640 German Civil Code) is required, then Buyer will accept the purchased equipment in accordance with the agreed CSA provisions. The parties will give priority to achieving CSA and the purchased equipment shall not be used by Buyer for material production, for development of new processes or for any purposes other than achieving CSA, prior to successful completion or waiver of the CSA provisions.

It is the responsibility of the Buyer to ensure that all the required facilities are ready and site preparation is completed for successful commencement of CSA on delivery of the equipment.

8.2 In the event of a delay in acceptance despite readiness for acceptance, the goods shall be deemed accepted if a) CSA has not been commenced within 30 days after delivery and completed within 60 days after delivery (through no fault of Seller) or b) (if an additional installation has been agreed) CSA has not been commenced within 15 days after any agreed installation and completed within 45 days after any agreed installation (through no fault of Seller), if not agreed otherwise or c) Buyer has started using the goods and 15 days have elapsed since delivery or (if applicable) any agreed installation.

9. FORCE MAJEURE.

Seller shall not be liable for failure to perform occasioned by strikes, lockouts, labor difficulties, riots, inability or difficulty in obtaining or procuring supplies, labor or transportation, fires, storms, floods, earthquakes, explosions, accidents, acts of God, interference by civil or military authorities, whether legal or de facto, acts of the public enemy, war, rebellion, insurrection, sabotage, embargoes, orders given priority by any public authority or any other cause beyond the reasonable control of Seller if such event was not foreseeable at the time when the contract was entered into.

10. PATENTS.

If a third party claims that the purchased equipment infringes that party’s patent or copyright or other intellectual property right, Seller will defend Buyer against that claim and will pay all costs, damages and attorneys’ fees that a court finally awards, provided that Buyer: (a) promptly notifies Seller in writing of the claim, and (b) allows Seller to control, and cooperates with Seller in, the defense and any related settlement negotiations.

If such a claim is made or appears likely, Seller, at its option, may obtain a license to enable Buyer to continue to use the product, may modify the product or may replace it with one that is functionally equivalent if Seller is unable to do either of these things within a reasonable time, the Buyer may rescind the contract or claim a reasonable reduction of the purchase price.

Seller shall not be liable for any claim based on (i) anything Buyer provides which is incorporated into a product, (ii) Buyer’s modification of a product or use thereof other than in its specified operating environment, or (iii) the combination, operation or use of a product with products provided by other manufacturers or other products not provided by Seller as a system.

Any claims of Buyer for compensation shall be limited as set forth in Section 15 of these terms and conditions.

Sale of products or parts thereof does not confer on Buyer any license relating to (i) anything Buyer provides which is incorporated into a product, (ii) Buyer’s modification of a product or use thereof other than in its specified operating environment, or (iii) the combination, operation or use of a product with products provided by other manufacturers or other products not provided by Seller as a system.

11. RESCHEDULING.

If Buyer has been granted by Seller any rescheduling rights, such rights shall be as set forth in Exhibit A.

12. CANCELLATION.

If Buyer has been granted by Seller any additional contractual cancellation rights, such rights shall be as set forth in Exhibit A.

13. ASSIGNMENT.

Buyer shall not assign this order or any portion thereof without the prior written consent of Seller.
14. WARRANTY (“Gewährleistung” in terms of German Civil Code).

(a) Unless these terms and conditions (including Sections 10 and 15) provide otherwise or specify additional terms, the relevant statutory provisions shall govern Buyer’s rights in the case of material or legal defects (“Sach- und Rechtsmängel”).

(b) No warranty shall be provided for standard wear and tear for this type of contract (particularly for filters, lamps, pilot lights, filaments, fuses, mechanical pump belts, probes, V-belts, wafer transport belts, pump fluids, O-rings and seals).

(c) No warranty shall be provided for all used equipment, including demo equipment.

(d) No warranty shall be provided for equipment and system failures resulting from (i) abuse, misuse, modification or mishandling; (ii) damage due to forces external to the machine including, but not limited to, acts of God, flooding, power surges, power failures, defective electrical work, transportation, foreign equipment/attachments or Buyer-supplied replacement parts or utilities or services such as gas; (iii) improper operation or maintenance; or (iv) failure to perform preventive maintenance in accordance with Seller’s recommendations (including keeping an accurate log of preventive maintenance). In addition, this warranty does not apply if any equipment or part has been modified without the written permission of Seller or if any Seller serial number has been removed or defaced.

(e) Specifically excluded from this warranty is all standalone computer and data storage equipment not manufactured by Seller (such as computers, monitors, printers and printer buffers). Such equipment will carry only the original manufacturer warranty.

(f) Unless acceptance (in the meaning of § 640 German Civil Code) has been expressly agreed, Buyer has a duty to inspect delivered goods promptly after they are delivered to Buyer or any third party nominated by it, and promptly report any defects. §§ 377 and 381 German Commercial Code and the terms of this subsection shall apply to goods inspections and defect notifications. The requirement of prompt notification shall be deemed satisfied if a notice of defects is sent, at the latest, within five (5) working days of delivery or, if the defect was not evident at the time of the goods inspection, at the latest within three (3) working days after the defect is identified. Seller assumes no warranty and accepts no other liability for defects if Buyer has failed to properly inspect the goods and/or report defects.

(g) Buyer must give Seller an opportunity to review the complaint, particularly by making available respective goods and their packaging to Seller for inspection. At Seller’s request, the goods subject to complaint must be sent back to Seller. Buyer must contact Seller in advance for authorization to return equipment and must follow Seller’s shipping instructions. Freight charges and shipments to Seller are Buyer’s responsibility.

In the event of a justified defect complaint, Seller shall reimburse the costs of the least expensive shipping method; this shall not apply if the shipping costs are increased because the goods are located somewhere other than the place of contractually agreed use.

(h) If the goods are in fact defective, Seller will cover the necessary expenses for the purpose of examining the goods and effecting supplementary performance, particularly including transport, infrastructure, labor and material costs. Supplementary performance shall not include either dismantling and removing the defective item or re-installing a non-defective item if Seller had no installation obligation originally. However, if Buyer’s request to remedy a defect proves to be unjustified, Seller may require Buyer to reimburse Seller’s costs.

(i) If the delivered goods are defective, Seller shall be entitled to its choice of supplementary performance (“Nacherrfüllung”), either by rectifying the defect (repair) or by providing a new, non-defective item (replacement).

(j) If it is not possible to effect supplementary performance or if the attempt to supplementary performance is unsuccessful, or if the reasonable period for effecting supplementary performance has expired without result or can be dispensed with according to statute, Buyer may, at its election, rescind the contract or reduce the purchase price. However, there is no right of rescission in the case of minor defects.

(k) Any claims of Buyer for compensation shall be limited as set forth in Section 15 of these terms and conditions.

15. LIMITATION OF LIABILITY.

15.1 Further claims by Buyer, particularly for damage compensation in place of performance and compensation for other direct or indirect loss – including accompanying or consequential loss, regardless of legal grounds – are hereby excluded. This shall not apply if:

(a) Seller has fraudulently concealed a legal or material defect or has provided a guarantee for its absence, or for a characteristic of the goods;

(b) The damage is due to intent or gross negligence on the part of Seller, one of its legal representatives or assistants, or is due to a negligent violation of material contractual obligations on the part of Seller or these persons. Material contractual obligations are obligations whose fulfillment is material to due and proper implementation of the contract and which the contractual partner regularly expects and can trust to be fulfilled. However, in the event of simple negligence, Seller’s liability for damages other than personal injury or damage to health shall be limited to the foreseeable loss typical for this type of contract;

(c) A culpable breach of obligations on the part of Seller or its legal representatives or vicarious agents has led to personal injury or damages to health; or
(d) Seller is liable under the German Product Liability Act ("Produkthaftungsgesetz").

For the avoidance of any doubt, the foregoing provision in Section 15.1 does not imply a change in the burden of proof to the detriment of Buyer.

15.2 The provisions of Section 15.1 shall apply correspondingly to any direct claims by the Buyer against Seller’s legal representatives and vicarious agents.

15.3 Contractual penalties (penalties for non-performance, flat-rate damages, etc.) to which Buyer is subject by a third party can only be claimed as damage compensation from Seller – regardless of the other requirements – if this has been expressly agreed in advance between Buyer and Seller or if Seller has been expressly informed in writing of a potential contractual penalty agreed between Buyer and a third party before the conclusion of the contract with Seller.

15.4 In every case, the statutory provisions for final delivery to a consumer who is a private individual shall remain unaffected (supplier’s recourse as per §§ 478, 479 German Civil Code).

16. LIMITATION PERIOD.

16.1 In deviation from § 438 (1) no. 3 German Civil Code, the limitation period for claims based on material or legal defects (including those not based on the contract) shall be 12 months from the date of delivery; however, the foregoing shall not apply in the cases described in Section 15.1 (a) to (d) of these terms and conditions. The applicable statutory limitations period shall apply in those cases. If an acceptance in the meaning of § 640 German Civil Code has been agreed, the periods shall begin upon acceptance.

16.2 The limitation period in the event of supplier’s recourse as per §§ 478, 479 German Civil Code and the limitation periods set forth in § 438 (1) no.1 and no. 2 and 438 (3) German Civil Code shall remain unaffected.

17. NONSOLICITATION.

Buyer will not solicit the employment of any employee of Seller who has come into contact with Buyer in connection with the products or services provided to Buyer hereunder.

18. COMPLIANCE WITH LAWS.

(a) The performance of each party hereunder is subject to compliance with all applicable laws.

(b) Buyer understands that exports and re-exports of Seller’s products and any related software, service, technical assistance, training and related technical data, and any media in which any of the foregoing is contained (the “Items”) may be subject to German, European, U.S. and foreign trade controls, customs, anti-boycott and economic sanctions laws, regulations, rules and orders (the “Export Laws”). In addition to any other remedy it may have, Seller may suspend or cancel the export, delivery, installation, or any maintenance or repair service of any Item if (a) Seller has not received all export-related documentation requested by Seller, including end-user certificates, (b) Seller has not received the governmental approvals that Seller deems to be required, or (c) Seller believes that such activity may violate any Export Laws or Seller’s own compliance policies.

Buyer shall only use the Items for non-military, peaceful purposes. Buyer shall not export, re-export or otherwise transfer or provide any Item in contravention of any applicable Export Law or any end-user certificate provided by Buyer, including to an embargoed or otherwise sanctioned country, to anyone listed on any applicable prohibited persons list published by the U.S., the UN, the EU or the OSCE, or for a prohibited end-use (such as research on or development of chemical, biological, or nuclear weapons, unmanned air vehicles or missiles, or nuclear explosive or fuel cycle activities). Buyer must notify Seller before providing any technical data to Seller that is controlled under any applicable Export Law. Seller will not be liable to Buyer for any loss or expense if Buyer fails to comply with any Export Law.

(c) Buyer will comply with all applicable import laws or other restrictions or conditions respecting the import of Items that are now in effect or are hereafter imposed by any government or other applicable jurisdiction. Buyer shall be responsible for obtaining any necessary import permit, license or authorization at its sole cost and expense. Buyer shall immediately notify Seller if an import permit, license or other authorization is required in connection with any such import.

19. APPLICABLE LAW / PLACE OF JURISDICTION.

The contract created hereby shall be interpreted and construed under the laws of Germany, without regard to the choice of law provisions thereof and not including the U.N. Convention on Contracts for the International Sale of Goods.

The place of exclusive (and international) jurisdiction for any and all disputes arising out of or in connection with the Seller’s business relations with the Buyer shall be the place of Seller’s registered office. However, Seller may also sue Buyer in the place of its domicile.

20. SEVERABILITY CLAUSE.

If individual provisions of these terms and conditions should be void or invalid in whole or in part, this shall not affect the validity of the remaining provisions. In place of any provisions which are invalid or not incorporated into the contract primarily the statutory provisions shall apply. In all other cases, the Parties shall agree a valid provision to replace the invalid or unenforceable provision which reflects as closely as possible the original economic purpose, provided a supplementary interpretation of the contract does not have precedence or is not possible.
EXHIBIT A
ADDITIONAL PROVISIONS

1. Rescheduling.

Buyer is entitled to request a one-time rescheduling of the delivery against payment of a "Rescheduling Charge". The charges shall be determined as follows and shall be due and payable within ten (10) days of the rescheduling:

<table>
<thead>
<tr>
<th>Number of Weeks of Rescheduling Requested</th>
<th>Rescheduling Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4 Weeks</td>
<td>No Charge</td>
</tr>
<tr>
<td>5 to 12 Weeks</td>
<td>15% of Purchase Price</td>
</tr>
<tr>
<td>13 to 26 Weeks</td>
<td>35% of Purchase Price</td>
</tr>
<tr>
<td>27+ Weeks</td>
<td>Order Considered Canceled</td>
</tr>
</tbody>
</table>

More than one rescheduling of an order will be considered a cancellation of the order. Sixty-six percent (66%) of the rescheduling charge shall be applied against the purchase price if the order is subsequently shipped or against the cancellation charges if the order is subsequently canceled. On any order that is rescheduled and subsequently canceled, cancellation charges will be based upon the time between the originally scheduled delivery date and the date of notice of cancellation.

2. Cancellation.

Buyer is granted a contractual right to cancel any order against payment of a "Cancellation Charge". In the event of attempted cancellation by Buyer of any order, Buyer shall pay Seller a cancellation and re-stocking charge based upon the timing of the attempted cancellation notice as follows:

<table>
<thead>
<tr>
<th>Days Attempted Cancellation Notice Given Before Confirmed Shipment Date of Order</th>
<th>Cancellation Fee Equals the Following Percentage of Purchase Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 90 Days</td>
<td>35% of Purchase Price</td>
</tr>
<tr>
<td>61 to 90 Days</td>
<td>50% of Purchase Price</td>
</tr>
<tr>
<td>31 to 60 Days</td>
<td>75% of Purchase Price</td>
</tr>
<tr>
<td>0 to 30 Days</td>
<td>100% of Purchase Price</td>
</tr>
</tbody>
</table>

Higher cancellation charges, up to the full value of the order, may apply in the case of special, custom or modified equipment.