

**KONHA KOSIS F TECHNICAL DESCRIPTION IN ACCORDANCE
WITH KOZLODUY NPP EAD DOCUMENT NO. 58728**

23.09.2026.

Commercial Department

Ref. No. KON-KNPP-001/26

Kozloduy NPP EAD
3321, Kozloduy
Bulgaria

Subject: RESPONSE TO MARKET RESEARCH No. 58728

Dear Sirs,

In response to the Market research No. 58728 titled "Supply of a system for eddy current testing, ultrasonic inspection, and the installation and removal of mechanical plugs on the heat exchanging tubes of ПГВ-1000M type steam generator" we hereby include, attached to this letter, our indicative proposal.

For any query you may have, please contact Berislav Nadinic
(bnadinic@konha.hr, +385 99 4920470)

Faithfully yours,

заличено на основание
чл. 5, пар. 1, б. „в“ от
Регламент (ЕС) 2016/679

KONHA
SAVJETOVANJE d.o.o.
Zagreb, Palinovečka 19k

Berislav Nadinic
KONHA CEO



INDICATIVE PROPOSAL FOR MARKET CONSULTATION 58728

1. Detailed technical description is given in Appendix 1
2. Indicative price

Indicative price for requested inspection and plugging and unplugging system is:

9 732 500,00 Euros
(nine million seven hundred thirty-two thousand five hundred Euros)

3. Warranty

Warranty is 24 months after SAT in Kozloduy NPP facility.

Notes:

1. Technical description attached to this letter is giving basic information about KONHA Ltd. equipment. All details will be given in tender documents.
2. KONHA Ltd confirm that its equipment fully and absolutely satisfies **all** requirements of Kozloduy NPP Technical specification.
3. KONHA Ltd. claim that its equipment, as well its choices related to third party goods like instruments, third party software, etc. can be changed in accordance with Koyloduy NPP preferences, without any change of total price.

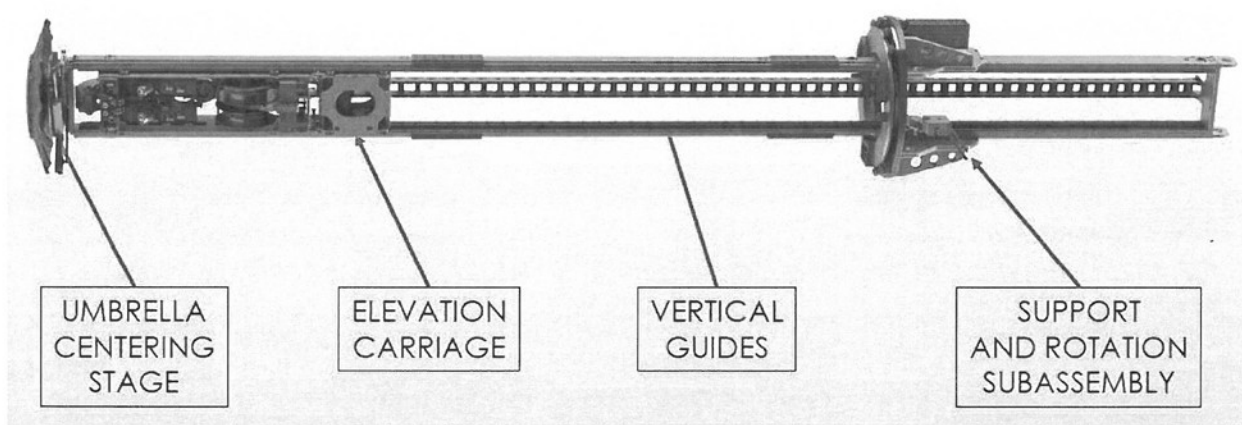
Appendix 1. Technical description

1. Manipulator providing vertical and horizontal (rotational) movement relative to tube sheet – 4 units

KONHA KOSIS F manipulator consists of the following parts, see Figure 1.1:

Figure 1.1. Main parts of KOSIS F manipulator

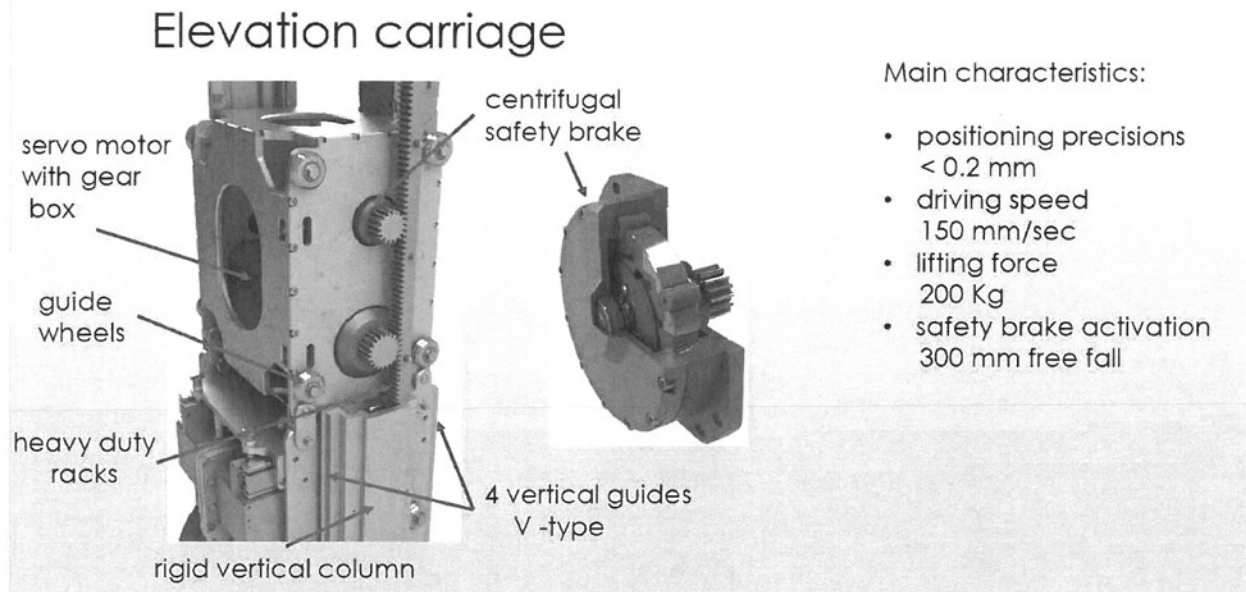
Main manipulator assembly



Elevation carriage parts are presented on Figure 1.2.



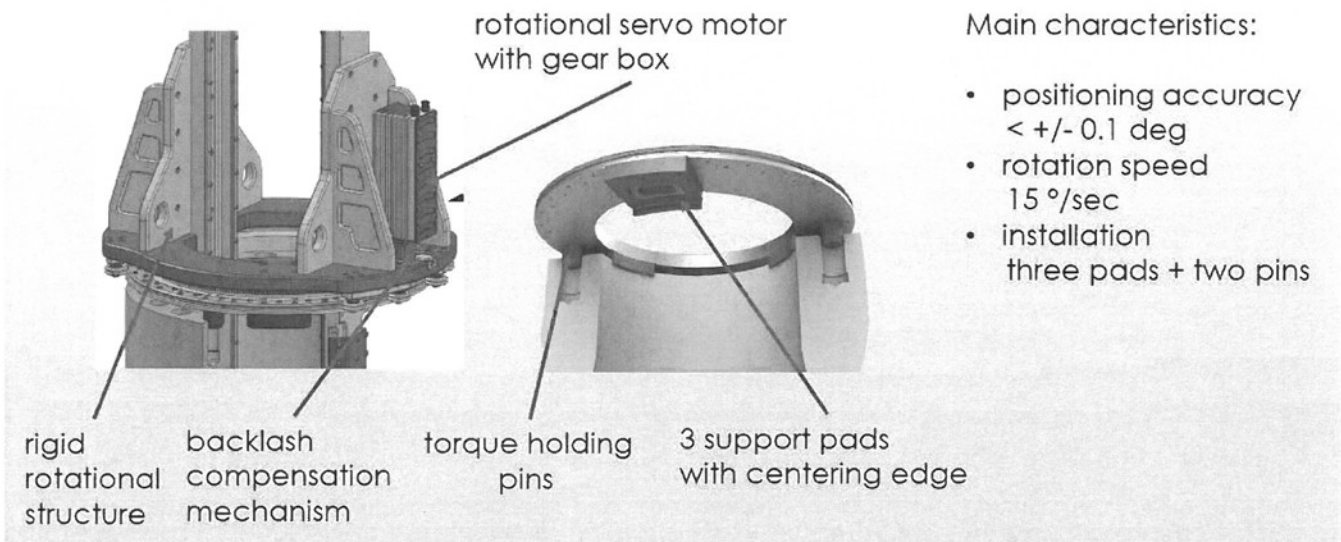
Figure 1.2 Elevation carriage parts



Support and Rotation assembly are presented on Figure 1.3.

Figure 1.3 Support and Rotation assembly

Support and rotation subassembly



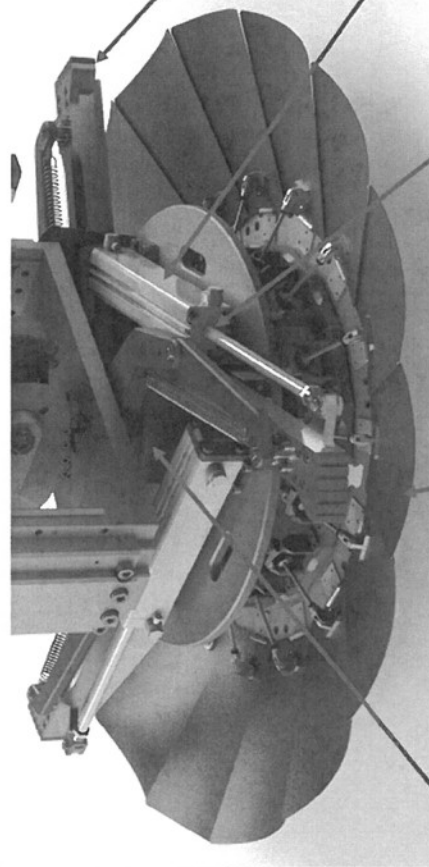
Protection umbrella with centering device is presented on Figure 1.4.

Figure 1.4 Protection umbrella with centering device

Umbrella and centering stage

Main characteristics:

- centering precisions
< 2 mm
- centering holding force
2000 N
- rotation
+/- 360 deg - multiturn



3 support legs
120 deg

pneumatic
rotational joint

16, each pneumatically
actuated lattices

synchronization
mechanism

3 pneumatics
cylinders



2. Device for moving the probes along the length of the heat exchanging tubes – 8 (eight) units.

Eddy current module which consists of 2 pushers per one manipulator (in total 8 push pullers) is described in the following Figures: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9 and 2.10.

Figure 2.1 ET module general technical characteristic

ET MODULE – general working characteristics

Two independently driven pusher
able to work with **Ø8.0 to Ø11.5** probes
type: bobbin , array and rotating probe

Working capacity:

bobbin probe – **7000 half tubes per 24 hours**
array probe for ligaments- **1000 per 4 hours**

Setup time : **6 hours** from cart "тележка" to
first tube – start of inspection

Preparation personnel :

1 mechanical expert + 1 asistent
1 NDT ET / operator

Polar crane usage: **2 x 30 min.**

30 min. "тележка" – assembling place

30 min. Assembling and testing place -- collector

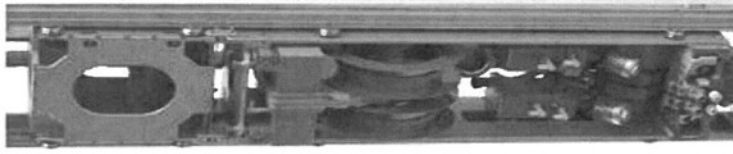
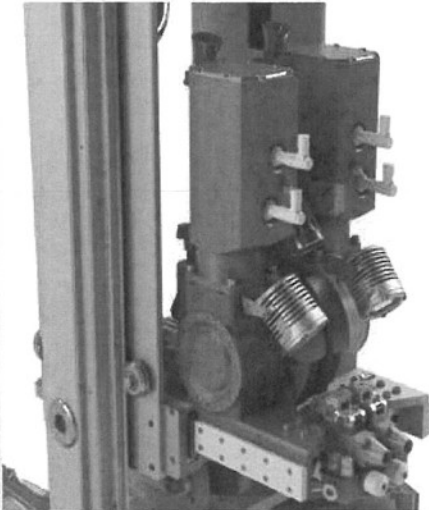


Figure 2.2 Pushers general technical characteristics

ET MODULE: Pusher - General technical characteristic



Push puling speed : 0 - 2000 mm/sec

- push and pulling speed separately defined by operator
- acceleration and deceleration separately setttable
- jog movement also are possible

Push puling force : 550 N (max. 950N)

- real time display of applied force and position by graph
- safety stop on setup max. force

Mechanically actuated " sensi coil "

- position repeatability les than 2 mm on 10m span

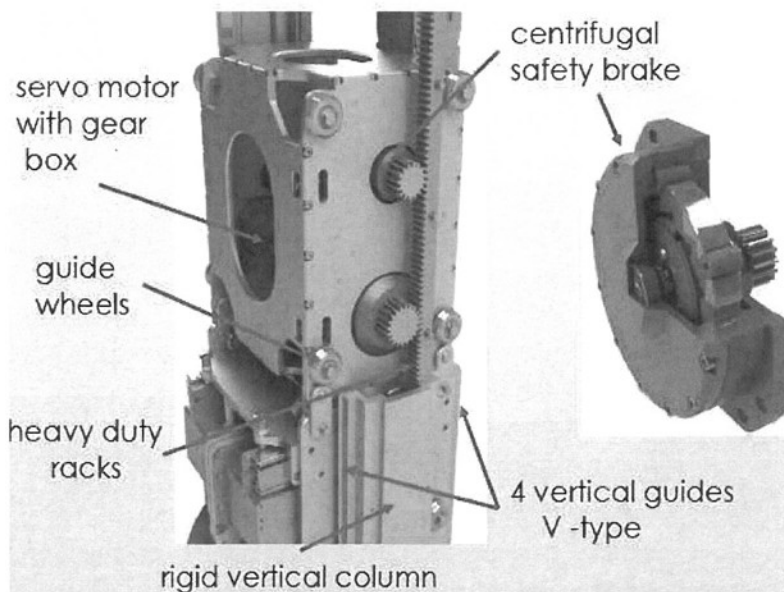
Automatic tube blowout submodule "сушка "

- remove residual water in tubes which need to bye tested

Laser assisted positioning during calibration

Figure 2.3. KONHA Elevation carriage

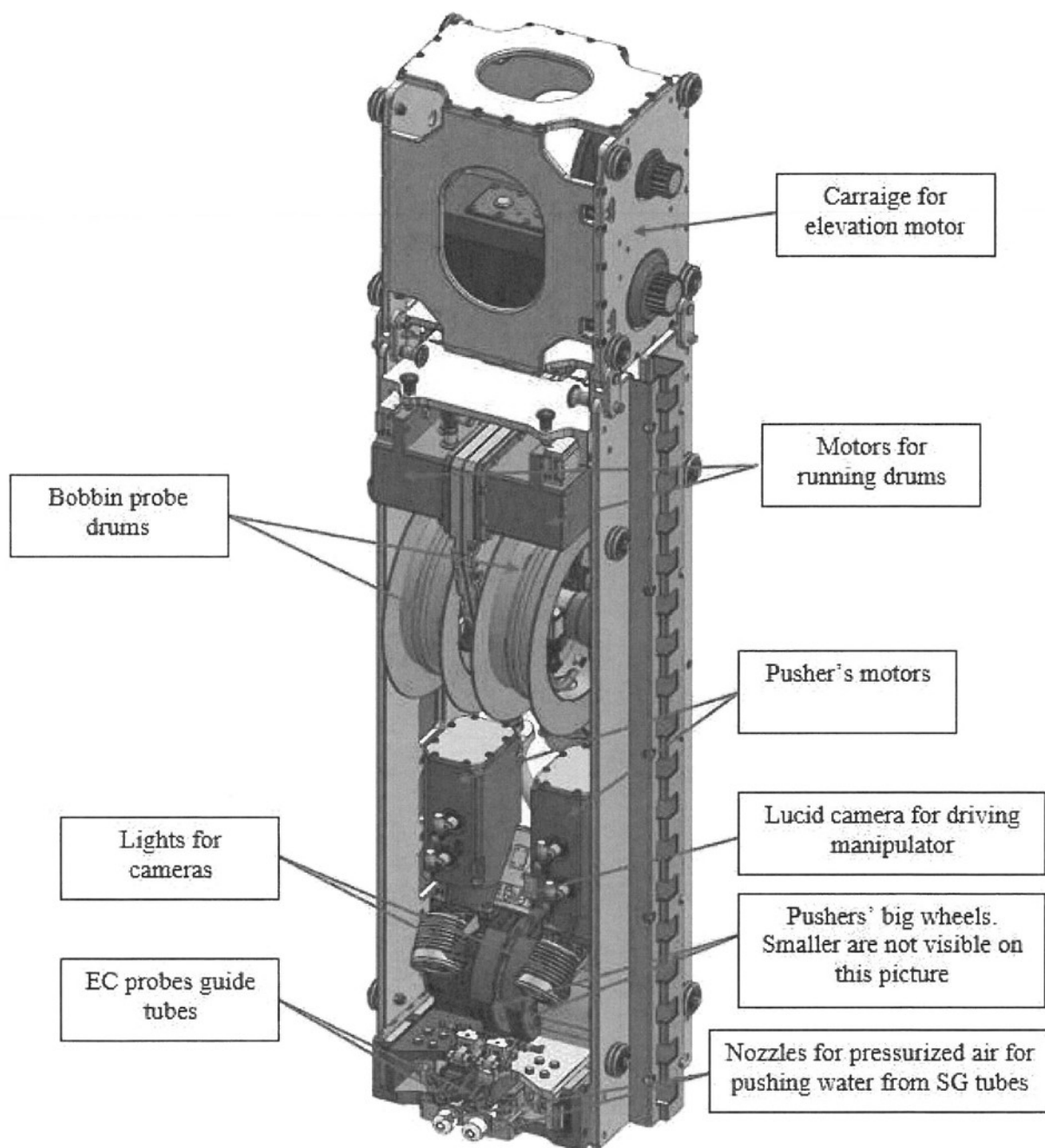
Elevation carriage



Main characteristics:

- positioning precisions < 0.2 mm
- driving speed 150 mm/sec
- lifting force 200 Kg
- safety brake activation 300 mm free fall

Figure 2.4. KONHA ET module main parts

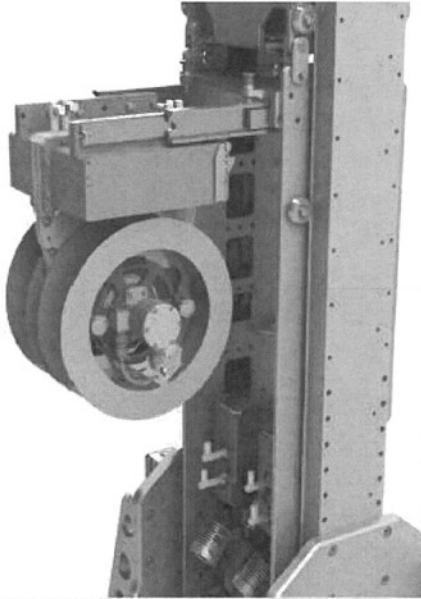


The advantages of KONHa design are the following:

1. No any springs inside drums for which you never know when they will break.
2. Instead springs KONHA has additional electrical motors (identical as pusher motors) for each probe which work in parallel with pusher motors, keep all the time appropriate tension between pusher motors and drum motors. See Figure 2.5.
3. In the case that pusher motor fail because of any reason, drum motor will pull the probe out from steam generator tube. In other designs when pusher motor fail it is extremely difficult to pull the probe out of SG tube.
4. In the case that probe stuck in SG tube operator has 2-time greater pull force that in other designs.
5. The radius of bend through probe has to pass in its way to SG tube is several times greater than in present Kozloduy NPP manipulators. This means that probes life is significantly larger than in present design. In other words, probe wastage is 3 to 4 times smaller than in present Kozloduy NPP equipment. See figure 2.6.
6. Design of pusher with one big wheel and 6 small wheels assure the work with same sets of wheels on the level of inspection of 80 000 half tubes without any changes. See figure 2.6.
7. Electric motors used by KONHA are state of the art electric motors which are more powerful than motors used now by Kozloduy NPP manipulators with many additional advance features related to their regulation, calibration and smooth operation.

Figure 2.5. Servo actuated bobbin probe drums

Servo actuated bobbin probe drums



- each drum is driven by a servo motor
- the capacity of each drum is 20 m
- the drive motors are synchronized with the pusher motors
- tension control of winding
- drums contribute with extra pulling force and reduce slip on the pusher
- a mechanism for easy drum replacement has been implemented

Typical probe change time is less than 6 min.
(tube to tube with calibration)

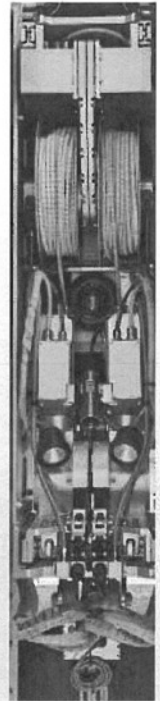
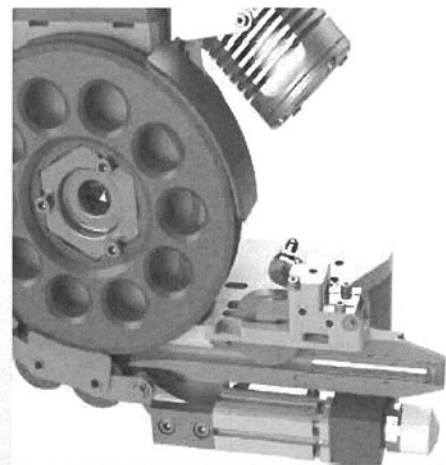
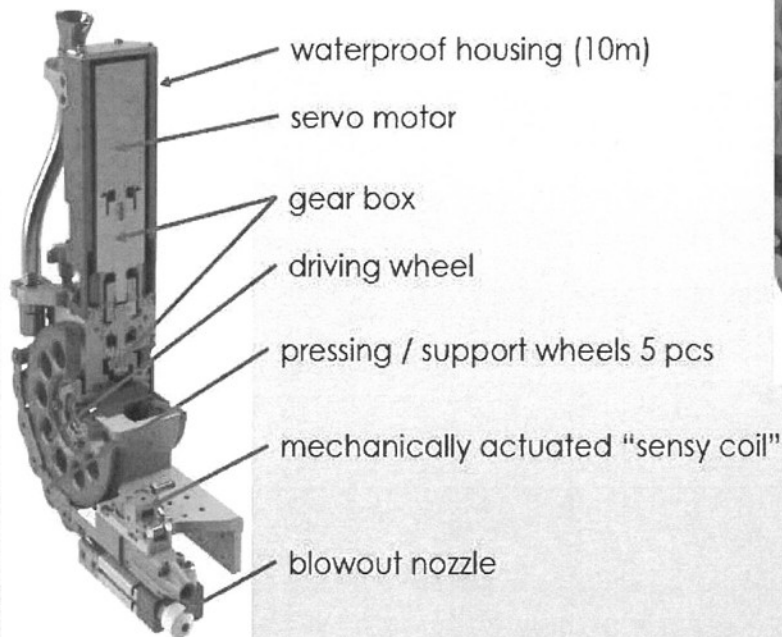


Figure 2.6. KONHA pusher detailed view

Pusher – detailed view

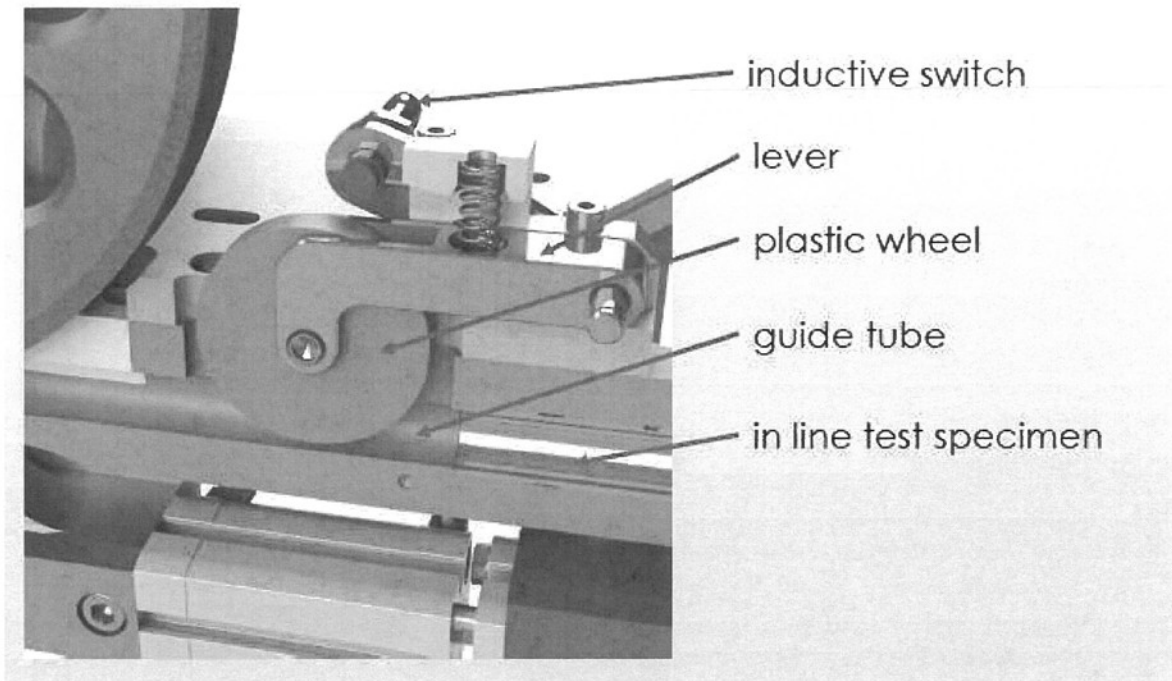




KONHA pusher has mechanically actuated mechanism for turn off pusher work. This mechanism never failed in comparison with sensing coils which fail very often. See Figure 2.7.

Figure 2.7. Mechanical mechanism for automated pusher stops

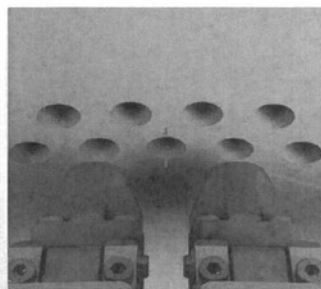
Mechanically actuated " sensi coil "



KONHA has laser cross for speed determination of tubes for calibration of manipulator position, as well as, monitoring manipulator during data acquisition. See Figure 2.8.

Figure 2.8. Laser positioning system.

Laser assisted positioning during calibration



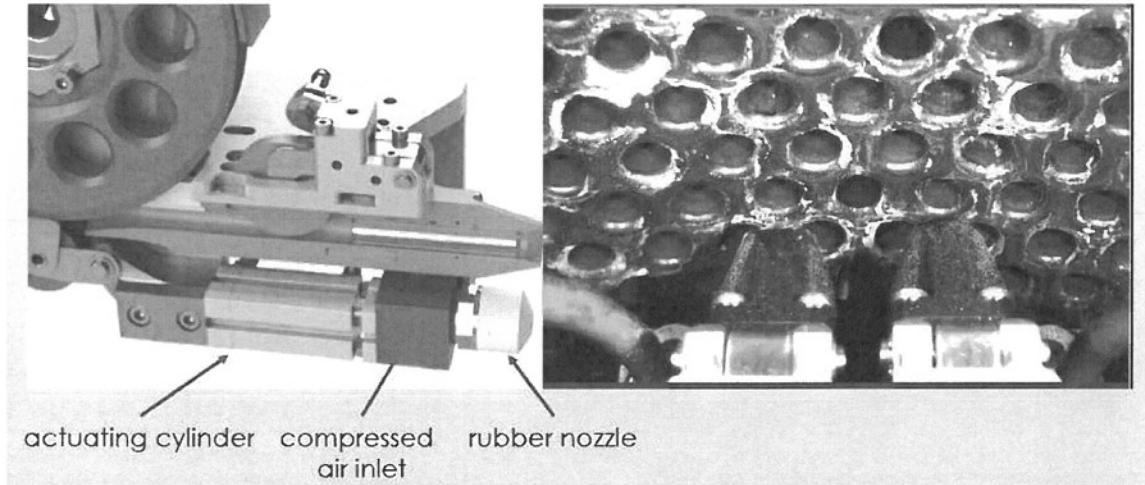
The purpose of this feature is to facilitate the primary calibration of manipulator positions

KONHA Eddy current module has automatic blowout submodule which can be used for

pushing out water from steam generator tubes, as well as, drying of SG tubes before inspection. See Figure 2.9.

Figure 2.9. Automatic blowdown submodule.

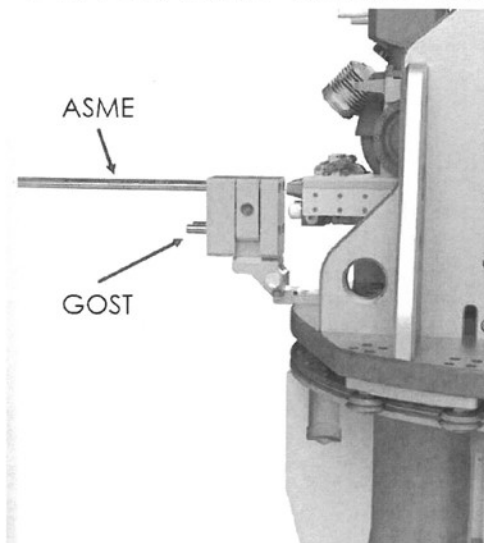
Automatic tube blowout submodule "сушка"



Automatic calibration after change of probes or at beginning and end of each calibration group and it is performed totally automatically. See Figure 2.10.

Figure 2.10. Automatic calibration

Automatic calibration



The system has the possibility to perform calibration without the presence of an assistant

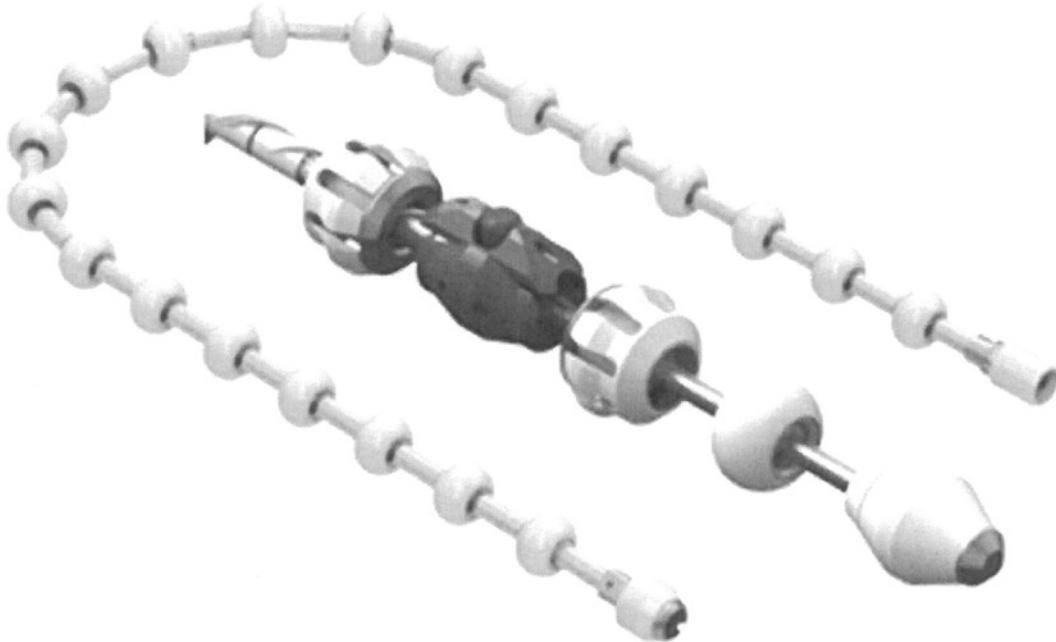
The calibration protocol is pre-programmed in software

KONHA pusher module can use bobbin probes, rotating probes (plus point, pancake), array probes of any kind, X probes, etc.).

Bobbin probes



Rotating probes with pancake or plus-point coils



Array probes based on pancake or plus point coils (4x1, 4x2, 8x1, 8x2, X probe)

8x2 plus point



X probe



3. Module for eddy current testing of the ПГВ-1000M-type steam generator collector material using a ПНВ-2/ПНВ-3 or equivalent probe – 2 units (the modules are compatible with any manipulator).

For using ПНВ-2/ПНВ-3 or equivalent probe the special module is used. See Figure 3.1 of this module un transport mode and on Figure 3.2 in working mode

Figure 3.1. Module for use of ПНВ-2/ПНВ-3 or similar probe for inspection of collector material in transport mode

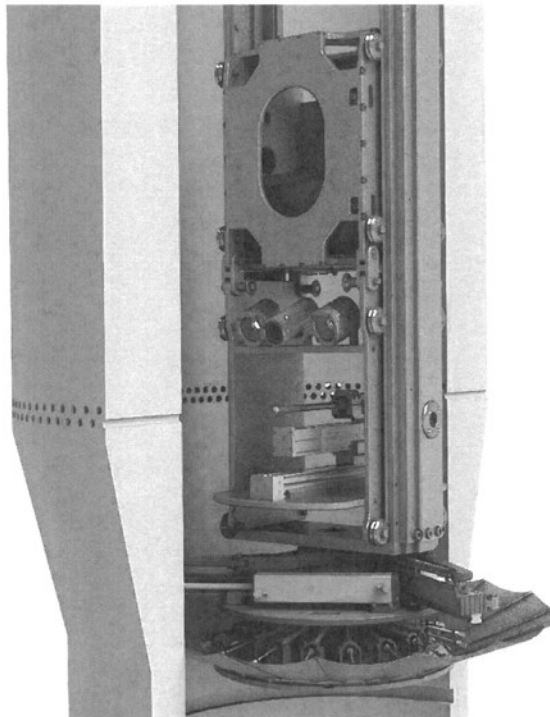
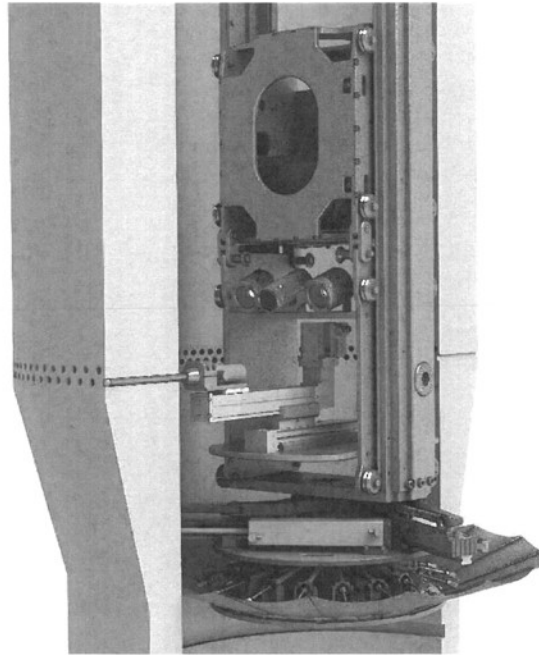


Figure 3.2. Module for use of ПНВ-2/ПНВ-3 or similar probe for inspection of collector material in working mode



The ПНВ-2/ПНВ-3 probe is given on next Figure 3.3.





Probe characteristics are the following:

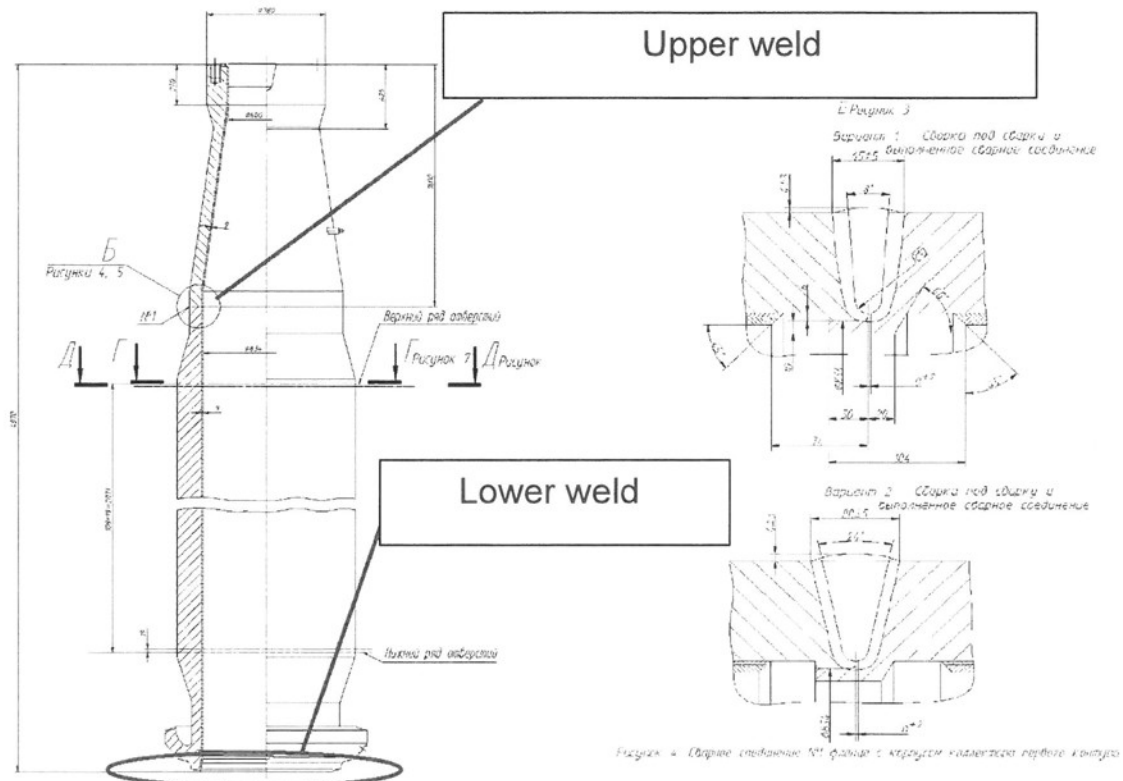
Basic parameters are:

- Total length: 332 mm
- Probe body diameter 32 mm
- Diameter of the measuring part of the probe with the coils 12,3 mm
- Effective length of the probe - 176 mm
- Probe rotation speed – up to 7000 rot/min

4. Ultrasonic inspection module (shall be compatible with any manipulator) for welded joints No. 35/Z (between the collector flange and the tube sheet, and between the tube sheet and DN 850) of the ПГВ-1000M-type steam generator collector – 1 unit.

In accordance with technical requirements two collector welds have to be examined, upper weld and lower weld. See Figure 4.1.

Figure 4.1 Collector welds which have to be examined with UT equipment



KONHA UT module for examination of Upper weld is given on Figure 4.2 and Figure 4.3.

Figure 4.2 KONHA UT module characteristics

UT/VT MODULE – general technical description

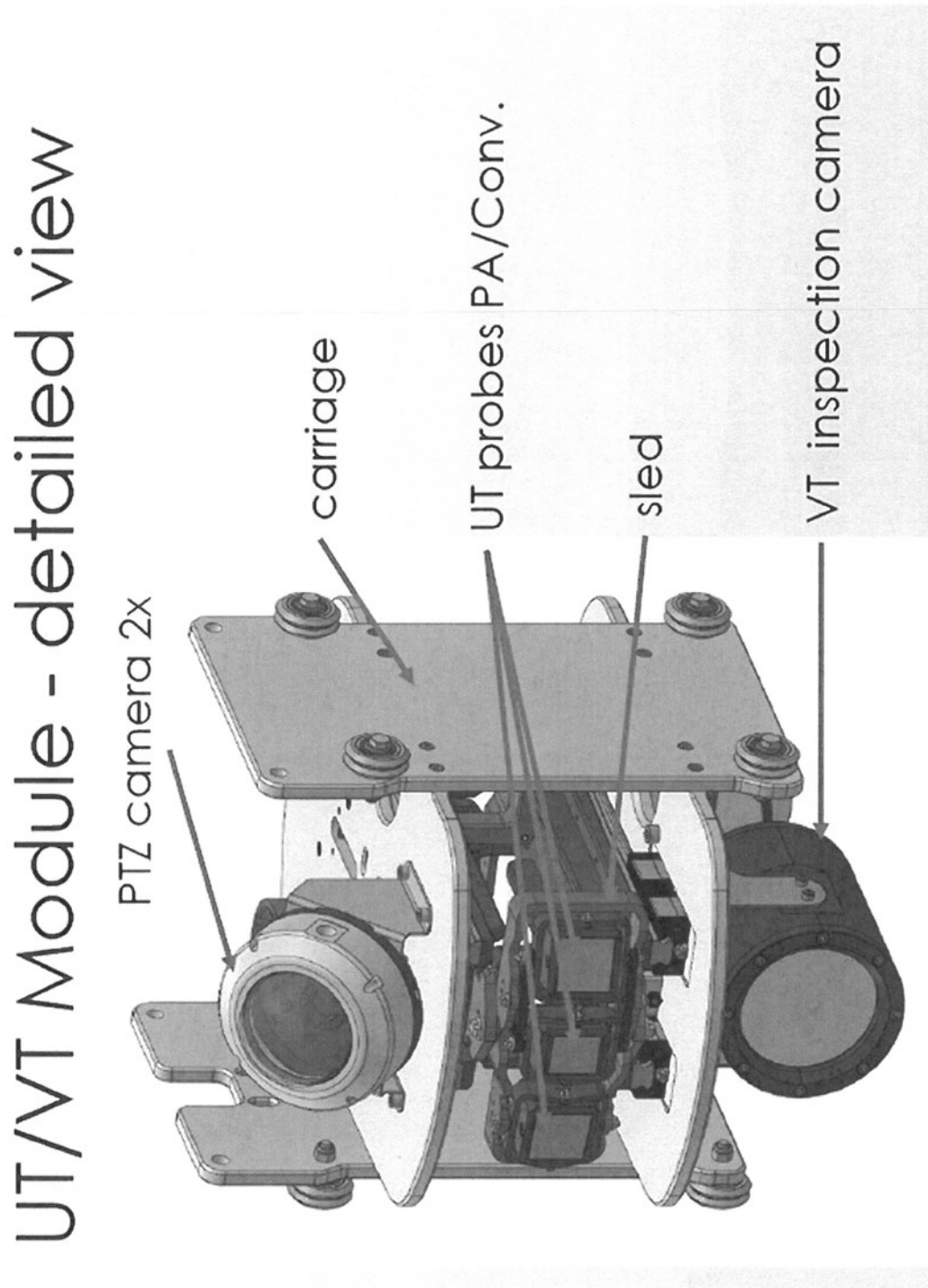


- the module consists of a carriage that is attached to the elevation carriage and is guided along vertical guides
- UT probes are inserted into "sleds" which is removable from holding arm
- each arm are pneumatically driven with possibility to regulate pressing force
- each probe has a separate water supply with the possibility of water flow regulation
- sleds are monitored separately by PTZ dome cameras
- it is possible to work with 6 phased array or conventional probes smaller than 45x45 mm

The KONHA VT inspection camera is placed at the lowest point and can work under 10m of water column in case of bubble test



Figure 4.3. KONHA UT module parts



Module for Lower weld is now under design and the drawings will be available in one month period.

5. Module for installing mechanical plugs on heat exchanging tubes (the module is compatible with any manipulator) via hydraulic pulling – 1 unit.

Installation of mechanical Westinghouse plugs (see Figure 5.1) is performed in 3 steps:

1. Measurement of tube profile where mechanical plug will be installed by laser device (See Figure 5.2). Based on measurement results determination of rolling parameters and then rolling performance (See Figure 5.3)
2. Rolling of place where mechanical plug will be installed (See Figure 5.4)
3. Installation of mechanical plug via extraction of internal expander (See Figure 5.5)

For testing purposes KONHA developed system using numerous collector imitator samples. See Figure 5.6.

Figure 5.1 Westinghouse mechanical plug and Westinghouse patent





Westinghouse patent:

United States Patent [19]

[11] **4,390,042**

Kucherer et al.

[45] **Jun. 28, 1983**

[54] **TUBE PLUG**

[75] Inventors: **Harvey D. Kucherer**, Monroeville;
Ralph W. Kugler; **Stuart L. Rieben**,
both of Mt. Lebanon; **John J.**
Wilhelm, New Kensington; **Mark E.**
Wylie, Monroeville, all of Pa.

[73] Assignee: **Westinghouse Electric Corp.**,
Pittsburgh, Pa.

[21] Appl. No.: **173,550**

[22] Filed: **Jul. 30, 1980**

[51] Int. Cl. **F16L 55/12**

[52] U.S. Cl. **138/89; 165/71;**
29/523

[58] Field of Search **138/89; 220/234, 237;**
165/71, 76; 29/523

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,092,358	9/1937	Robertson	138/97 X
3,135,414	6/1964	Lee	138/89 X
3,525,365	8/1970	Meulendyk et al.	138/89
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4,091,841	5/1978	Beneker et al.	138/89

Primary Examiner—James E. Bryant, III

Attorney, Agent, or Firm—L. A. DePaul; Z. L. Dermer

[57] ABSTRACT

The tube plug comprises a shell having a tapered inner surface against which an externally tapered expander member moves by application of a pulling force. The motion of the expander member relative to the shell causes the shell to expand into contact with a heat exchange tube thereby plugging the tube. The expander member is formed from a hardened metal with tangentially blended leading radius and a self-locking trailing edge which provides for ease in expanding the shell while preventing inadvertent unlocking of the plug. The shell has a substantially uniform wall thickness throughout the portion of the shell which experiences expansion so that the force necessary to perform the expanding process does not increase beyond the strength limitations of the installation equipment as the expander member is moved through the shell. The shell also has a plurality of lands on the outside surface thereof whose depth increases from closed end to open end of the shell so that a uniform wall thickness can be maintained in that region while allowing the lands to contact the inner surface of the heat exchange tube.

10 Claims, 4 Drawing Figures

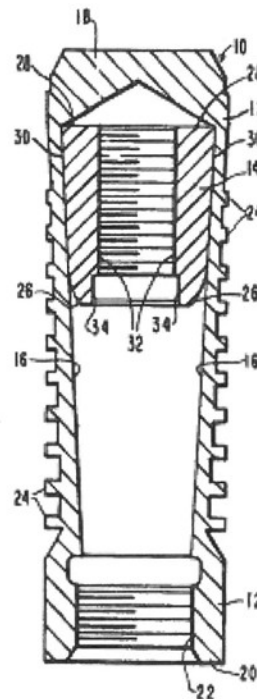


Figure 5.2 Measurement of tube profile with laser device

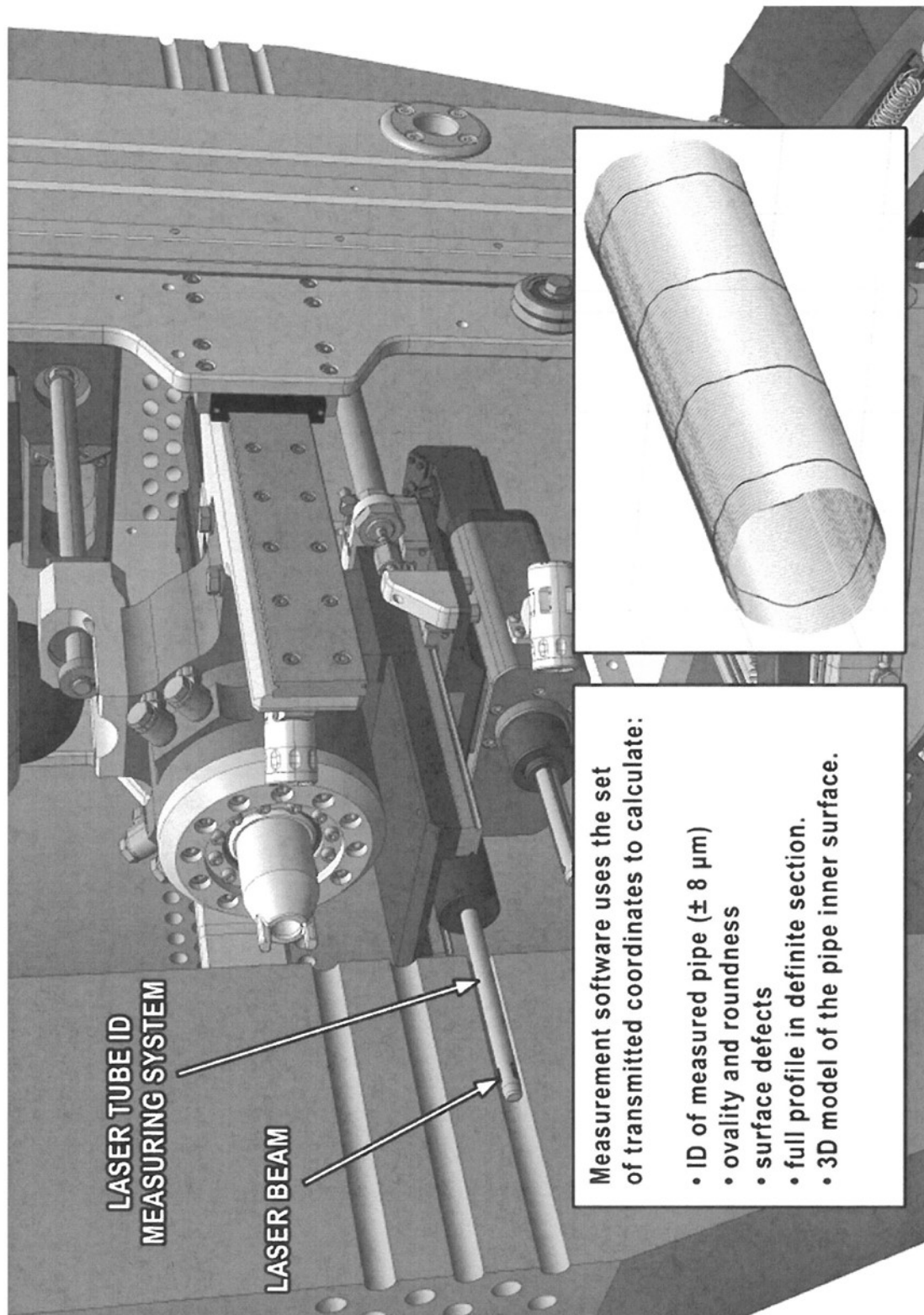




Figure 5.3 Rolling of place where will be installed mechanical plug

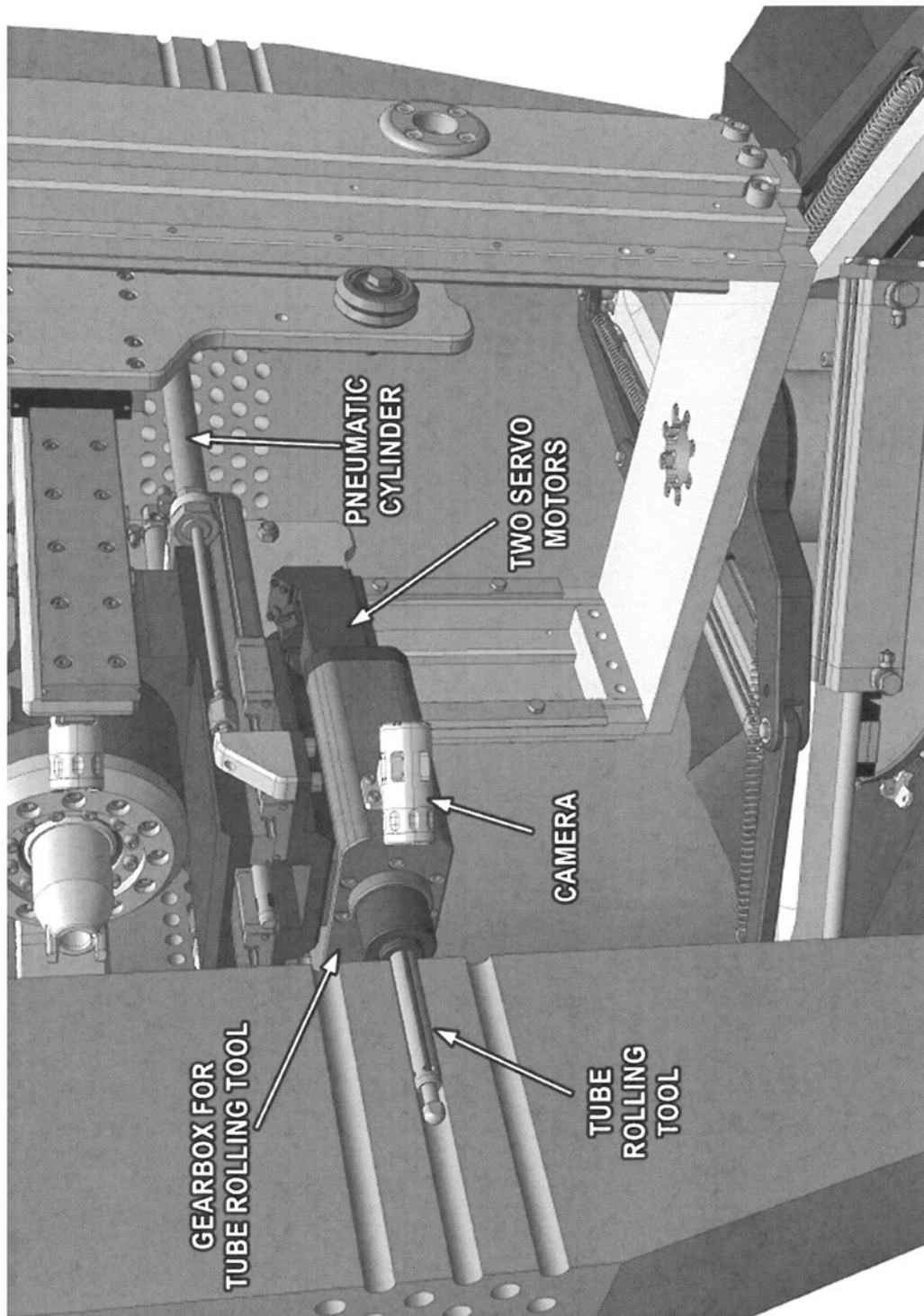
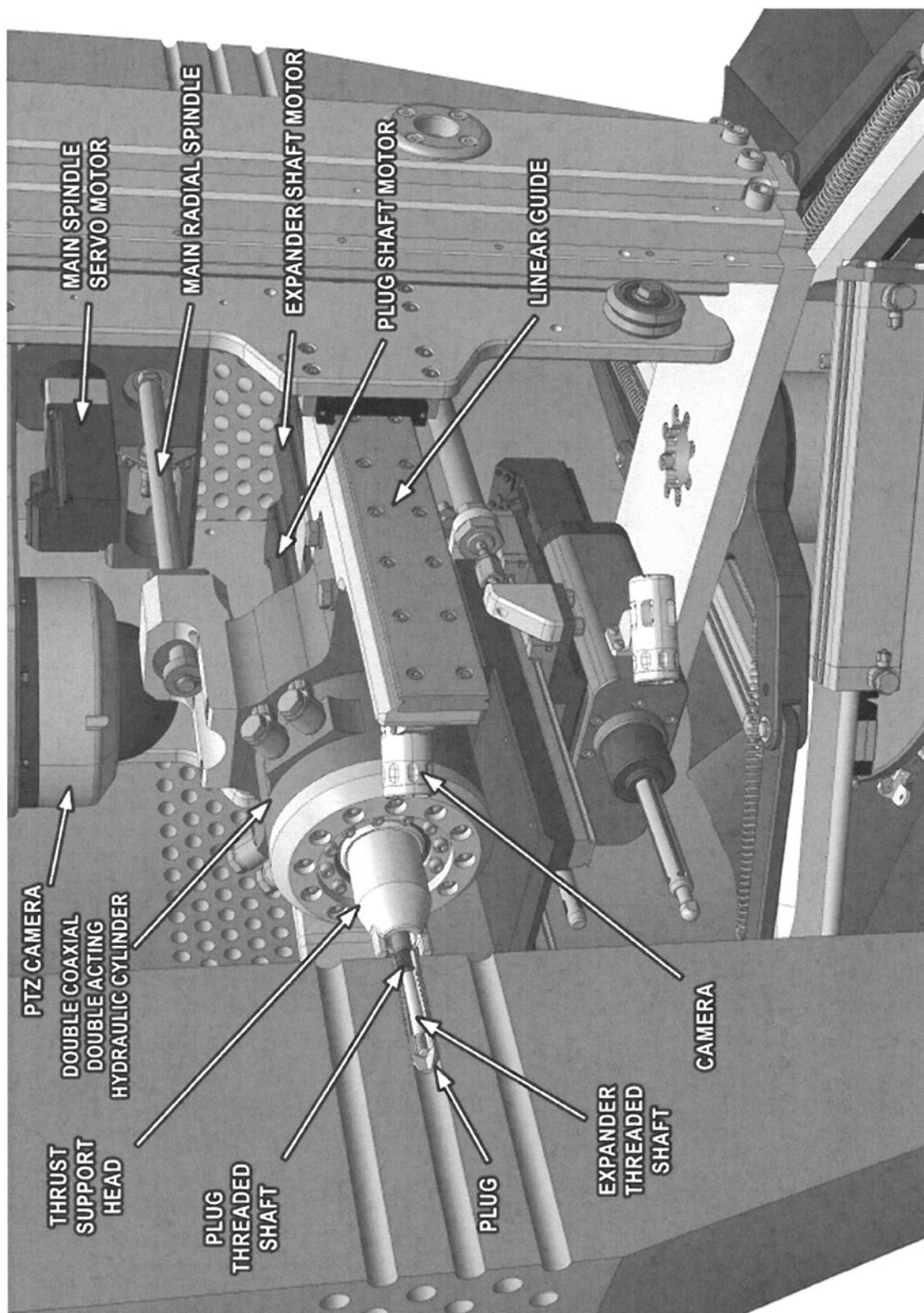
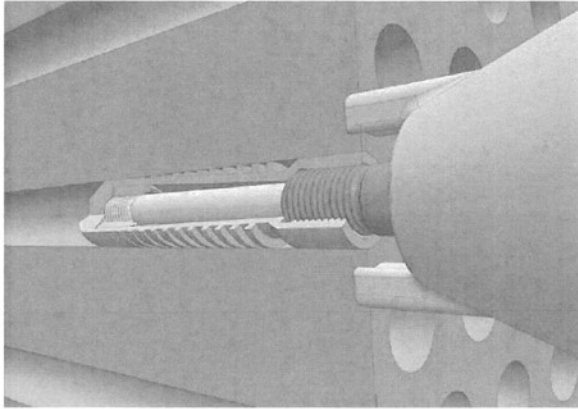


Figure 5.4 Installation of Westinghouse mechanical plug via pulling of internal expander



Situation before expander movement



Situation after expander movement

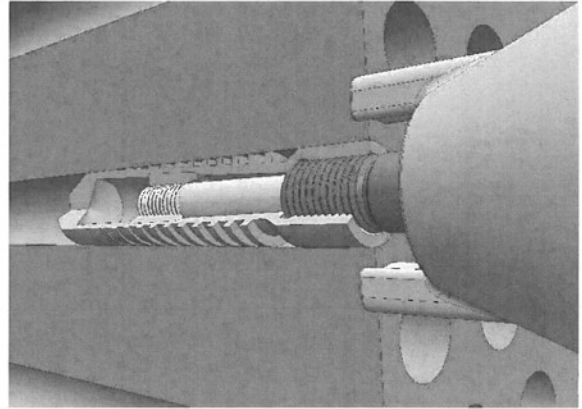


Figure 5.5 Collector imitator sample used for training purposes



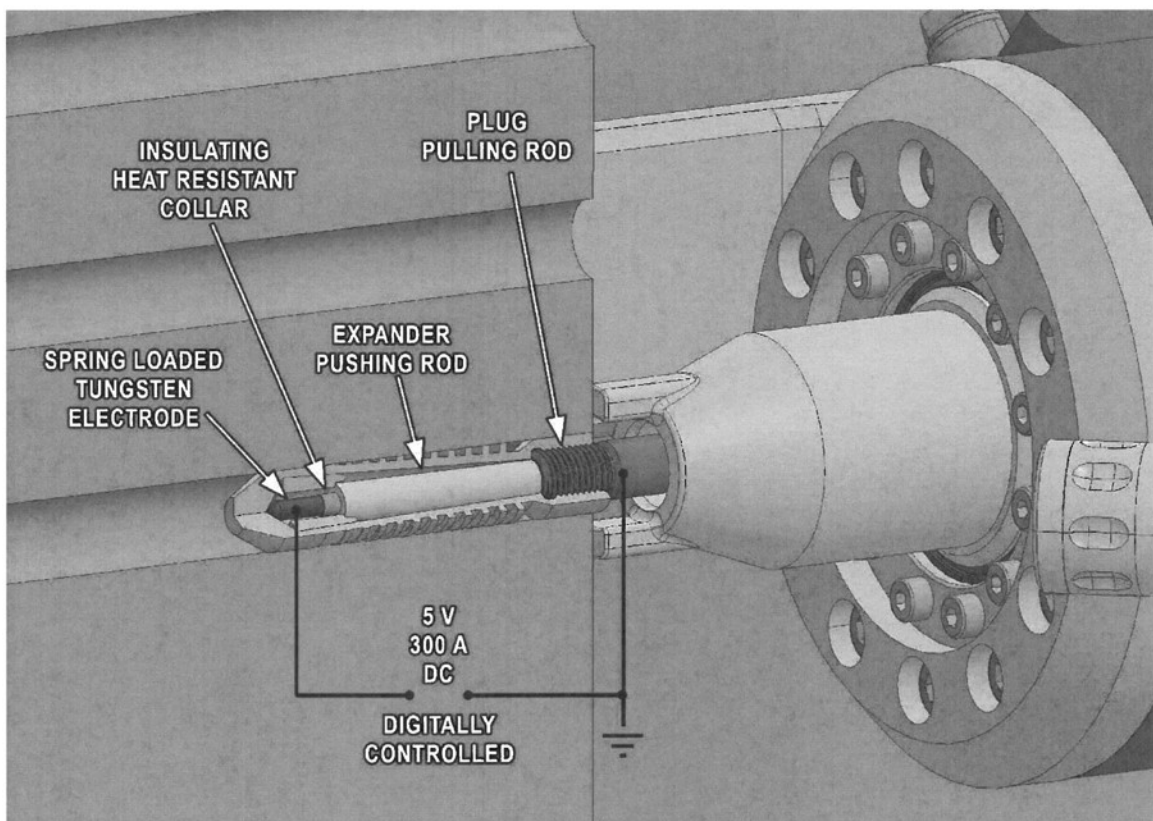
6. Module for removing mechanical plugs (the module is compatible with any manipulator) from heat exchanging tubes – 1 unit.

Removal of Westinghouse mechanical plugs is performed using basically the same module which is used for their installation but with different head.

Steps of plug removal are the following:

1. Pushing expander in most upper position (using expander shaft thread) which is the same as it was before plug installation. Before pushing expander in upper position plug lower part thread has to be screw in by pulling shaft too. See Figure 6.1.
2. Heating of the whole plug to relax residual stress from process of installation See Figure 6.1.
3. Pulling plug with pulling shaft but in the same time pushing expander in opposite direction with the aim to shrink plug diameter and to allow easy removal See Figure 6.1.

Figure 6.1 Process of plug removal with removal head





It has to be noted that heating of plug has to be performed with powerful source of direct current. See Figure 6.2.

Figure 6.2 Powerful source of direct current 6V 310A.



7. Eddy current flaw detector MIZ 85iD-2 – 5 units.

KONHA Ltd. will deliver eddy current instrument from ZETEC company MIZ 85iD-2 which has following characteristics:



MIZ®-85iD

Advanced Standalone ECT Instrument

FEATURES & BENEFITS

- › Available in a dual or single probe configuration to best suit your application
- › Supports all common steam generator inspection techniques
- › Integral probe interface module (PIM) eliminates the need for probe adapters
- › MIZ-iD *Intelligent Device* technology provides automatic probe configuration validation with MIZ-iD equipped probes
- › Integrated probe pusher control which can be used for automatic acquisition



MIZ-85iD-1 AND MIZ-85iD-2

FLEXIBLE PERFORMANCE

The MIZ-85iD family leverages the industry leading MIZ-80iD eddy current instrument technology into a modular "instrument only" alternative to the integrated all-in-one approach of MIZ-80iD System. The small rugged module is light weight and integrates easily in a multitude of inspection system scenarios. The completely sealed enclosure provides protection from environmental and radiological contamination to ensure integrity in electronic performance and allow serviceability throughout the life of the product.

Advanced features such as Auto Tube End Detection Improve probe life, while the internal electronic differential reference signal and electronic connector pin

multiplexer eliminate the need for reference probes and common probe adapter cables. These features provide superior data quality and promote better analysis results.

Integration with probe delivery systems is provided through two independent Auxiliary I/O control lines to operate probe pushers such as the 10D probe pusher and provide direct integration with peripheral devices such as probe position encoders. On-board independent web servers allow for network configuration management and instrument calibration. Optional calibration module provides traceability in the calibration process to Bureau of Standards.



MIZ®-85iD

The MIZ-85iD is available in one or two probe standard model configurations. Each MIZ-85iD includes a one year license of EddyNet/AQ acquisition software.

General Specifications

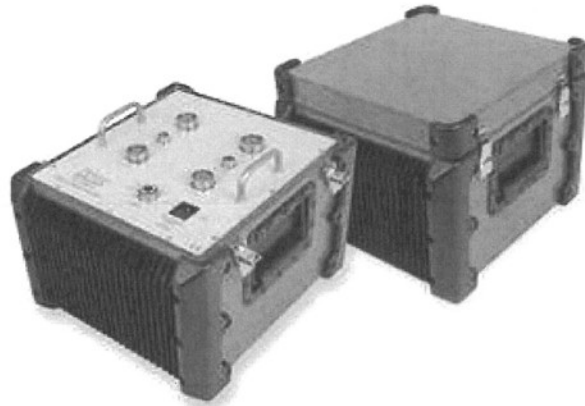
- ▶ **Weight (without lid):** 32.5 lbs. (14.75 kg)
- ▶ **Power:** 100-240 VAC, 50-60 Hz Auto Switching
- ▶ **Operational Temperature:** 32°F to 113°F (0°C to 45°C)
- ▶ **Storage Temperature:** -4°F to 140°F (-20°C to 60°C)
- ▶ **Dimensions:** 11.5"H x 16.25"L x 14"W

MIZ-85iD Eddy Current Instrument

- ▶ **Frequency Range:** 20 Hz to 1.2 MHz
- ▶ **Gain:** 23-53 dB in 1 dB steps
- ▶ **Sample Rate:** 10Hz to 40 kHz
- ▶ **Drive Voltage:** 0-20 Vpp, 0-60 Vpp I-Probe mode
- ▶ **Coil Drive Amplifiers:** Up to 2 per probe connector
- ▶ **Coil Input Amplifiers:** Up to 8 per probe connector
- ▶ **Drive:** 0 – 20 Vpp
- ▶ **Supported Probe Technology:**
Array Probes, Bobbin Probes, and MRPC®
- ▶ **Channel Capability:**
40 Continuous Mode
512 Multiplex
640 Super-Multiplex
- ▶ **Maximum Sample Rates:**
Continuous Mode: 40,000 Hz
Multiplex & Super-Multiplex: 20,000 Hz

Probing System Integration Features

- ▶ Analog servo control lines ($\pm 0-10$ VDC)
- ▶ Solenoid function control lines (24 VDC)
- ▶ Auxiliary differential encoder inputs (up to 2/probe)
- ▶ Auxiliary limit switch input (1/probe)
- ▶ External acquisition trigger option
- ▶ CAN Bus device network integration option



Ordering Information

MIZ-85iD Configuration Options¹:

- ▶ MIZ-85-1 SYSTEM + EDDYNET/AQ
- ▶ MIZ-85-2 SYSTEM + EDDYNET/AQ

MIZ-85iD Eddy Current Inspection System²:

- ▶ MIZ-85iD instrument
- ▶ Protection lid
- ▶ Operating Guide
- ▶ MIZ-85iD Certification
- ▶ Power Cords
- ▶ Shipping/Storage Cases

¹ Additional versions are available specifically for the French market techniques. Ask a Zetec customer service representative for more details on the French market versions.

² Software development implementation guide is available for customers seeking to integrate with their own acquisition software.

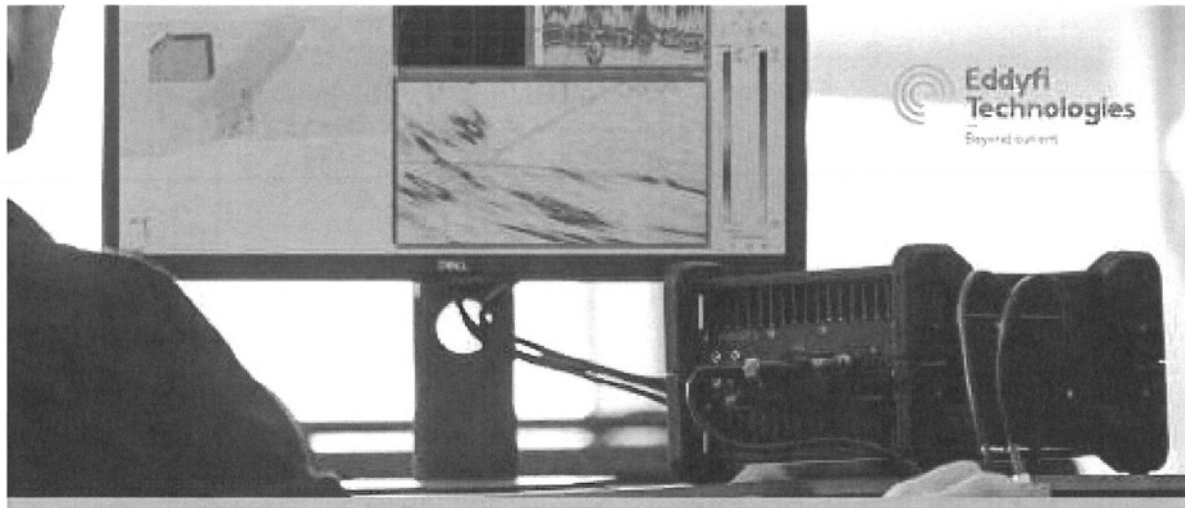
Zetec: Innovation That Delivers Results

For nearly 50 years, Zetec has advanced NDT standards and science. We provide new insight and control through inspection solutions that protect our customers' most important assets and ensure the quality of their products. By integrating design and engineering with our own manufacturing, Zetec delivers solutions that optimize productivity, safety and total cost of ownership.



8. Multichannel ultrasonic flaw detector – 2 units.

KONHA Ltd. will deliver Panther 2 PA 128/128 Eddyfi UT instruments. Here are its characteristics:



Technical
Specifications

PANTHER 2

The ultimate solution for industrial inspections with PAUT and TFM

Combining unrivalled speed and performance, Panther™ 2 by Eddyfi Technologies is the exceptional phased array ultrasonic testing instrument offered in a compact format.

QUALITY REVEALED FASTER

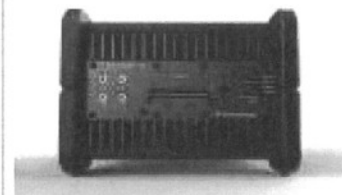
For integrators, manufacturers, industrial labs, and NDT service providers, Panther 2 by Eddyfi Technologies is the ultimate phased array ultrasonic testing (PAUT) instrument with a complete total focusing method (TFM) toolbox delivering data results faster than any other commercially available solution.

DESIGNED FOR INDUSTRIAL ENVIRONMENTS

Well suited for a wide range of diverse inspection applications common across industries such as aerospace, oil and gas, and metallurgy, the second-generation Panther is built to perfection and built for perfection. This is evident with:

- Reinforced bumpers that offer unit protection and convenient stackability.
- Casing that incorporates external fans for optimized heat dissipation with no air intake.
- Flexible toolbox that enables adaptability for unique inspection requirements.
- Automation to streamline the inspection process.
- Exclusive flash mode that fits industrial productivity requirements.

Advanced inspection data results are made accessible with a complete software ecosystem to suit specific needs, including an open software development kit (SDK). Panther 2 is your go-to for flexible and scalable testing requirements.





FASTEST DATA THROUGHPUT

Panther 2 is distinctly equipped for ultra-fast ethernet delivering a 10 Gigabit-per-second high speed link for the fastest data throughput possible:

- up to 30m (98ft) with RJ45 copper cable.
- or up to 200m (656ft) with optic fiber durable enough to handle inspections in even the harshest conditions.

READY, SET...DONE!

We understand that time is money and optimizing your quality assurance investment starts with high productivity. That's why Eddyfi Technologies introduced "flash" modes making Panther 2 an astounding eight times faster than any other commercially available phased array instrument. Why settle for anything less?

PROBE NUMBER LIMIT: NONE

With configurations from 32 up to 2,048 elements, the adaptability of Panther 2 enables scalable automated inspections. The compact unit can be daisy-chained to drive 256 elements simultaneously with up to 16 units in parallel, offering a substantial increase in inspection speed.

ON COMMAND AND IN CONTROL

The control is in your hands, even with a hands-off approach: users can completely automate their process, customize displays, create unique supervision software, develop specific analysis features, and monitor productivity with established benchmarks all thanks to our readily available software development kit (SDK).

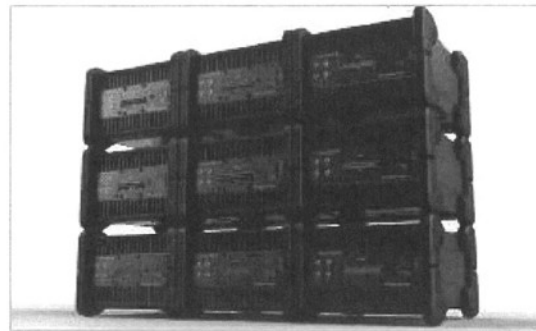


Figure 1: Panther 2 can be daisy-chained to drive 256 elements simultaneously with up to 16 units in parallel.

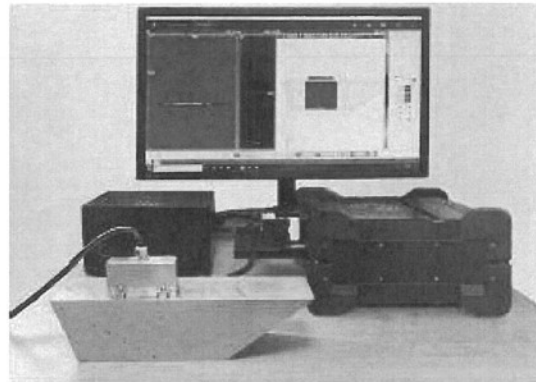


Figure 2: Eddyfi Technologies offers the complete PAUT solution.

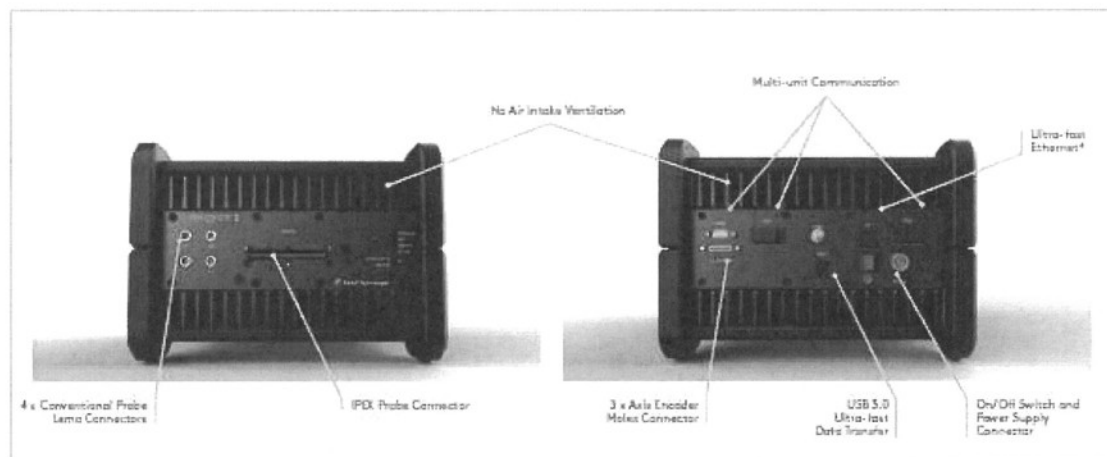


Figure 3: Annotated breakdown of Panther 2 showing its key features.

STAY IN THE KNOW WITH DESKTOP TFM

Acquire™ is Eddyfi Technologies' acquisition software dedicated to advanced phased array ultrasonic testing (PAUT), total focusing method (TFM) settings, and imaging. It was designed for both industrial and laboratory applications, also allowing research and development teams to create customized techniques and new inspection methods.

Acquire software includes a huge PAUT and TFM toolbox, powered by CIVA NDT simulation software. It works with:

- Various type of components including 2D and 3D import
- Most PAUT probe types (including matrix, sparse array, daisy, DLA/DMA, etc.)
- Highly customizable TFM setups to evaluate your own ideas including FWT pitch/catch, full matrix capture (FMC), image fusion, tailored propagation modes, conversion modes, adaptive reconstruction, etc.
- Elementary A-scan access at your convenience
- CIVA simulations to experiment acquiring your own data.

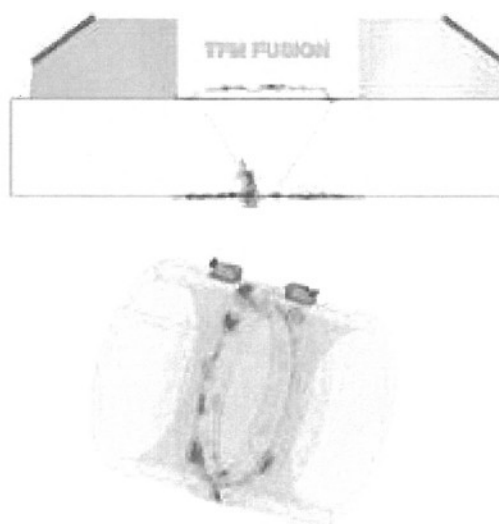


Figure 4: CIVA NDT simulation software

NO NEED TO LEARN THE HARD WAY: SOFTWARE YOUR WAY

Eddyfi Technologies' software development kit (SDK) is a high-level library that allows users to quickly develop their own applications to control Panther 2 (access any acquisition parameters), access real-time conventional, PAUT, and TFM data or saved data for post processing.

SDK advantages include:

- Hardware abstraction layer: customer code does not depend on model, revision, and number of devices connected to Acquire
- Stable API that enables a future Acquire upgrade without software modification
- It's very fast to develop very basic automation
- OS/language independent: it can be developed from any system able to communicate with TCP/IP socket (PC under Windows, PC under Linux, Mac OS, Android smartphone, PLC, etc.)
- CIVA simulations to experiment acquiring your own data.

A COMPLETE SOFTWARE ECOSYSTEM

Acquire software partly embeds CIVA software for both simulation and setup; it is fully compatible with CIVA and ULIS for advanced analysis.

Capture™, the proven streamlined software already powering the portable Mantis™ and Gecko® instruments, is now compatible with Panther 2 for both acquisition and analysis. It enables higher productivity and can read Acquire data files.

Panther 2, powered by industry-leading software, let's you tackle any type of inspection.

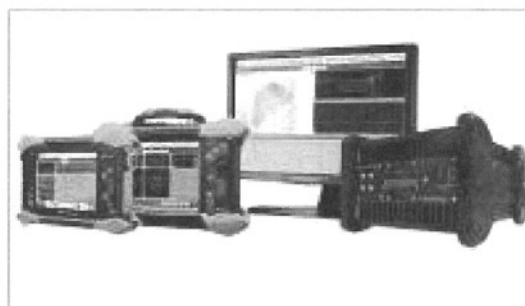


Figure 5: Capture advanced phased array software compatible with Mantis, Gecko and Panther 2 instruments



SPECIFICATIONS

INSTRUMENT		ANALYSIS	
Dimensions (W x H x D)	298 x 220 x 137mm (11.7 x 8.7 x 5.4in)	CAD Part Geometry	Plane, cylinder, Torus section, nozzle
Weight	8kg (17.6lb)	CAD Weld Geometry	Butt weld
Operating Temperature	-10-50°C (14-120°F)	Customizable Inspection Report	Yes
Storage Temperature	-10-60°C (14-140°F)		
IP Rating	IP20 (IP54 with accessory)	PHASED ARRAY	
Power Supply	110-240 VAC, 50-60 Hz	Configurations	Linear scanning, sectorial scanning, parallel shooting, ultrasonic phased modes (Flash modes)
Configurations	32-128PR, 64-64PR, 64-128PR, 256-256PR with or without TFM	Scan Modes	Linear scanning, sectorial scanning, parallel shooting, ultrasonic phased modes (Flash modes)
PULSERS		Scalable	Up to 16 Parameter units (2,048 channels)
128 Phased Array Channels*		Active Aperture up to 256 Elements*	Delay law computation for standard and parametric components
Bipolar Square Pulse Width	30 ns to 2,000 ns	Probes	Linear, matrix, DIA and DMK, annular, delay, and sparse array
Voltage Amplitude	Maximum 100 V with 1 V step	Number of Probes	Unlimited probes, no group limitation, up to 4,192 focal laws
Maximum PRF	Up to 30 kHz	Focusing Modes	True depth, sound path, projection
RECEIVERS		REAL-TIME TFM, FMC, PWI (WITH TFM OPTION)	
128 Phased Array Channels*		Reconstruction Channels	Up to 128 (up to 256 with two Parameter 2 units)
Input Impedance	50 Ω	Maximum Refresh Rate	Up to 500fps (depending on pixel numbers)
Frequency Range	0.4-20 MHz	Maximum Pixels for Reconstructed Image	More than one million
Maximum Input Signal	1.8V _{pp}	Sound Paths	Circle (L or C), indirect and converted modes, fluxon modes
Gain	Up to 120 dB (1.5 dB step)	DIGITIZER	
Crosstalk Between Two Channels	≤ 30 dB	Summed A-scan Digitizing	Digitizing and real-time summation on 128 channels (256 with 256/256PR configuration)
Analog Amplifier	Window noise amplifier	A-scan Signal Processing	Rectified, RF, and envelope
ACQUISITION		Adjustable Filters	PRF and TR filters
A-scan/Block Data Recording	800% amplitude range	Maximum Delay	1.6 ms
Inspection Data File Size	Hard drive limit	Resolution	14 bit Dynamic 16 bit
Acquisition Triggers	Time, event, encoder	Maximum Sampling Frequency	125 MHz
Data Transfer	USB, ultra-fast Ethernet 10 Gbit with fiber optic or RJ45 cable	Digitizing Depth (TFM)	Up to 16k points
ANALYSIS		Digitizing Depth (Phased Array)	Up to 55k points
Views	A-scan, B-scan, C-scan, D-scan, ectodynamic, top, side, front, 3D		
FMC/PWI Data Acquisition Post-Process TFM Reconstruction	CAD geometry with CWK***		
Software Compatibility	Captiva, CV A and ULT5****		
Amplitude Range	Up to 800%		

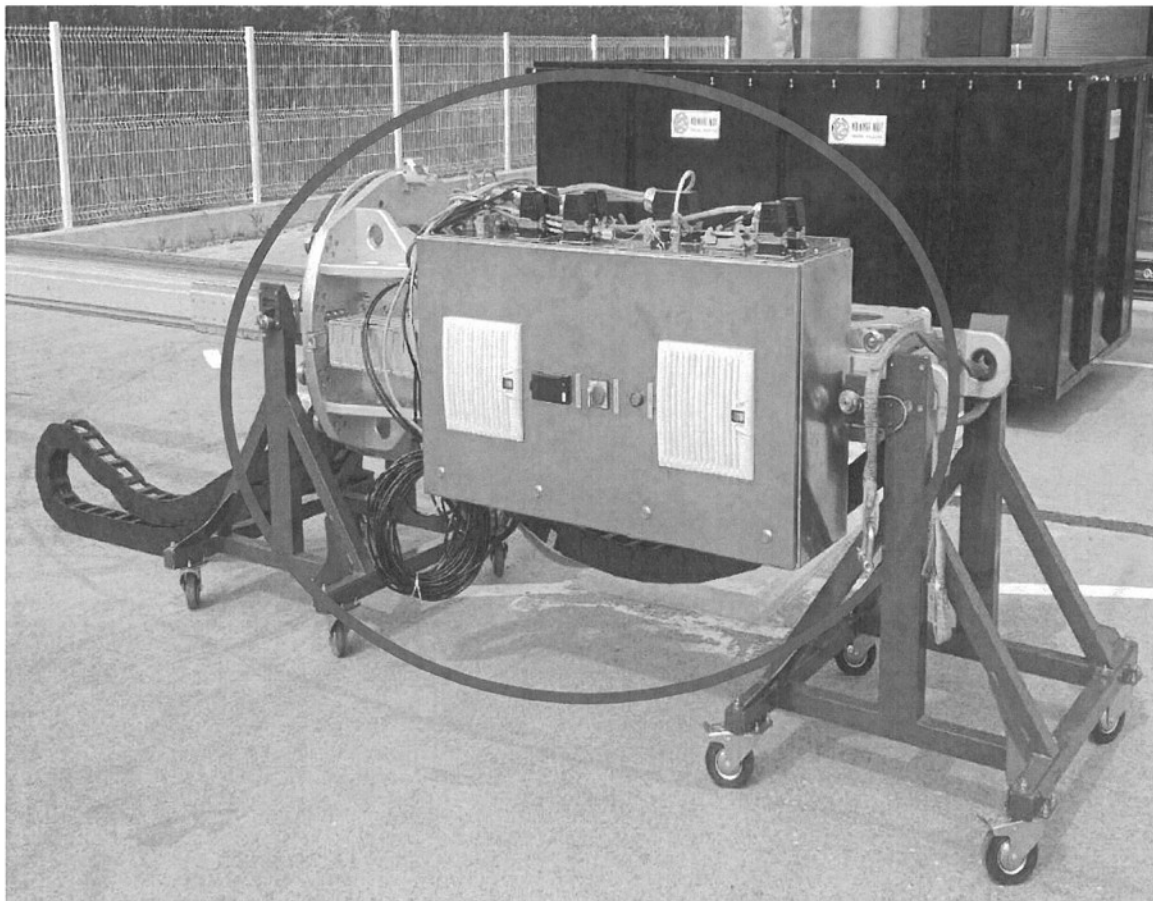
WIZARDS	
Type	CAD overlay and 3D view
	Real-time phased array calculation
	Wedge calibration (angle, height, amplitude calibration, TCG)
	Amplitude balancing
I/O	Probe and weld geometry design
	1 PPK for phased array
	1 USB 3.0
	4 Gbit/sec (200 Mbit/sec)
Connector Type	1 Ultra-fast Ethernet RJ45 or fiber optic
	10 Gbit/sec
	4 USB 3.0
	3 encoder inputs
	1 encoder trigger
	1 ultra-high-speed summation port (for summation between units)

*Dependent on configuration 256-channel unit built using two 128-channel units.
***KONHA is compatible with CWK and ULT5 as a reference of TCG.

9. Motion control unit – 4 units.

Control box is attached to manipulator and it controls all electric items in KOSIS F inspection/plugging system. See Figure 9.1 for more details.

Figure 9.1. Manipulator Controller of electric items





10. Pneumatic system control unit – 4 units.

Pneumo Control box is attached to manipulator and it controls all pneumatic items in KOSIS F inspection/plugging system. See Figure 10.1 for more details.

Figure 10.1. Pneumo Controller of pneumatic items



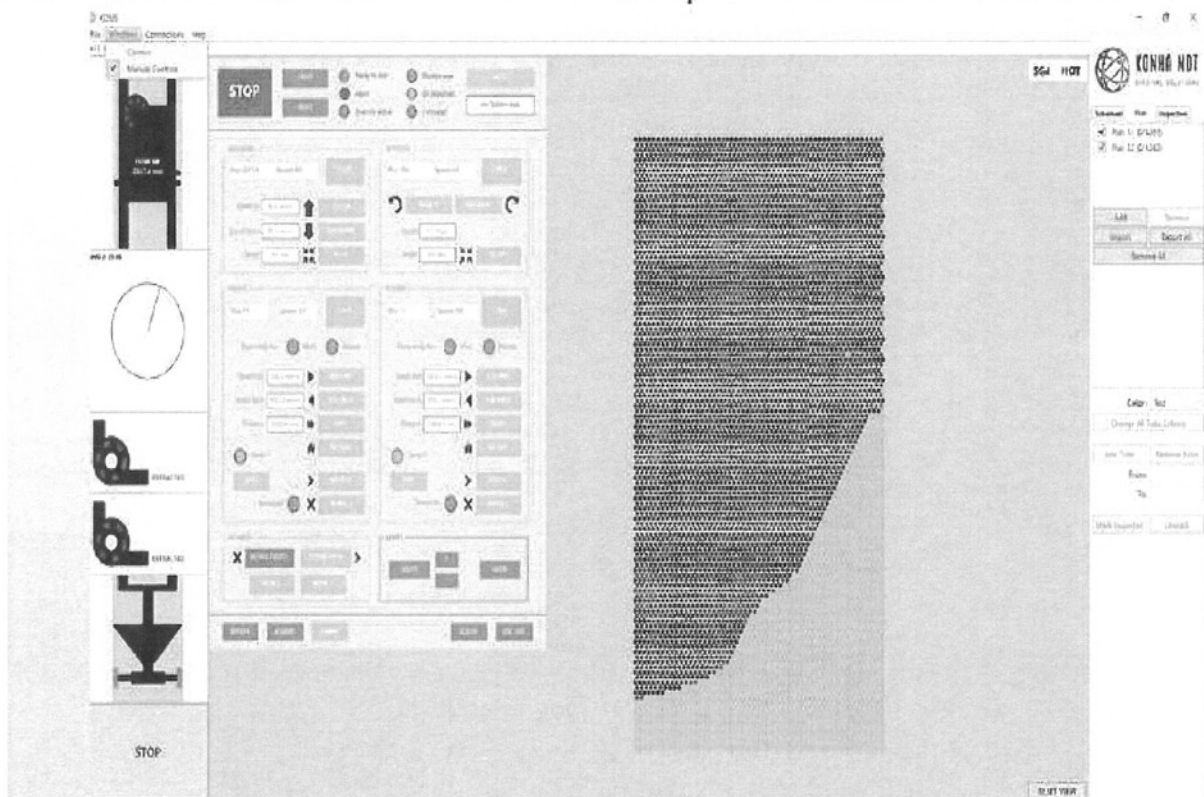
11. KONHA software for running KOSIS F manipulator – 4 units.

Regarding KONHA manipulator software it has to be noted that this software does not include only software for running KONHA manipulator but also inspection planning and inspection monitoring software. So, with the use of this software it is easy to make plans of inspections, monitored the number of inspected tubes per particular plan, make retest list, etc. All data about the plans, retest lists etc. can be also managed in MS Excel as well.

On Figure 11.1 is given main screen of KONHA software for running KOSIS F manipulator.

Figure 11.1 Manipulator Control software

ET Module: software - manipulator control screens





12. Workstations

1. Workstations with a software for manipulator control/positioning, software for probe movement, and software for acquisition of eddy current testing data– 5 units

Računalo INSTAR Workstation, Intel Core Ultra 9 285K up to 5.7GHz, Vodeno hlađenje, 64GB DDR5, 2TB NVMe SSD, NVIDIA RTX 4500 ADA 24GB, Win 11 Pro, 5 god jamstvo

Šifra artikla: 265K-WOR-SSD2TB-4500ADA

BRAND: INSTAR

Dostava: 2,99 €



GLAVNE SPECIFIKACIJE:

- Procesor: Intel Core Ultra 9
- Radna memorija: 64GB
- Pohrana: 2TB
- Grafika: NVIDIA RTX

Sve specifikacije →

♡ Dodaj u omiljene artikle

★ Sviđa mi se (0)

INSTAR
VAŠ OMIJENI TEKNO CENTAR



Associated Monitors – 10 units

Monitor Dell 39.7" U4025QW, IPS, 120Hz, HDR600, HDMI, DP, 4xUSB 3.2, 2xUSB-C, TB4, RJ45, Zvučnici, Zakrivljeni 2500R, 5120x2160

Šifra artikla: U4025QW

Kataloški broj: U4025QW

BRAND: DELL

Dostava: 2,99 €



2. Workstation with a software for acquisition of ultrasonic inspection data – 1 unit

**ASUS ROG Strix G18 G815LW-SA298W - Intel Ultra 9-386H / 32GB RAM / 1TB SSD / nVidia RTX5080 / 18" 2.5K / Windows 11 Home
asu-g815lw-sa298w**



3. Workstation with a software for manipulator control/positioning, software for installing mechanical plugs, and software for removing mechanical plugs – 1 unit

Računalo INSTAR Workstation, Intel Core Ultra 9 285K up to 5.7GHz, Vode NVMe SSD, NVIDIA RTX 4500 ADA 24GB, Win 11 Pro, 5 god jamstvo

Šifra artikla: 285K-WOR-SSD2TB-4500ADA

BRAND: INSTAR

Dostava: 2,99 €



Associated Monitor – 1 unit

Monitor Dell 39.7" U4025QW, IPS, 120Hz, HDR600, HDMI, DP, 4xUSB 3.2, 2xUSB-C, TB4, RJ45, Zvučnici, Zakrivljeni 2500R, 5120x2160

Šifra artikla: U4025QW

Kataloški broj: U4025QW

BRAND: DELL

Dostava: 2,99 €



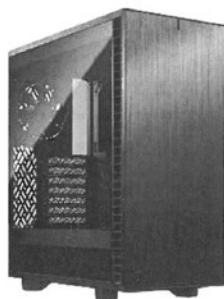
4. Workstation with a software for analysis of eddy current testing data – 12 units

Računalo INSTAR Workstation, Intel Core Ultra 9 285K up to 5.7GHz, Vodeno hlađenje, 64GB DDR5, 2TB NVMe SSD, NVIDIA RTX 4500 ADA 24GB, Win 11 Pro, 5 god jamstvo

Šifra artikla: 285K-WOR-SSD2TB-4500ADA

BRAND: INSTAR

Dostava: 2,99 €



GLAVNE SPECIFIKACIJE:

- Procesor: Intel Core Ultra 9
- Radna memorija: 64GB
- Pohrana: 2TB
- Grafika: NVIDIA RTX

Sve specifikacije →

♥ Dodaj u omiljene artikle

★ Sviđa mi se (0)

INSTAR
VAŠ OMIJENI TEHNIČKI CENTAR

Associated Monitors – 24 units

Dell Alienware AW3425DW monitor, OLED, 34", 21:9, 3440x1400/3440x1440, 120Hz/240Hz, USB-C, HDMI, Display port, USB



5. Workstation with a software for analysis of ultrasonic inspection data – 1 unit

ASUS ROG Strix G18 G815LW-SA298W - Intel Ultra 9-386H / 32GB
RAM / 1TB SSD / nVidia RTX5080 / 18" 2.5K / Windows 11 Home
asu-g815lw-sa298w



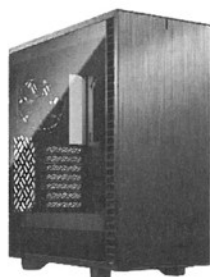
6. Workstation with a software for resolution/review of the analysis results – 1 unit

Računalo INSTAR Workstation, Intel Core Ultra 9 285K up to 5.7GHz, Vodeno hlađenje, 64GB DDR5, 2TB NVMe SSD, NVIDIA RTX 4500 ADA 24GB, Win 11 Pro, 5 god jamstvo

Šifra artikla: 285K-WOR-SSD2TB-4500ADA

BRAND: INSTAR

Dostava: 2,99 €



GLAVNE SPECIFIKACIJE:

- Procesor: Intel Core Ultra 9
- Radna memorija: 64GB
- Pohrana: 2TB
- Grafika: NVIDIA RTX

Sve specifikacije →

♥ Dodaj u omiljene artikle

★ Sviđa mi se (0)

INSTAR
VAŠ OMIJENI YOUNG CENTAR

Associated Monitors – 2 units

Dell Alienware AW3425DW monitor, OLED, 34", 21:9,
3440x1400/3440x1440, 120Hz/240Hz, USB-C, HDMI,
Display port, USB





KONHA NDT
ORIGINAL SOLUTIONS

KONHA KOSIS F TECHNICAL DESCRIPTION IN ACCORDANCE WITH KOZLODUY NPP EAD DOCUMENT NO. 58728

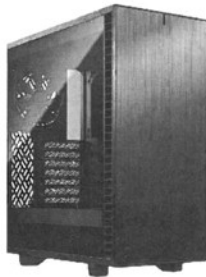
7. Workstation with a software for the management of testing /inspection results (database) – 1 unit

Računalo INSTAR Workstation, Intel Core Ultra 9 285K up to 5.7GHz, Vodeno hlađenje, 64GB DDR5, 2TB NVMe SSD, NVIDIA RTX 4500 ADA 24GB, Win 11 Pro, 5 god jamstvo

Šifra artikla: 285K-WOR-SSD2TB-4500ADA

BRAND: INSTAR

Dostava: 2,99 €



GLAVNE SPECIFIKACIJE:

- Procesor: Intel Core Ultra 9
- Radna memorija: 64GB
- Pohrana: 2TB
- Grafika: NVIDIA RTX

Sve specifikacije →

♥ Dodaj u omiljene artikle

✦ Sviđa mi se (0)

INSTAR
VAŠ OMILJENI TEHNIČKI CENTAR

Associated Monitors – 2 units

Dell Alienware AW3425DW monitor, OLED, 34", 21:9, 3440x1400/3440x1440, 120Hz/240Hz, USB-C, HDMI, Display port, USB



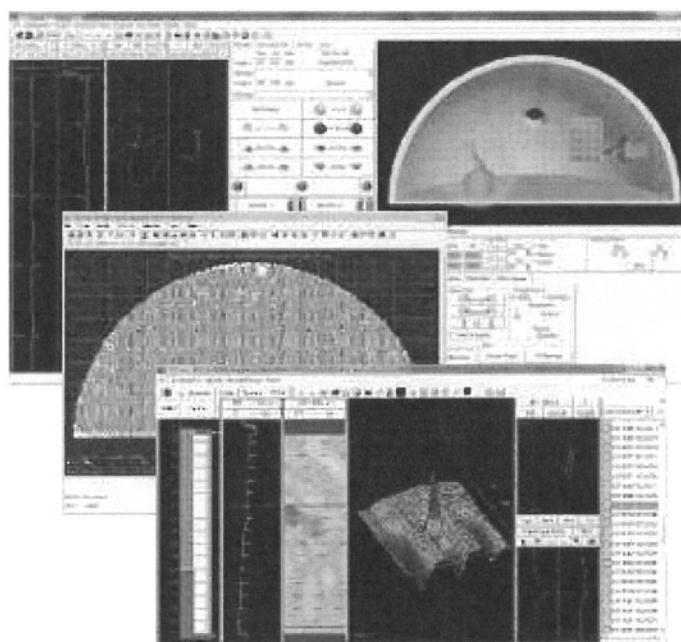
13. Eddy current software

EDDYNET PC SOFTWARE

For Acquisition, Data Management and Analysis

FEATURES & BENEFITS

- Familiar Eddynet functionality in an updated Windows® PC platform for easy transition from EddynetSuite
- Individually licensed programs for maximum deployment flexibility
- Leverages familiar Windows® PC operating system for simplified utilities and administration
- Full integration between applications to ensure best practices for steam generator inspections



THE ORIGINAL JUST GOT BETTER

From the world leader in eddy current steam generator inspection software comes Eddynet on the Windows PC platform. Eddynet now has the flexibility to be operated from a wider array of hardware choices. A new licensing methodology allows users to select from separately licensed acquisition, data management, and analysis modules for ultimate flexibility to match their specific inspection needs.

Familiar EddynetSuite features and modules are available from the Eddynet PC software making an easy transition for experienced users.

In addition, Eddynet PC products utilize the underlying Windows OS to make the task of network administration, file utilities, and printing much simpler.

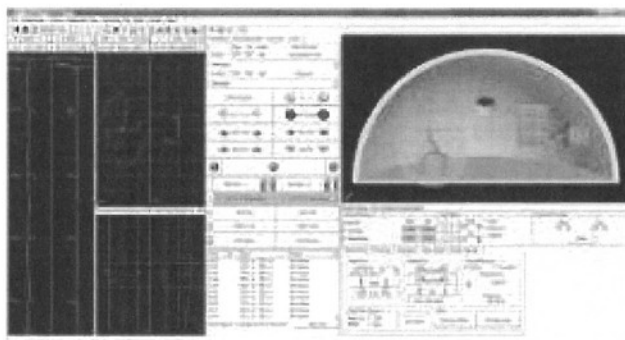
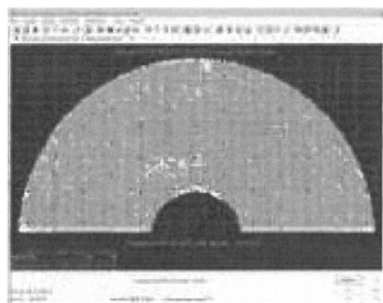
For Acquisition, Data Management and Analysis

Eddynet PC products are available through several modules to match the inspection activity. Each module has been developed with decades of experience in steam generator eddy current inspections.

Eddynet/DM

Data management

- › Inspection Planning
- › Inspection Mgmt
- › Historical Mgmt
- › APTS
- › Test Plans
- › Special Interest Test
- › PID Test
- › Test Plan Groups
- › Test Plan Scanner Tool
- › Extent Reporting Tool
- › Advanced Reports Tools
- › Auto Closeout Reporting Tool
- › HMS/EIMS exports
- › Tubesheet Builder
- › Cal-Board



Eddynet/AQ

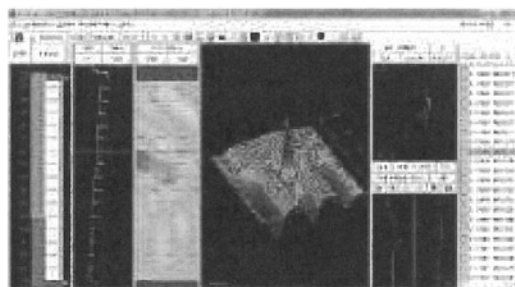
Acquisition Software

- › Auto Acquire (AAS & Scripted AAS)
- › MIZ-ID support
- › DQV (optional)
- › PIMS (Probe Inventory Management)
- › Data Stripper (X-Probe/Bobbin)
- › Network Hardware Identification Utility
- › Integrated Test Management

Eddynet/AN Analysis

Data management features

- › Bobbin Analysis
- › MRPC Analysis
- › Array Analysis
- › Advanced C-Scan
- › E-Resolution
- › APTS
- › Bobbin Profile
- › Array Profile
- › D-Probe Profile
- › Multi-datafile comparison



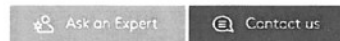
Zetec: Innovation That Delivers Results

For nearly 50 years, Zetec has advanced NDT standards and science. We provide new insight and control through inspection solutions that protect our customers' most important assets and ensure the quality of their products. By integrating design and engineering with our own manufacturing, Zetec delivers solutions that optimize productivity, safety and total cost of ownership.

14 UT software

UltraVision 3 Classic

Complete UT and Phased Array
inspection software



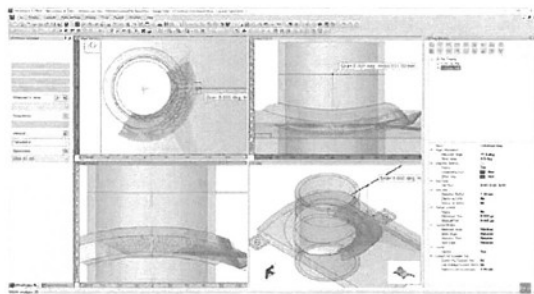
Details

3D work environment

The integrated 3D work environment allows you to create your actual inspection configuration in UltraVision 3 Classic and perform ray tracing with coverage mapping to determine your detection capability and inspection coverage.

The ultrasonic inspection software is intuitive and allows users to design and simulate an inspection easily. Inspection parameters and results are delivered in a comprehensive report.

UltraVision supports many advanced ultrasonic inspection techniques and methods. It provides value, support, and critical inspection processes when reliability, performance, and ease of use are required.



Technique development

The development of the inspection technique is the start of every ultrasonic inspection. Basic inspection techniques can be drafted manually or on third-party software, but this is time consuming and requires transfer. UltraVision provides an extended set of capabilities for complex and custom geometries.

- From basic to complex geometry management
- Custom geometry handling
- Scanner creation tool
- Overlays
- UV technique

UltraVision features an advanced focal law calculator, standard for the entire Eddyfi Technologies' UT portfolio. It can handle probes with up to 256 elements and takes into consideration the embedded probe, the wedge, and the material database.

Visual feedback is provided on focal law generation. Focal law calculation supporting flat and cylindrical geometries is easy, fast, and accurate to ensure that probes are positioned optimally for the inspection. The focal law calculator supports all advanced ultrasonic inspection techniques, including phased array pulse echo, pitch and catch, tandem TFM and PWI, plus conventional time-of-flight-diffraction (TOFD). UltraVision supports flexible probes that can adapt to irregular surfaces requiring inspection. UltraVision can calculate focal laws to match the surface profile.

UltraVision will design a probe to meet the application requirements, assessing the theoretical parameters, calculating beam parameters, and providing a 3D simulation of the acoustic beam. It will also simulate beam behavior if any of the channels are defective. Additionally, calculated wedge parameters can be exported to facilitate wedge manufacture.

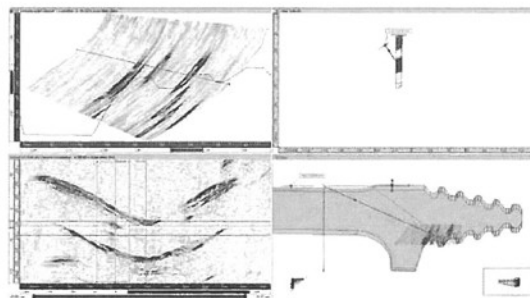
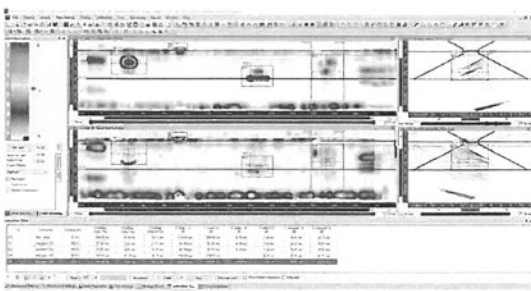
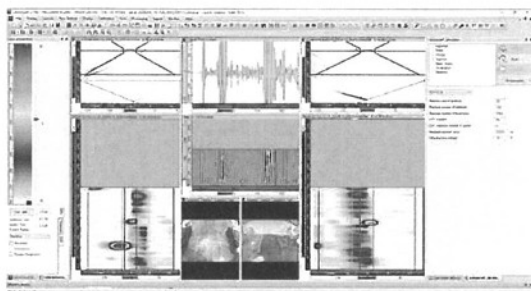
Data analysis

UltraVision's powerful data analysis features provide an inspection advantage. Views and Axis: Provides a range of advanced views which can be uncorrected, volume corrected, or three-dimensional. The software can also convert between Cartesian and Polar coordinate systems and can convert Linear to Logarithmic data.

Analysis Support: A large set of tools is available to assist with data analysis and sizing indications.

File Management: Data can be filed or exported according to user requirements. Processing Tools: UltraVision also features a range of processing tools offering various data display formats and corrective processing. The original raw data is never compromised.

Parameters: All UT and mechanical parameters can be reviewed and displayed in information fields. Customized information fields are filed through dynamic links to Excel where specific calculations can be performed.



Data acquisition

When it comes to setup building, calibration, and data acquisition, UltraVision can handle it all.

Setup Building: UltraVision can effectively take care of user rights management (from individuals to groups), ensuring the inspection integrity. UT parameter, mechanical, and screen view settings can all be restricted to defined users or groups.

Calibration: Various tools are available to check the calibration of mechanical and UT parameters. Plus, automatic probe detection identifies connected probes, reads probe parameters, serial number, and tracks any probe changes.

Data Acquisition: UltraVision acquires all the relevant data necessary for accurate and reliable inspections. This data is stored in a data file that can reach up to 20GB and can be filed or exported according to user requirements.

Reporting

With UltraVision, reporting is highly flexible and powerful. Indications are automatically published in an indications table that can be exported to Excel or a complete report.

Indications are directly plotted on a 3D view of the inspected specimen. Additional configurable user fields can be created to provide more information in the report. Best of all, a wide range of predefined reports are available to facilitate the reporting process.

[Download UltraVision Classic](#)

15. Licenses

KONHA Ltd. will deliver the following licences in the scope of supply:

1. Five licences for the software for acquisition of eddy current testing data.
2. Two licences for the software for acquisition and analysis of ultrasonic inspection data.
3. One licence for the software for installation of mechanical plugs, and the software for removal of mechanical plugs.
4. Twelve licences for the software for analysis of eddy current testing data.
5. One licence for the software for resolution (review) of eddy current testing results.
6. One licence for the software for eddy current testing data management (database).

16. Spare components of the manipulators

Spare parts which will be delivered are strictly in accordance with Technical specification.

17. Delivery schedule

The equipment will be delivered not later than 360 calendar days from the date of advance payment.

18. Other conditions

KONHA Ltd will be a manufacturer of systems for eddy current testing, ultrasonic inspection, and installation of mechanical plugs on the heat exchanging tubes of ПГБ-1000M steam generators.

KONHA Ltd. will provide technical assistance by supplying at least 3 specialists in mechanics, electronics, and software to maintain the equipment for a period of 14 calendar days during each annual refuelling outage for 2 (two) consecutive years.

The specialists will be certified to work in ionizing radiation environments.

The KONHA Ltd. will ensure updates to the supplied software in the event of a change or update to the operating system for a period of at least 5 years.

The licences for the supplied software will be hardware keys. The supplied software will have a perpetual license.

All other conditions mentioned in document 58728 will be fully fulfilled by KONHA Ltd. in every sense.

19. Training of Kozloduy NPP specialists

The KONHA Ltd. will conduct training for specialists from Kozloduy NPP EAD:

1. Equipment operation – at least 8 persons;
2. Equipment maintenance – at least 10 persons;
3. Equipment periodic servicing – at least 10 persons;
4. Spare part configuration and adjustment – at least 10 persons;
5. Using the software for eddy current and ultrasonic data acquisition – at least 10 persons;
6. Using the software for eddy current and ultrasonic data analysis – at least 10 persons;
7. Using the software for resolution (review) of eddy current testing data – at least 2 persons;
8. Using the software for eddy current testing data management (database) – at least 2 persons;
9. Using the modules for installation and removal of mechanical plugs – at least 10 persons.

The training will be conducted in Bulgaria at the Contracting Authority's premises.

Йотова, Цветелина А.

From: Добрева, Мануела К.
Sent: 24 септември 2026 г. 8:14
To: Йотова, Цветелина А.
Subject: Препр.: Пазарна Консултация № 58728
Attachments: KONHA indicative proposal related to doc 58728.pdf

От: Михайлова, Веселина А.
Изпратено: 24 септември 2026 г. 8:13:52 (UTC+02:00) Хелзинки, Киев, Рига, София, Талин, Вилнюс
До: Добрева, Мануела К.
Як: Александров, Пламен Г.; Лазарова, Милена Т.
Тема: FW: Пазарна Консултация № 58728

BX-E-6304/24.09.2026

From: Berislav Nadinic <bnadinic@konha.hr>
Sent: Thursday, September 24, 2026 1:19 AM
To: Йотова, Цветелина А. <CYotova@npp.bg>
Cc: commercial <commercial@npp.bg>
Subject: Re: Пазарна Консултация № 58728

ВНИМАНИЕ: ВЪНШЕН ПОДАТЕЛ. Не отваряйте прикачени файлове и линкове в съобщението, ако не разпознавате подателя и не знаете, че съдържанието е безопасно.

Dear Mrs. Cvetelina,

Please find attached KONHA indicative proposal in accordance with document 58728.

Best regards

KONHA CEO

dr.sc. Berislav Nadinic dipl.ing.mech.

On 11/09/2026 08:45, Йотова, Цветелина А. wrote:

Уважаеми д-ми и г-да,
Във връзка с провеждането на Пазарна Консултация № 58728, приложено изпращам линк.
<https://kznpp.org/bg/pazarni-konsultatsii/7202>

В очакване на индикативно предложение и с пожелание за успешен ден.

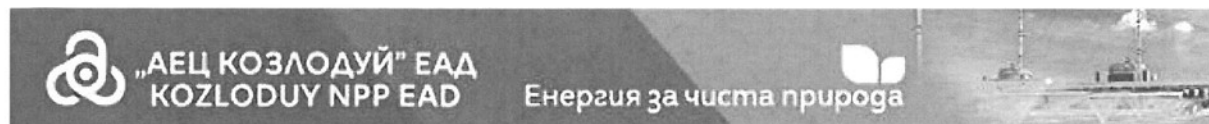
Цветелина Ангелова Йотова
Експерт Маркетинг

Тел.: (0973) 7 21-02

E: cyotova@npp.bg

„АЕЦ Козлодуй“ ЕАД, 3321

България, област Враца, гр. Козлодуй



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