Automated NDT Systems & Service

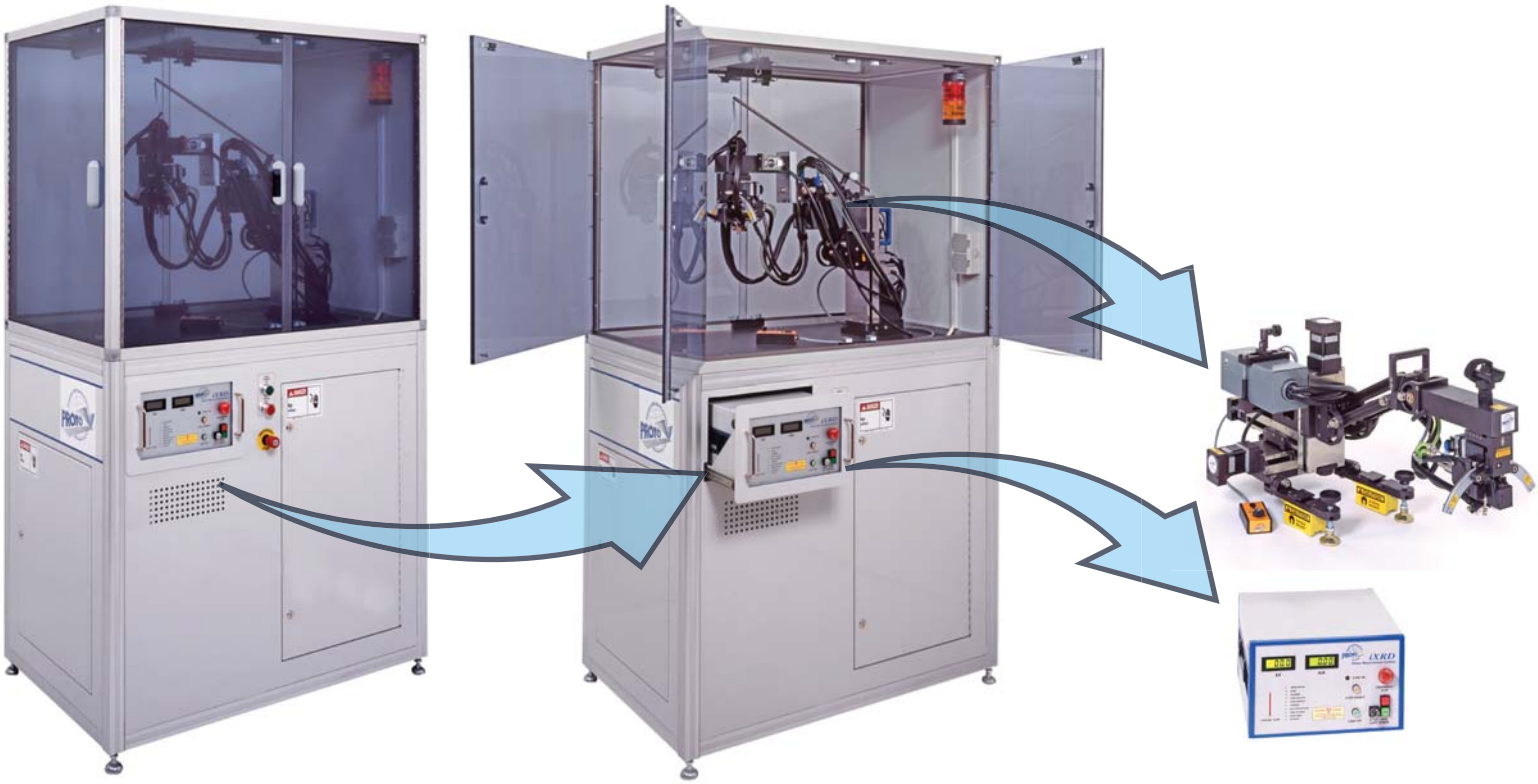
PROTO

Manufacturing

AUTOMATED RESIDUAL STRESS ANALYSIS

iXRD Combo

Laboratory & Portable Non-Destructive Residual Stress Measurement System



A world of solutions

iXRD Combo

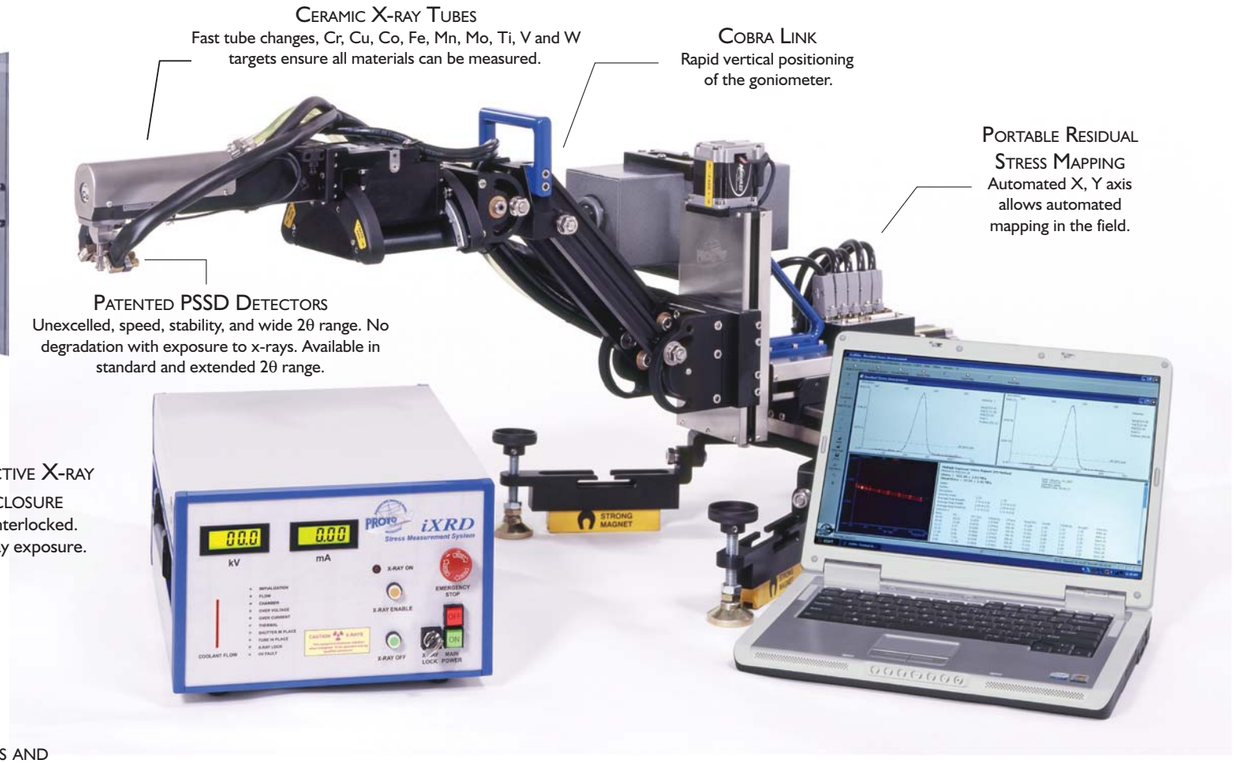
Lab and Portable High Speed Measurement

The iXRD Combo combines the versitility of the iXRD with the convenience and safety of a fully interlocked enclosure. Easily transformed from a lab system into a portable system in minutes, the iXRD Combo is ideally suited for customers who need a laboratory system but also need the ability to work in the field when required.

iXRD Combo is available with a standard or widebody enclosure for large part capacity, flexible goniometer and field stand options, and optional laboratory residual stress mapping.

Protective X-ray Enclosure
Fully interlocked.
No x-ray exposure.

Wheels and Level Pads
Easy to move



Goniometer Options

MG40P

Our standard portable goniometer. With a 40 mm focal distance and a 30 mm x-ray tube the MG40P offers a good balance between size and versatility. Can measure inside a 120 mm diameter bore.

MG30P

With a 30 mm focal distance and a 16 mm x-ray tube the smaller MG30P is ideal for those tight locations.Can measure inside a 90 mm diameter bore.

MGR40P

With built-in phi axis rotation the MGR40P allows for fully automated triaxial measurements in the field.

Field stand options

FS2

A low cost basic stand for added flexibility in the field
Standard features:
Automated or manual Z-axis, Cobra-link for flexible positioning of the goniometer, magnetic feet, adjustable foot pads.

FS4

Our most popular stand for portable stress measurement
Standard features: Automated X, Y and Z-axis, full-featured field residual stress mapping, Cobra-link for flexible positioning of the goniometer, magnetic feet, adjustable foot pads.

FS5

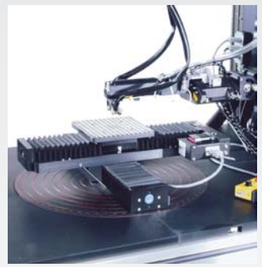
Our new lightweight fully-automated field stand for portable stress mapping
Standard features: Automated X, Y and Z-axis, full-featured field residual stress mapping, Cobra-link for flexible positioning of the goniometer, adjustable foot pads, light weight. Interchangeable magnetic feet and suction cup feet for mounting to non magnetic structures such as aircraft wings.

Enclosure options

BASIC

A basic enclosure with an automated Z-axis.

LABORATORY MAPPING



Automated X, Y & Φ axis for full featured laboratory mapping. Can be added to either standard or widebody enclosure.

WIDEBODY

Optional oversized enclosure for increase part size capacity.
Standard Dimensions:
1040 x 660 x 1820 mm
Widebody Dimensions:
1090 x 860 x 1820 mm
(l x w x h)

iXRD Combo Specifications

iXRD Instrument Module
Light weight, compact field proven performer the iXRD has set the standard for portable residual stress analysis instrumentation. Built in high voltage generator, self contained recirculating high efficiency liquid to air heat exchanger and the necessary electronics to run the goniometer and field stand of your choice.

Weight
iXRD Module 14.7 kilograms

Dimensions
iXRD power unit L x W x H: 41cm x 29 cm x 19 cm

Operating Temperature Range
0°C to 35°C non-condensing humidity

Power Requirements
90-265 VAC 50/60hz 10 amps

Goniometers
ψ (Omega) geometry or χ (Side inclination) geometry
Manual and automatic focusing.
MG40P & MGR40P - 40 mm focal distance
MG30P - 30 mm focal distance
Fully adjustable ψ, X, Y, Φ, range and oscillation
"Through the collimator" spot indicator.

Apertures
"Snap in" style apertures can be changed in seconds.
Standard set: 0.5, 1.0, 2.0 mm round, 0.5x3, 3x0.5, 1x3, 3x1, 0.5x5, 5x 0.5, 1x5, 5x1, 1.5x5, 5x1.5 mm
Extended set: 0.2, 1.5, 2.5 mm round, 2x5, 5x2, 0.2x3, 3x0.2, 0.5x2, 2x0.5, 1x2, 2x1mm
Large grain aperture set: 3.0, 4.0mm round, 2x3, 3x2, 2x5, 5x2, 2.5x5, 5x2.5, 1.5x4, 4x1.5, 2x4, 4x2 mm
Stress profiling and mapping aperture set: 0.2 mm round 0.2x3, 3x0.2, 0.2x5, 5x0.2, 0.5x2, 2x0.5, 1x1, 2x2, 1x2, 2x1mm
Custom apertures also available.

X-ray Detectors
Patented position sensitive scintillation detectors (PSSD). These x-ray detectors provide unexcelled speed, stability and wide 2θ range, and, unlike other x-ray detectors, do not deteriorate with exposure to x-rays. No expensive replacements required. The detectors can be quickly positioned in ψ (Omega) geometry or χ (Side inclination) geometry. Two detectors for unsurpassed accuracy and speed. Available in standard and extended 2θ range.

Detector Spectra Window
MG40P & MGR40P - 18.18 degrees 2θ per detector
MG30P - 24.09 degrees 2θ per detector

2θ Range
123°-171° is standard, extended ranges are available. Detectors are easily moved into position and secured by hand along the arcs.

X-ray Tubes
Proto manufactures its own line of x-ray tubes specifically designed to enhance the performance, reliability and capabilities of our laboratory and portable x-ray diffraction systems. Our unique designs have advanced the state-of-the-art in x-ray tube performance, size and ruggedness. Our fine focus x-ray tubes feature an advanced ceramic body with optimized liquid cooling.

Available in miniature (30mm diameter) tubes for the MG40P goniometer and micro (16mm diameter) tubes for use in the MG30P goniometer. Available x-ray tube targets include Cr, Cu, Co, Fe, Mn, Mo, Ti, V and W, with nominal power ranges from 40 to 300 watts depending on the target material and x-ray tube size. Custom x-ray tubes and targets are also available. Water cooled with quick disconnects. Pre aligned x-ray tubes can be exchanged in less than 3 minutes.

Filters
Kβ filters are placed in front of the PSSD detectors in pre-machined slots and are supplied in pairs with each Proto x-ray tube, appropriate to x-ray tube target material.

Safety
8 m cable between goniometer and power unit.
Warning light beacons for x-ray on and shutter open mounted on a magnetic stand for easy positioning and maximum visibility.

Laptop
Proto provides the latest generation brand name laptop computer with each iXRD.

Software
Powerful yet easy to use XRDWin 2.0. A comprehensive Windows™ based data collection and stress analysis package Linear and elliptical regression, Dolle-Hauk method, triaxial method. Parabolic, Gaussian, Pearson VII, Cauchy, centroid, centered centroid, mid-chord fitting. Graphical display of "d", "2θ", "intensity", "breadth", "FWHM" vs. $\sin^2\psi$ or $\sin^2\chi$. Residual stress mapping with 3D map display. X-ray elastic constant determination. Principle stress calculator, material removal corrections, depth of penetration correction. Retained austenite measurement. Inline inspection monitor.

Accessories
Field stands: #2, #4, #5
Alignment scope.
Custom field stands and goniometers.
Custom enclosures and inline inspection rigs.
Extended warranty and maintenance agreements are available.

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