MACHINES & MANUFACTURING

ABOUT TETA

TETA is a developer and manufacturer of electron beam equipment.
The TETA brand represents a group of enterprises established in 2008.

We have our own research and production facilities that enable us to carry out the full range of scientific, design, technological, and manufacturing tasks.

Our core product is electron beam welding equipment. We supply both standard and custom-made systems, including equipment for electron beam melting and additive manufacturing. We also provide installation, commissioning, and maintenance services.

Our team consists of highly qualified professionals specializing in the design and production of electron beam guns, vacuum systems, electric drives, and automated process control systems. The company's leading engineers have over 20 years of joint research and development experience

More than sixty enterprises have chosen TETA equipment, representing industries such as aerospace, nuclear, metallurgy, instrumentation, and others.

When you work with us, you turn to partners who sincerely want to help and treat your goals as their own.

ELECTRON BEAM WELDING MACHINES

TETG

TETA 6E250 / TETA 6E400

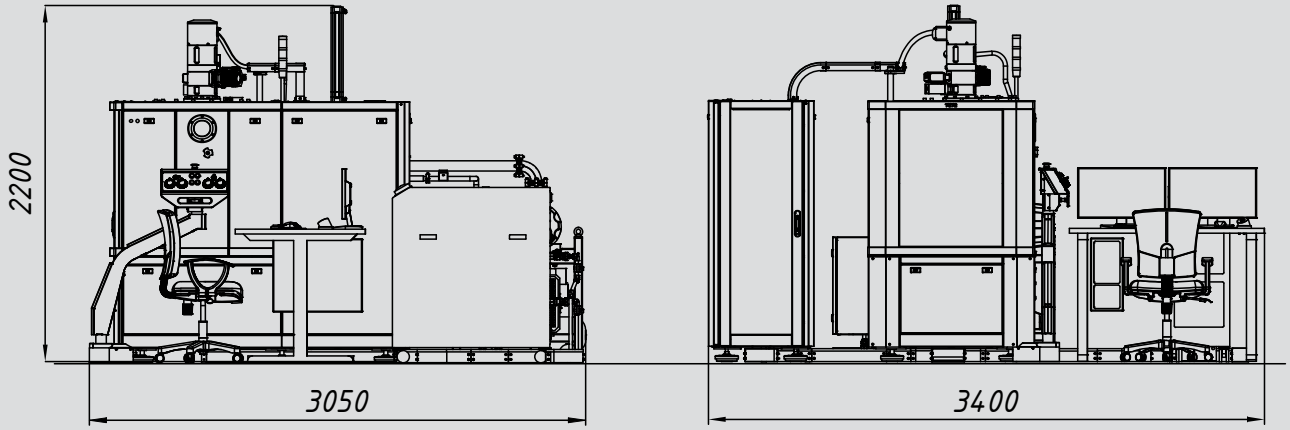
Designed for electron beam welding of small workpieces in vacuum. Capable of performing longitudinal, circumferential, radial, and end seams using a vertical electron beam. Features a cubic vacuum chamber, with variations available in chamber size.

STANDARD EQUIPMENT:

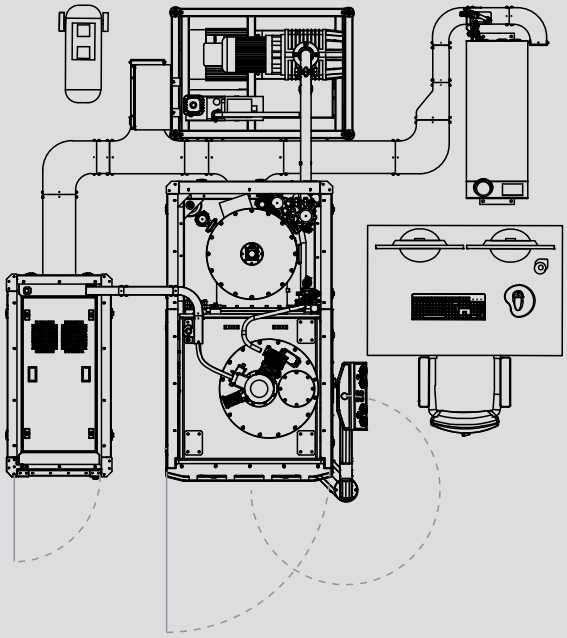
- Chamber-mounted electron beam gun
- Workpiece positioning table
- CNC rotary table
- Surveillance system

OPTIONS & PACKAGES:

- Direct, indirect, plasma cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera.
- 2-axis or 3-axis X, Y, Z workpiece positioning table
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping.
- Vacuum system based on oil-free pumps.
- Cathode replacement cartridge



TETA 6E400



TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS:	
TETA 6E250 / TETA 6E400	500×500×500 mm / 800×800×800 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	6-15 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT, INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	2 – 10 min
CNC TABLE DIMENSIONS TETA 6E250 / TETA 6E400	160×200 mm / 300×320 mm
MAX. X, Y, Z STROKE TETA 6E250 / TETA 6E400	250x250x300 mm / 400x400x300 mm
TRAVEL SPEED X, Y, Z	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 60 r/min

TETA 15E800

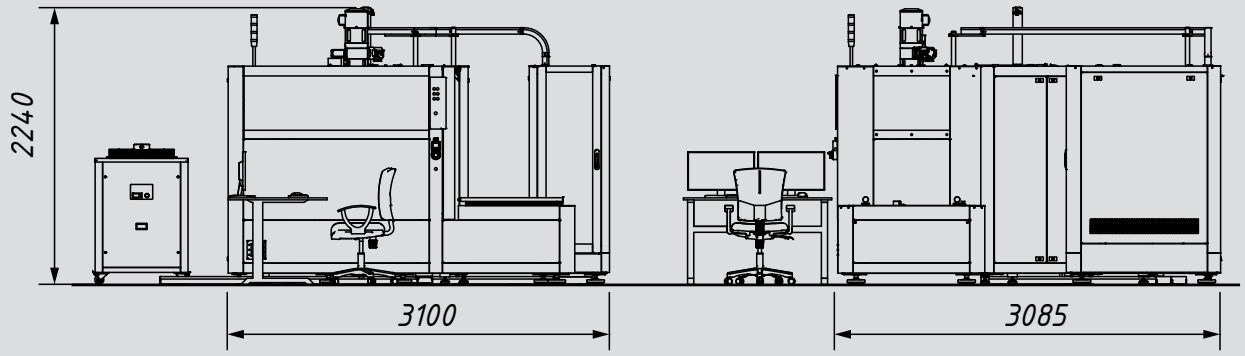
Designed for electron beam welding of parts in vacuum. Capable of performing longitudinal, circumferential, radial, and end seams using a vertical electron beam. Features a workpiece positioning table, which significantly facilitates the assembly, loading, and unloading of workpieces.

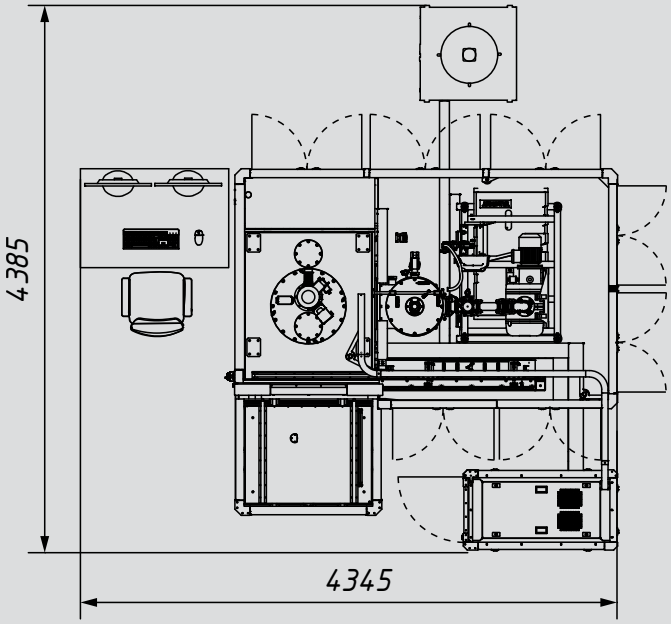
STANDARD EQUIPMENT:

- Chamber-mounted electron beam gun
- Workpiece positioning table
- CNC rotary table
- Surveillance system

OPTIONS & PACKAGES:

- Direct, indirect, plasma cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera.
- 2-axis or 3-axis X, Y, Z workpiece positioning table
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping.
- Vacuum system based on oil-free pumps.





TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS	800×800×1500 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	6-15 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT, INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	2 – 10 min
CNC TABLE DIMENSIONS	300×320 mm
MAX. X, Y, Z STROKE	800, 400, 300 mm
TRAVEL SPEED X, Y, Z	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 60 r/min
COOLING SYSTEM	CLOSED LOOP

TETA 15E900

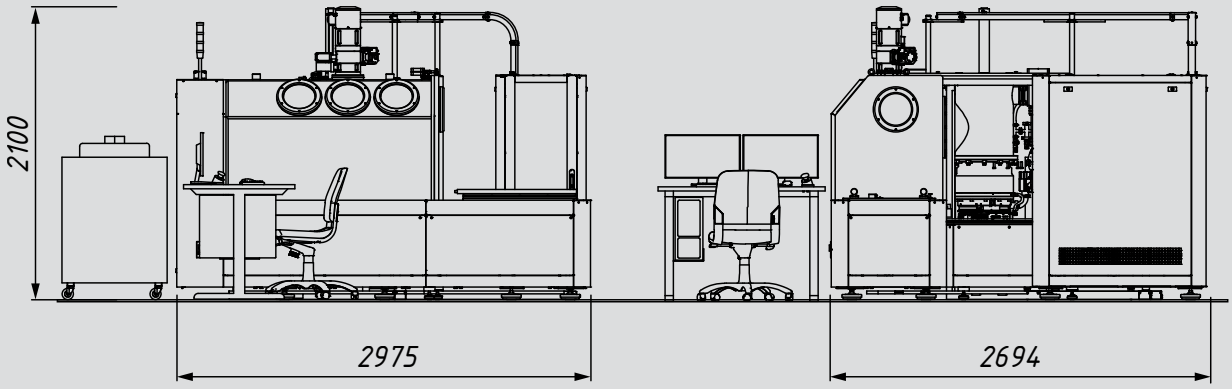
Designed for electron beam welding of parts in vacuum. Capable of performing longitudinal, circumferential, radial, and end seams using a vertical electron beam. Features a workpiece positioning table, which significantly facilitates the assembly, loading, and unloading of workpieces.

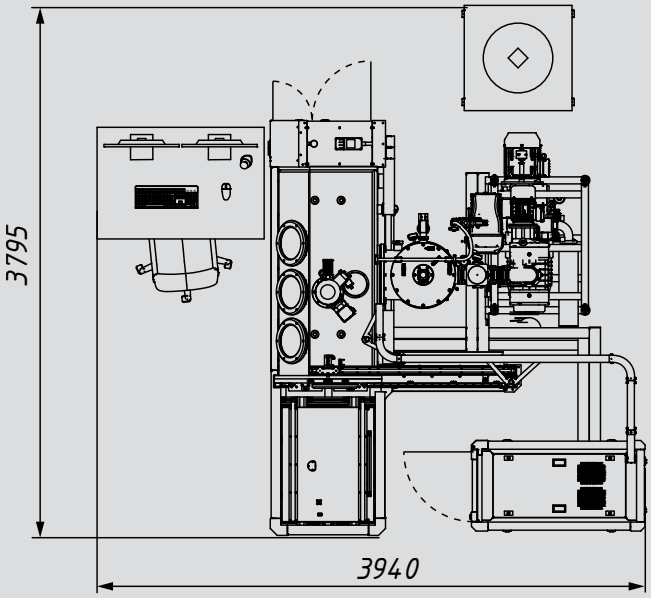
STANDARD EQUIPMENT:

- Chamber-mounted electron beam gun
- Workpiece positioning table
- CNC rotary table
- Surveillance system

OPTIONS & PACKAGES:

- Direct or indirect cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera.
- 2-axis or 3-axis X, Y, Z workpiece positioning table
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping.
- Vacuum system based on oil-free pumps.
- Wire feed into the weld zone.





TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS:	900×900×1900 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	6-15 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT, INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	2 – 10 min
WORKPIECE TRAVEL X, Y, Z	900, 100, 250 mm
TRAVEL SPEED X, Y, Z	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 60 r/min
COOLING SYSTEM	CLOSED LOOP

TETA 6E950

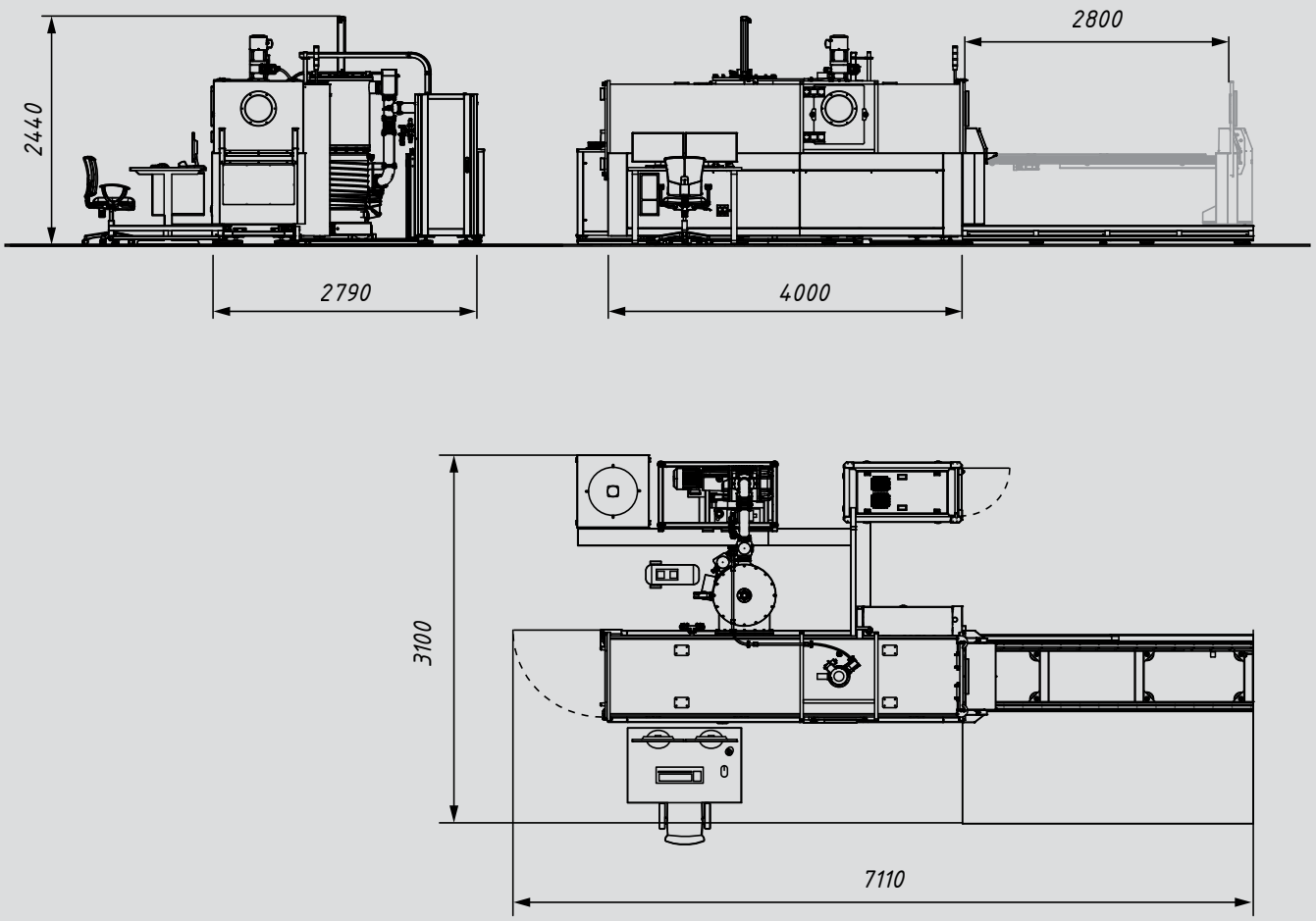
Designed for electron beam welding of long workpieces in vacuum. Capable of performing longitudinal, circumferential, radial, and end seams using a vertical electron beam. Features a workpiece positioning table, which significantly facilitates the assembly, loading, and unloading of workpieces. Includes a side access hatch.

STANDARD EQUIPMENT:

- Chamber-mounted electron beam gun
- Workpiece positioning table
- CNC rotary table
- Surveillance system

OPTIONS & PACKAGES:

- Direct or indirect cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera.
- 2-axis or 3-axis X, Y, Z workpiece positioning table.
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping.
- Vacuum system based on oil-free pumps.



TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS	800×800×4000 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	6 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT, INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	10 – 15 min
WORKPIECE TRAVEL X, Y	950, 400 mm
TRAVEL SPEED X, Y	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 30 r/min
COOLING SYSTEM	CLOSED LOOP

TETA 30E1200

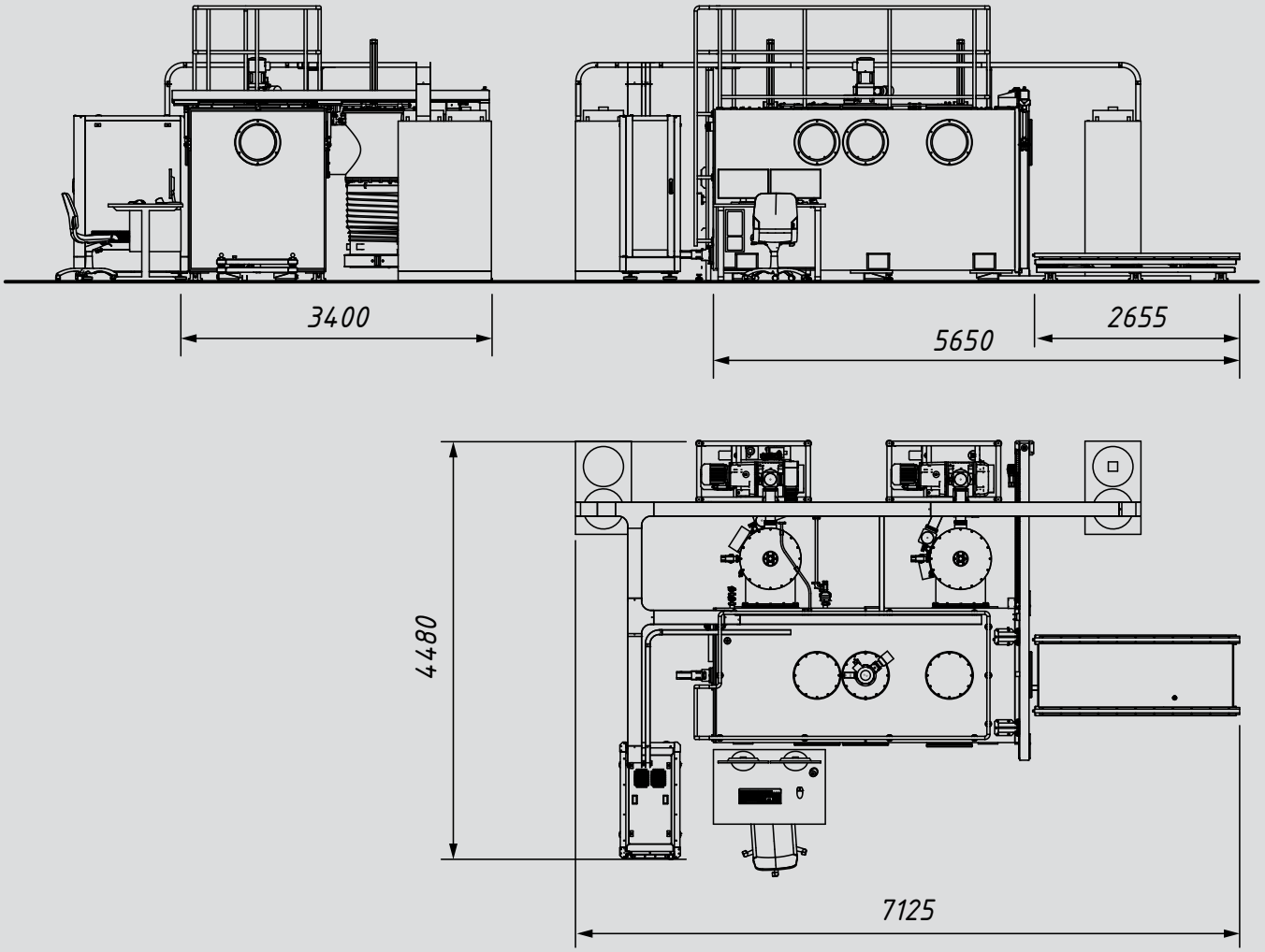
Designed for electron beam welding of parts in vacuum. Capable of performing longitudinal, circumferential, radial, and end seams using a vertical electron beam. Features a workpiece positioning table, which significantly facilitates the assembly, loading, and unloading of workpieces.

STANDARD EQUIPMENT:

- Chamber-mounted electron beam gun
- Workpiece positioning table
- CNC rotary table
- Surveillance system

OPTIONS & PACKAGES:

- Direct or indirect cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera.
- 2-axis or 3-axis X, Y, Z workpiece positioning table
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping
- Vacuum system based on oil-free pumps.
- Cathode replacement cartridge
- Wire feed into the weld zone.



TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS	3000 × 1200 × 1500 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	30 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT, INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	10 – 15 min
WORKPIECE TRAVEL X, Y	1200, 200 mm
TRAVEL SPEED Y	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 30 r/min
COOLING SYSTEM	CLOSED LOOP

TETA 30E2500

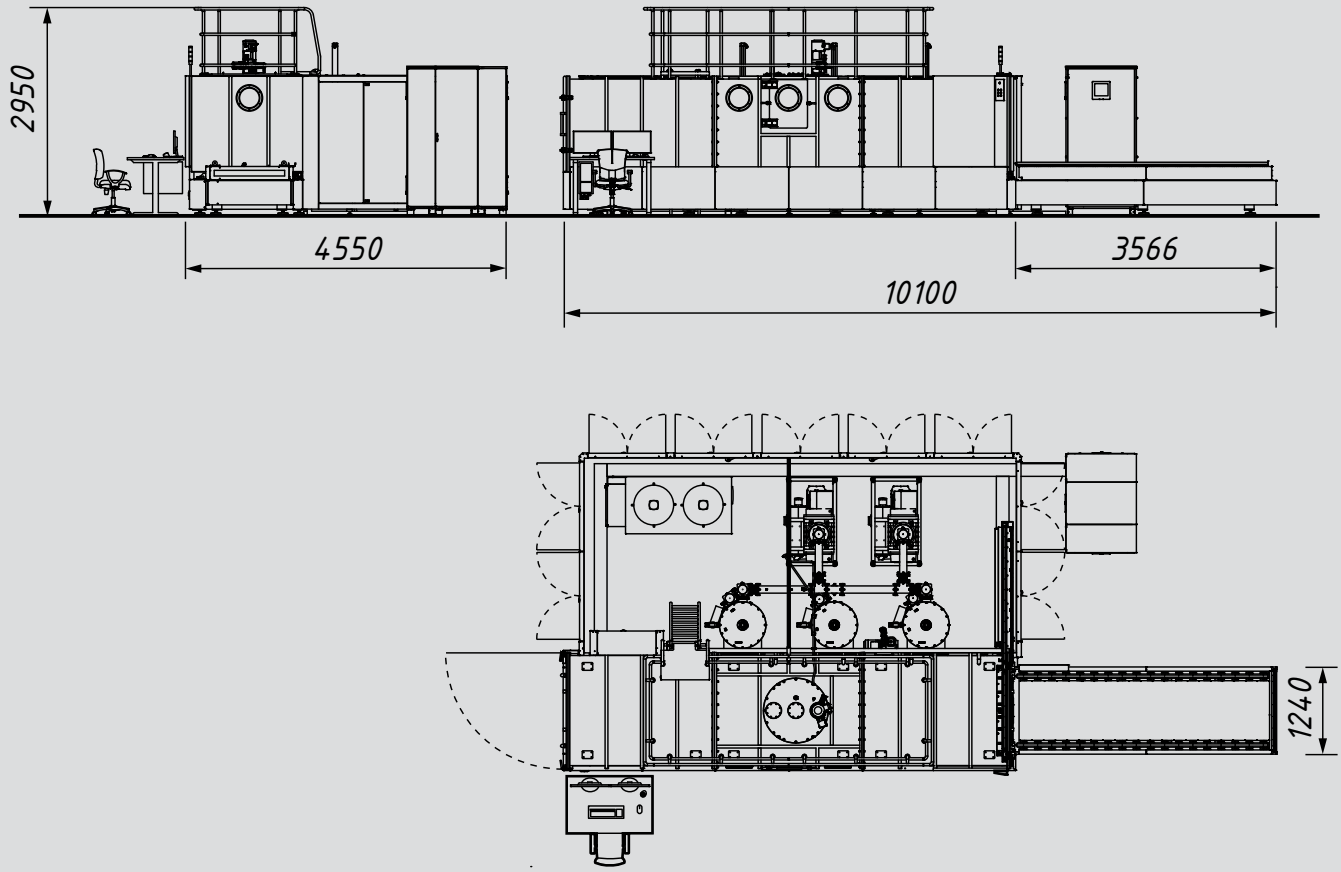
Designed for electron beam welding of long workpieces in vacuum. Capable of performing longitudinal, circumferential, radial, and end seams using a vertical electron beam. Features a workpiece positioning table, which significantly facilitates the assembly, loading, and unloading of workpieces. Includes a side acess hatch.

STANDARD EQUIPMENT:

- Chamber-mounted electron beam gun.
- Workpiece positioning table.
- CNC rotary table.
- Surveillance system.

OPTIONS & PACKAGES:

- Direct or indirect cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera.
- 2-axis or 3-axis X, Y, Z workpiece positioning table
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping
- Vacuum system based on oil-free pumps.
- Wire feed into the weld zone



TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS	1200×1500×6000 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	30 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT, INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	10 – 15 min
CNC TABLE DIMENSIONS	3400×600 mm
MAX. STROKE X, Y	2500, 500 mm
TRAVEL SPEED X, Y	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 30 r/min
COOLING SYSTEM	CLOSED LOOP

TETA 15E1500 / TETA 60E4000

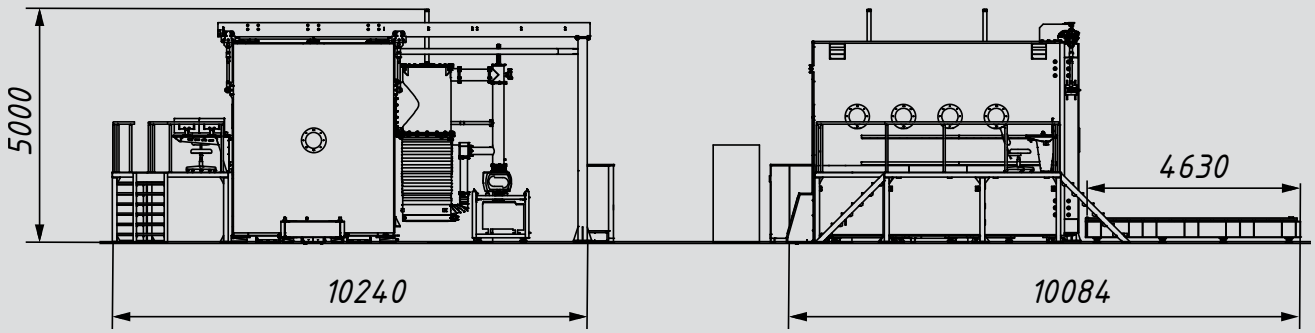
Series of large-scale electron beam welding systems for vacuum operation. These systems feature cuboid-shaped vacuum chambers with volumes ranging from 15 to 150 cubic meters. They enable welding along arbitrary beam trajectories with any beam inclination angle. The electron beam gun is positioned inside the vacuum chamber and moves via a 5-axis gantry. These systems can also support additive technologies such as electron beam wire deposition.

STANDARD EQUIPMENT:

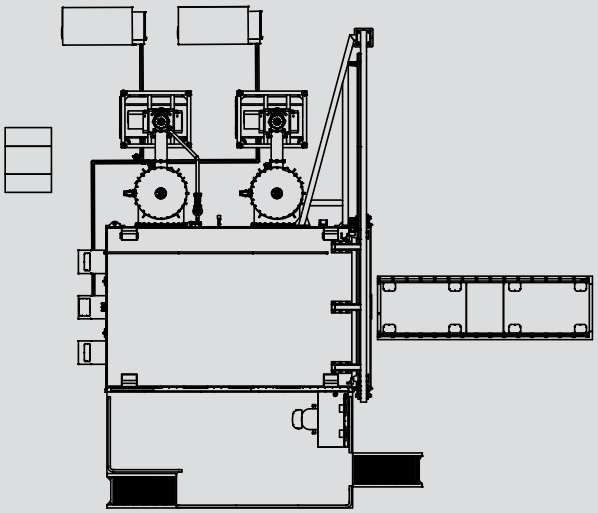
- In-chamber electron beam gun
- 5-axis gun gantry
- Workpiece positioning table
- CNC rotary table
- Surveillance system

OPTIONS & PACKAGES:

- Direct or indirect cathode
- Gate valve that isolates the cathode region of the electron beam gun from the working volume of the vacuum chamber.
- Coaxial-to-beam video observation system with dust protection, observation in reflected electrons, overview camera
- 2-axis workpiece positioning table
- Single- or multi-position rotary table, with or without rotation axis tilt, with or without workpiece clamping
- Cathode replacement cartridge
- Wire feed into the weld zone



TETA 60E4000



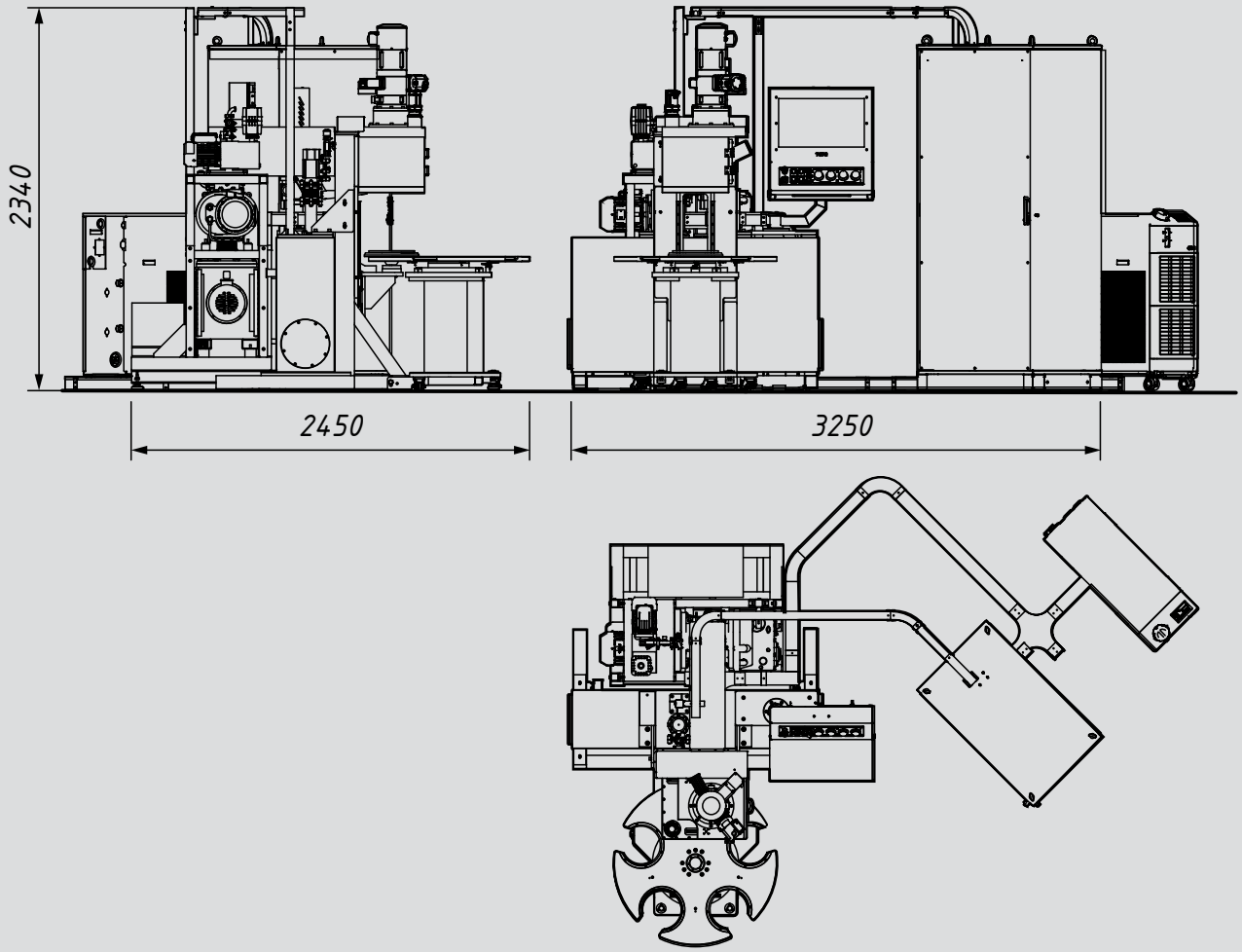
TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS	5000×3500×4900 mm
ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	60 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	INDIRECT HEATING
PROCESS VACUUM	$5*10^{-2}$ Pa
ULTIMATE VACUUM	$5*10^{-3}$ Pa
EVACUATING TIME	20 – 40 min
GUN ANGLE	±90°
GUN TRAVEL DISTANCE	4000, 2500, 3000 mm
TRAVEL SPEED X, Y	0,1 – 40 mm/s
ROTARY SPEED	0,1 – 30 r/min
COOLING SYSTEM	CLOSED LOOP

TETA 12E150

SPECIALIZED MACHINE

Designed for high-productivity electron beam welding of gears (or any parts with ring end or radial seams) in vacuum. Workpieces to be welded are placed on a pallet and sequentially fed into the vacuum chamber. The vacuum chamber has a small volume with minimal evacuation and venting times. After welding, the pallet rotates to present the next part for welding. The operator removes welded parts from the pallet and installs new ones. The welding cycle time is less than one minute.

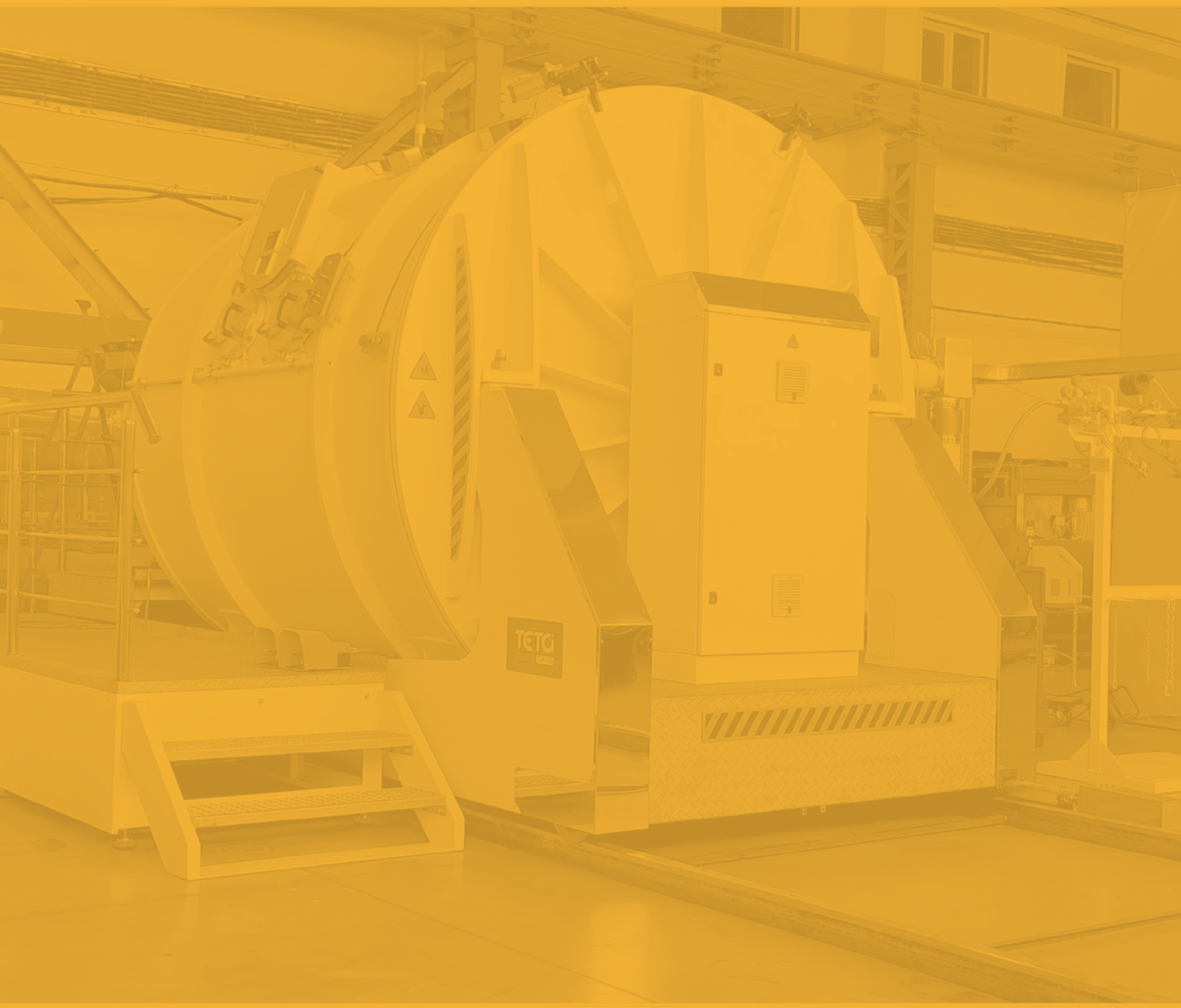


TECHNICAL DATA

ACCELERATING VOLTAGE	60 kV
MAX. BEAM POWER	12 kW
ANGLE OF DEVIATION	±7°
CATHODE TYPE	DIRECT
MAX. DIAMETER OF WELDED PARTS	280 mm
MAX. HEIGHT OF WELDED PARTS	200 mm
MAX. WELDING CYCLE TIME	1 min

MACHINES

TETG



TETA CA10

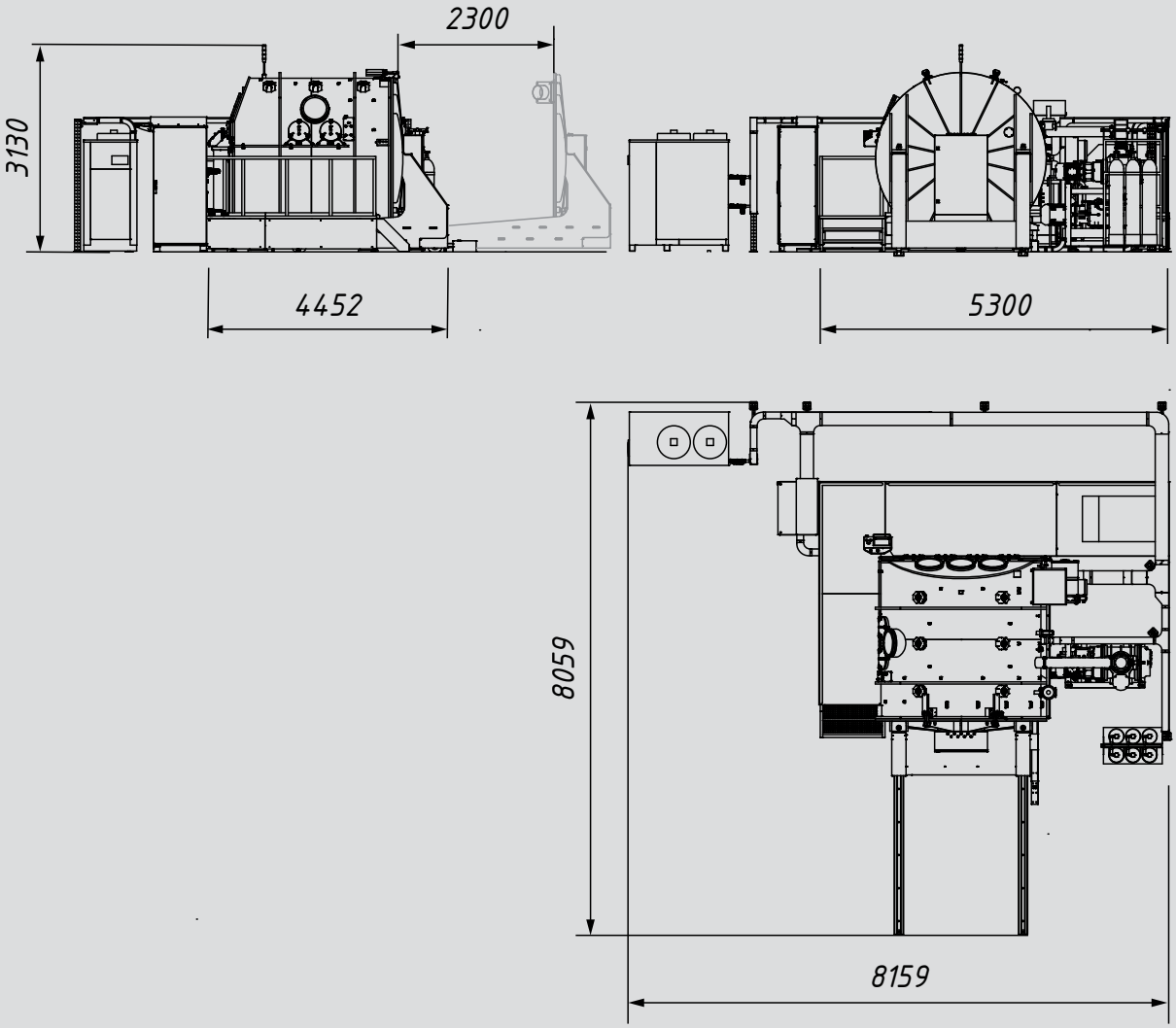
Designed for manual arc welding in an inert environment. The workpieces to be welded are positioned on a 5-axis cnc table. For ease of loading and unloading, the cnc table is mounted on a retractable lid of the working chamber. Prior to welding, the working chamber is evacuated by vacuum pumps and then filled with argon.

STANDARD EQUIPMENT:

- Gloveboxes
- 5-Axis cnc table
- Operating chamber evacuation and argon supply system

OPTIONS & PACKAGES:

- Auto-darkening viewports
- Argon cleaning, drying, and cooling
- Continuous monitoring of impurities in argon
- Cooling argon purge of gloveboxes



TECHNICAL DATA

VACUUM CHAMBER VOLUME	10 м^3
PROCESS VACUUM	from 1,3 to 1,3×10^{-1} Pa
EVACUATION TIME	15 min
ARGON FILL TIME	from 1 to 3 min
OPERATING CHAMBER ARGON PRESSURE	from 0,101 to 0,105 MPa
NUMBER OF GLOVE PORTS	6
NUMBER OF HAND HELD WELDING TORCHES	4
MAX. CNC TABLE PAYLOAD	1000 kg
MAX. DIAMETER OF CIRCUMFERENTIAL WELDS	1500 mm
MAX. TABLE TILT ANGLE	135 °
TABLE ROTATION SPEED RANGE	from 0,06 to 2,5 r/min
WELDING CURRENT ADJUSTMENT RANGE	from 5 to 450 A

TETA DW100

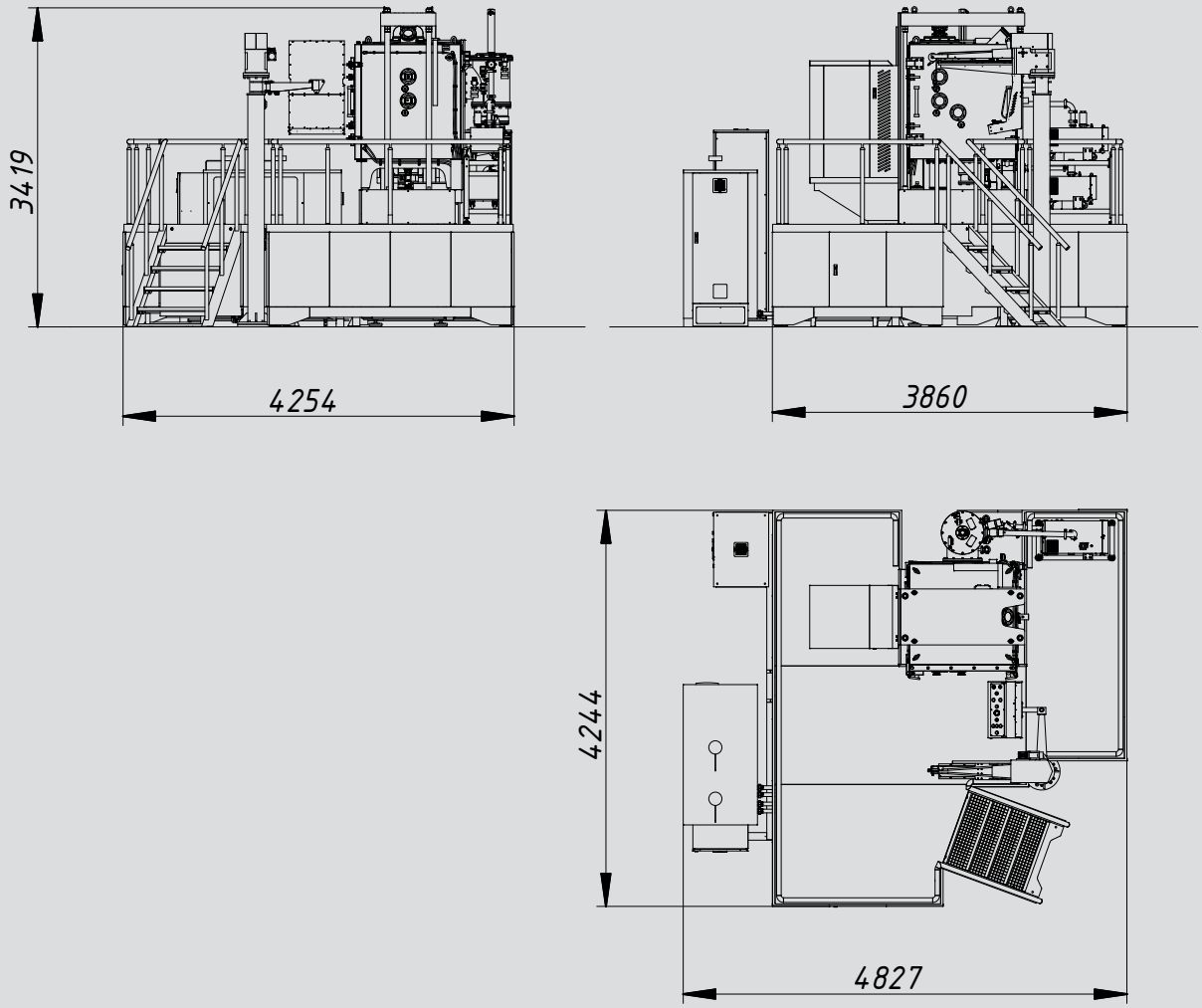
Designed for diffusion welding in vacuum. Prior to welding, the working chamber with loaded parts is evacuated, then the parts are heated inductively to the required temperature and compressed with specified force.

STANDARD EQUIPMENT:

- 6-Axis CNC Table
- Part induction heating system
- Hydraulic system for part compression

OPTIONS & PACKAGES:

- Interchangeable inductors of various sizes.
- Video surveillance
- Heating and compression according to a specified profile



TECHNICAL DATA

VACUUM CHAMBER DIMENSIONS	990 x 1010 x 1080 mm
PROCESS CHAMBER PRESSURE	$6{,}6\times10^{-3}$ (5×10^{-5}) Pa (Topp)
MAX. PART CHANGER COUNT	6
CENTER-TO-CENTER DISTANCE	620 mm
WORKTABLE DIAMETER	220 mm
STROKE OF THE PART COMPRESSION ROD	650 mm
COMPRESSION FORCE	from 0,5 to 20 tons
HEATING SOURCE POWER	100 kW
OPERATING FREQUENCY	2400 Hz
MAX. HEATING TEMPERATURE	1200 ˚C
HEATING RATE	FROM 60 TO 120 ˚C/MIN

TETA 30EBM900

Designed for vacuum melting of materials to refine them or produce new alloys. A distinctive feature of electron beam melting is the absence of restrictions on the melting temperature of materials. The power of the electron beam gun can range from tens of kilowatts to units of megawatts.

STANDARD EQUIPMENT:

- Chamber-mounted electron beam gun
- Feeding system for the remelted material
- Crystallizer

OPTIONS & PACKAGES:

- Feeding system for the remelted material in rods, charge
- The remelted material can be formed into an ingot or poured into molds.

NOTES

ELECTRON BEAM GUNS

TETA

CHAMBER-MOUNTED ELECTRON BEAM GUNS

The core of the electron beam gun is an integral metal-ceramic assembly. This assembly houses a replaceable cartridge containing the cathode. The cartridge may feature a direct or indirect heated cathode. The gun design allows for quick cartridge replacement, with no subsequent alignment required.

STANDARD EQUIPMENT:

- Independent differential pumping system based on a turbomolecular pump.
- A gate valve isolates the cathode volume of the gun from the working volume of the vacuum chamber.

OPTIONS & PACKAGES:

- Coaxial electron beam video observation system with dust protection.;
- Welding zone illumination
- Binocular coaxial video observation system.
- Heat shield

MODEL	ACCELERATING VOLTAGE kV	POWER kW	CATHODE TYPE
6F30	30	6	DIRECT
6P40	40	6	PLASMA
15H30	30	15	INDIRECT HEATING
30H30	30	30	INDIRECT HEATING
6F60	60	6	DIRECT
15F60	60	15	DIRECT
30H60	60	30	INDIRECT HEATING
60H60	60	60	INDIRECT HEATING

IN-CHAMBER ELECTRON BEAM GUNS

Similar to chamber-mounted guns. They feature a lightweight housing and compact dimensions. Designed for installation inside the vacuum chamber on a gantry, robot arm, or any other motion system.

MODEL	VOLTAGE, kV	POWER, kW	CATHODE TYPE
TETA 6FV30	30	6	DIRECT
TETA 15HV30	30	15	INDIRECT HEATING
TETA 30HV30	30	30	INDIRECT HEATING
TETA 6FV60	60	6	DIRECT
TETA 15FV60	60	15	DIRECT
TETA 30HV60	60	30	INDIRECT HEATING
TETA 60HV60	60	60	INDIRECT HEATING

ELECTRON BEAM MELTING GUNS

Designed for operation as part of electron beam melting systems. They feature a large beam deflection angle. Equipped with a two-stage differential pumping system.

MODEL	VOLTAGE, kV	POWER, kW
TETA150H30	30	150
TETA 300H30	30	300
TETA 900H50	50	900

POWER SUPPLIES

The TETA power supplies are designed using a modular system.

Key Modules
High-voltage power supply (HVPS)
Beam forming unit (BFU)
Deflection and focusing unit (DFU)
Control and monitoring unit (CMU)
These units feature digital control and offer high stability and repeatability of parameters. The HVPS generates the accelerating voltage, includes arc protection, and is implemented as a 15 kW power module. Multiple modules can be used if higher power is required. The BFU forms filament, bombardment, and Wehnelt voltages while ensuring beam current stabilization. The DFU provides high-speed beam deflection and focusing. The CMU manages the system's automation functions.

MODEL	VOLTAGE, kV	POWER, kW	CATHODE TYPE
TETA S6F30	30	6	DIRECT
TETA S15H30	30	15	INDIRECT HEATING
TETA S30H30	30	30	INDIRECT HEATING
TETA S6F60	60	6	DIRECT
TETA S15F60	60	15	DIRECT
TETA S30H60	60	30	INDIRECT HEATING
TETA S60H60	60	60	INDIRECT HEATING

CONTROL PANELS

TETA CONTROL PANELS ARE AVAILABLE IN VARIOUS CONFIGURATIONS: DESKTOP, FULL-SIZE AND MANUAL.

- Desktop control panel

Desktop control panel is used in conjuction with operator workstation.

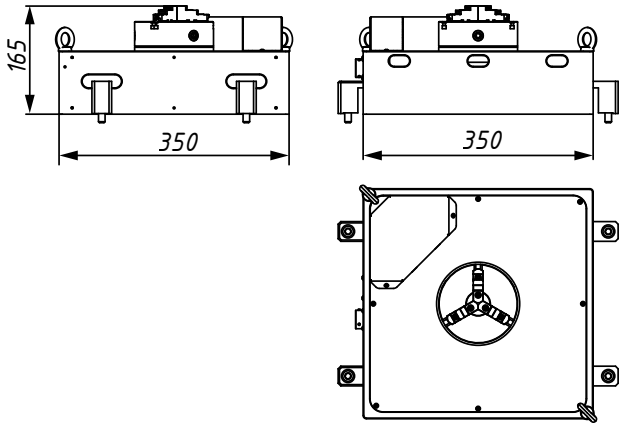
- Full-size control panel

information display and control of operating modes are integrated into a single unit.

- Manual control panel

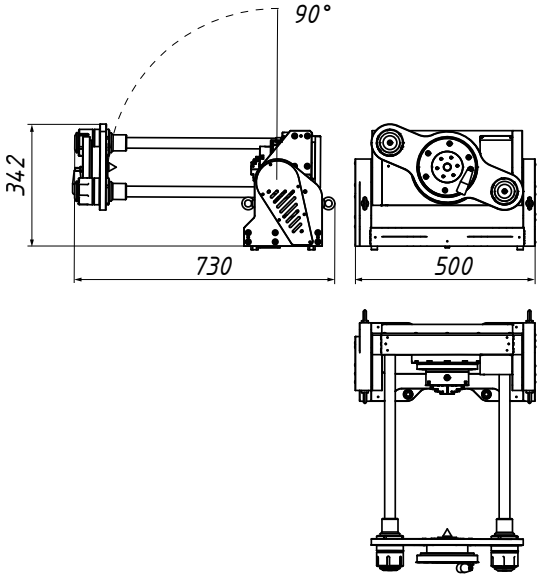
The handheld control panel is used in manual mode during observation through viewports.

CNC ROTARY TABLES



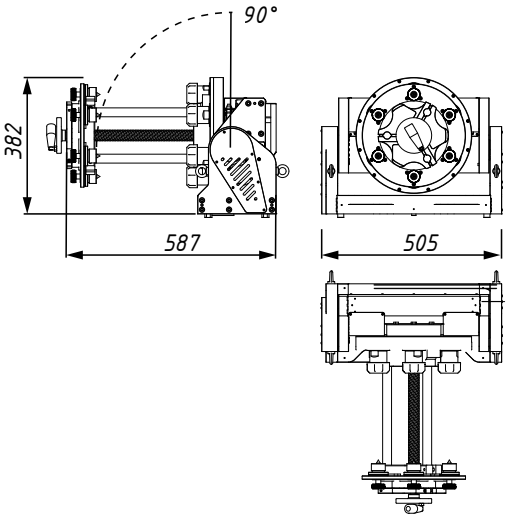
SINGLE-AXIS CHUCK

- Vertical or horizontal positioning
- Max. rotation speed 60 r/min



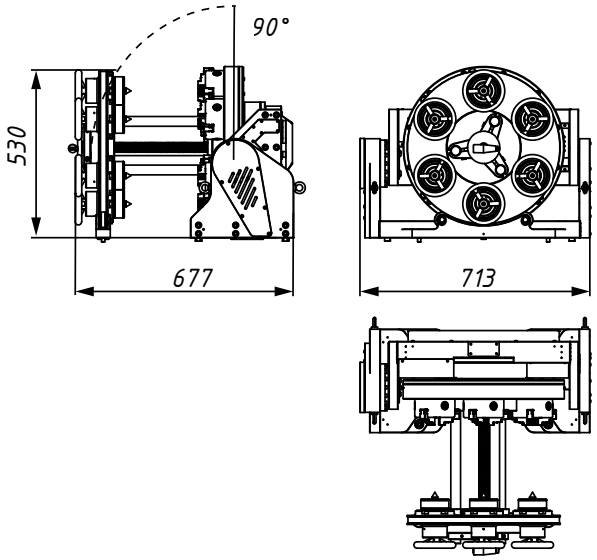
2-AXIS TABLE WITH A CHUCK & CLAMP

- Adjustable tilt of rotation axis
- Max. rotation speed 60 r/min



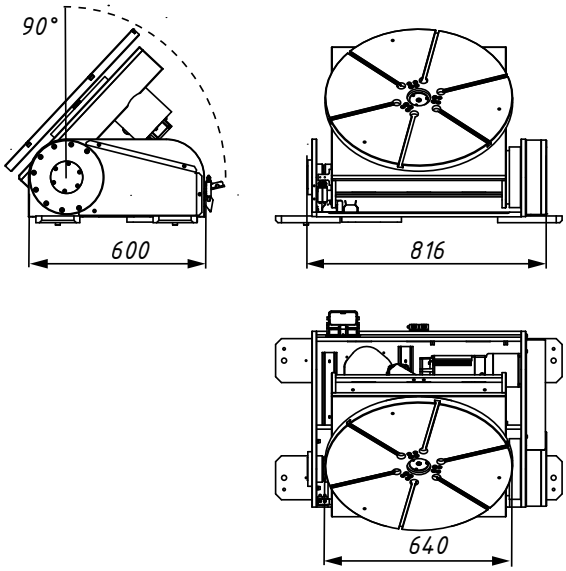
2-AXIS TABLE WITH MULTI-COLLET CHUCKS

- Adjustable tilt of rotation axis
- Max. rotation speed 60 r/min
- Workpieces clamped in a collet chuck



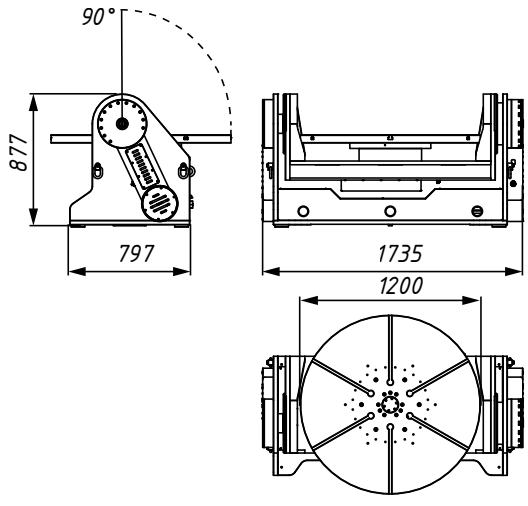
2-AXIS MULTI-CHUCK TABLE

- Adjustable tilt of rotation axis
- Max. rotation speed 60 r/min



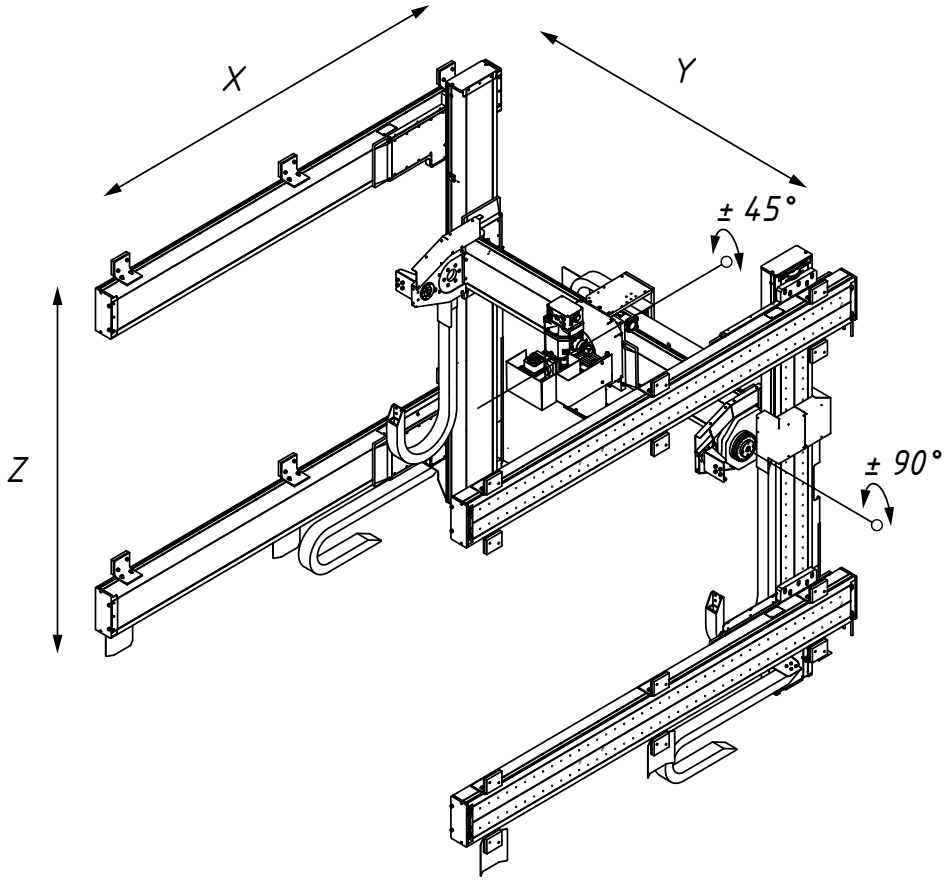
2-AXIS TILTING ROTARY TABLE

- Adjustable tilt of rotation axis
- Max. rotation speed 20 r/min
- T-slot lathe faceplate
- Max. payload 500 kg



2-AXIS ROTARY TABLE

- Adjustable tilt of rotation axis
- Max. rotation speed 10 r/min
- T-slot lathe faceplate
- Max. payload 1500 kg



5-AXIS PORTAL

- Designed for moving the electron gun inside the vacuum chamber
- 3-axes – movement along, across, and up-down relative to the vacuum chamber
- Travel range corresponds to the size of the vacuum chamber
- Travel speed up to 50 mm/s
- Positioning accuracy of 50 μm

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