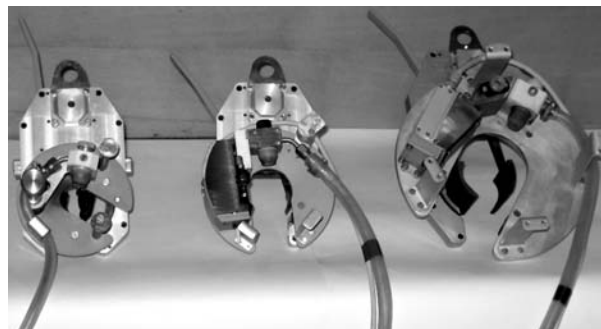




AUTOMATIC MACHINES ADTs 625, ADTs 626 AND ADTs 627 FOR ORBITAL WELDING OF PIPELINES

The welding complexes ADTs 627 U3.1, ADTs 625 U3.1 and ADTs 626 U3.1 developed at the Research Engineering Centre of Welding and Testing in Atomic Energy of the E.O. Paton Electric Welding Institute are designed for automatic orbital welding with non-consumable (tungsten) electrode in shielding gases (mainly argon) of position welds of 8–76 mm diameter pipelines of up to 4 mm wall thickness, manufactured of steels of pearlite, austenite classes and high alloys, under site conditions and for repair of objects of power engineering, including nuclear power stations, heat power stations and also of other fields of industry.



Brief technical characteristics of automatic machines

Parameter	ADTs 627	ADTs 625	ADTs 626
Diameter of pipes being welded, mm	8–24	18–42	45–76
The smallest distance between pipes, mm	60	65	80
Ranges of welding speed adjustment, m/h	1–20		
Diameter of tungsten electrode (of grades VL, VI or VT), mm	1.6	2.0	3.0
The largest radial movement of torch, mm	15	16	20
The largest torch movement across the butt, mm	±1	±5	
Cooling of torch	Gas		
Ranges of welding current adjustment, A	8–250		
Ranges of arc voltage adjustment, V	9–18		
Accuracy of welding current maintenance, %	not more than ±2		
Accuracy of arc voltage maintenance, V	not more than ±0.20	±0.15	
The highest speed of torch movement relative to mechanism AAV, mm/s	–	10	
Location of electric drive of rotation of face-plate	Parallel to the pipe axis		
Mass of welding head, kg	not more than 3.0	3.5	4.9
Consumed electric power, kV·A	not more than 6		

Each welding complex consists of

- ❖ multifunctional power source for welding using non-consumable electrode in inert gases (TIG welding)
- ❖ controller unit (control system)
- ❖ remote control panel
- ❖ one of welding heads (ADTs 627, ADTs 625, ADTs 626)
- ❖ collector
- ❖ set of connecting cables, wires and hoses

Power source of increased reliability provides

- ❖ formation of the steep-falling «boyonet» external volt-ampere characteristics necessary for TIG welding process and high dynamic properties similar to welding inverters
- ❖ presetting of values of welding current and time parameters of components of welding cycle by welding current and inert gas supply (duration of time intervals «gas before welding», «smooth increase in welding current», «heating», «smooth decrease in welding current», «gas after welding»)
- ❖ contactless exciting of welding arc using high-voltage breakdown of arc gap
- ❖ stabilization of preset values of welding current and time parameters of welding cycle at the influence of external disturbances (fluctuations in voltage of mains, changes in length of arc gap and other)
- ❖ realization of modes of automatic pitch-pulsed welding and welding using modulated current and also welding cycles in the modes 2T, 4T and in a special mode 4T-I

- ❖ possibility of remote control

Controller unit (control system)

- ❖ generates signals of control of switching on, switching off and duration of operation of components and mechanisms of welding set in the modes SETTING UP and WELDING according to programmed algorithms of performance of TIG welding of position welds of pipelines
- ❖ provides control and maintenance of stable value of preliminary set speed of rotation of face plate of welding head (welding speed)
- ❖ realizes control of functioning of automatic controller of arc voltage of welding heads providing maintaining of stable length of arc gap during welding due to automatic compensation of its deviations from preset value by correction of position of electrode of welding head relative to the workpiece being welded in accordance with the deviations of welding arc voltage

Remote control panel consists of control units, signalization and indication, providing selection or presetting of

- kind of work of welding complex (setting up/welding)
- kind of control mode (automatic/manual)
- kind of welding mode (continuous/pulsed)
- direction of rotation of face plate of welding head (forward/backward)
- directions for the mode of setting the radial movement of electrode of welding head (electrode up/down)
- preliminary control of consumption of inert gas (gas control)
- switching on/switching off of welding cycle (start/stop)
- values of arc voltage U_a
- values of welding speed v_w
- correction of values of welding current ΔI_w in the process of welding
- digital indication of preset and current values of welding current I_w , arc voltage U_a , welding speed v_w and consumption of inert gas (GAS)

Each welding head includes

- ❖ body of light-weight structure
 - ❖ clamping mechanism of welding head on the pipe
 - ❖ face plate rotated around the pipe axis
 - ❖ mechanism of face plate rotation
 - ❖ welding torch
 - ❖ executive mechanism of vertical movement of torch of welding system
- of automatic control of arc voltage in welding heads ADTs 625 and ADTs 626 and system of mechanical copying in welding torch ADTs 627

Design of welding heads provides

- quick installing and fastening of head on pipeline being welded and its removal by one welder-operator
- reliable fastening of head body on the pipeline which excludes its displacement caused by shocks and vibration
- accuracy of installing of a head on the pipeline (non-parallelism of the axis of welding torch relative to the axis of pipeline does not exceed 3°)
- reverse of rotation direction of face plate (on the command of control system of welding complex)
- quick replacement of worn-out tungsten electrode of welding torch
- laminar flow of inert gas and reliable protection of welding zone
- possibility of transverse correction of position of welding torch electrode relative to the butt of pipeline

Connection of any of welding heads to the power source, controller unit, control panel and system of gas supply is performed using a collector.

The distinctive feature of these welding complexes is their capability to provide the quality process of automatic orbital TIG welding of position welds of pipelines at the length of welding circuit of up to 60 m.

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