

**General and technical parameters of the dual column and boom welding manipulators system**

	Parameter	Value required
<b>1</b>	<b>General layout of the system.</b>	
1.1	The system is designed for an assembly of bodies of tanks in the vertical position while welding cylinder pieceparts one to another in the 2G welding position (with a rare exception of the case described in 3.9 -see further).	Yes
1.2	The system features two Column & Boom (CAB) manipulators, one configured for PAW + GTAW welding (the main CAB) and one configured for GTAW welding (the supplementary CAB). The manipulator stations will be mounted around a motorized turntable with between 90° - 180° spacing between the CABs.	Yes
<b>2.</b>	<b>Control modes of the dual CAB manipulators system.</b>	
2.1	The main CAB and the supplementary CAB run synchronically controlled by one operator from one workplace.	Yes
2.2	The main CAB can run alone independently.	Yes
2.3	The supplementary CAB can run alone indepenedently.	Yes
2.4	Workplace of an operator is set up near the main CAB, it has two displays which allow to follow up two weld processes performed on different CABs simultaneously. The operator's workplace could be implemented also in the way when two separate control panels of each CAB are fastened one next to the other on the common supporting framework.	Yes
2.5	The operator's console allows to view weld, to monitor weld parameters and to programm the weld parameters from one location.	Yes
2.6	Turntable can be paired to work with one or another CAB, switching in-between is made from the operators' console.	Yes
2.7	Operator's console has a supplementary remote radio (preferred) or cable control which controls functions of the supplementary CAB described in 4.5; 4.6; 7.3; 7.5 and turntable rotation jogging.	Yes
2.8	Software of the equipment allows creating and storing of at least 99 operator programs. These programs are transferable via USB and built-in Ethernet connection, could get backed up to a PC. Offline programming capability allows weld program entry while equipment is still in production. The operator's programming interface is implemented without a need to enter NC codes or learn specific programming language. Operator is enabled to create his own tasks for commonly used operations like jogging of the boom to home or some particular position and to assign the tasks to from at least 3 to 6 physical or virtual knobs for quick availability and usage. The software of the equipment allows to record parameters of recently performed weld operations and upload a weld report about them into the PC.	Yes
<b>3</b>	<b>The main CAB featuring:</b>	

3.1	Fixed base with level adjusting legs. Anchoring to flooring is allowed.	Yes
3.2	Lifting lugs for moving the whole CAB body with an overhead crane.	Yes
3.3	At least 270-degree rotational column base manually rotated via hand crank or simply by straight hand pushing if on bearings and manageable easily by one man.	Yes
3.4	Central electric cabinet which distributes power to absolutely all hardware on the main CAB, the supplementary CAB and the turntable. All circuits must be fuse protected.	Yes
3.5	All hardware of the CAB is placed on a column base-mounted skid and the boom. No separately from the CAB standing equipment is allowed.	Yes
3.6	Motorized column fixed speed jog motion with vertical stroke a	$4000 \leq a \leq 5000 \text{ mm}$
3.7	The vertical stroke of the column allows to perform welding not less than in 4000 mm height above the turntable	Yes
3.8	Motorised boom fixed speed jog motion with horizontal stroke b	$4000 \leq b \leq 4500 \text{ mm}$
3.9	Motorised boom horizontal weld slide with variable speed ranging 50-600 mm/min, controlled from the operator's console, intended for welding in 1G position outside the turntable.	Yes
3.10	PAW & GTAW weld gear packages with separate welding power sources.	Yes
<b>4</b>	<b>The supplementary CAB featuring:</b>	
4.1	Fixed base with level adjusting legs	Yes
4.2	Lifting lug with bearing for moving the whole CAB body with an overhead crane.	Yes
4.3	At least 270-degree rotational column base manually rotated via hand crank or simply by straight hand pushing if on bearings and manageable easily by one man.	Yes
4.4	All hardware of the CAB is placed on a column base-mounted skid and the boom. No separately from the CAB standing equipment is allowed.	Yes
4.5	Motorized column fixed speed jog motion with vertical stroke a	$4000 \leq a \leq 5000 \text{ mm}$
4.6	The vertical stroke of the column allows to perform welding not less than in 4000 mm height above the turntable.	Yes
4.7	Motorised boom fixed speed jog motion with horizontal stroke b	$2500 \leq b \leq 3500 \text{ mm}$
4.8	GTAW weld gear package with welding power supply	Yes
<b>5</b>	<b>The motorised turntable featuring:</b>	
5.1	Maximal load capacity w	$32 \leq w \leq 35 \text{ tons}$
5.2	Variable rotational speed and direction controlled from an operator console.	Yes
5.3	Outriggers of the table allow to place a cylinder on it with maximum diameter D	$6000 \leq D \leq 6200 \text{ mm}$

5.4	Outriggers of the table are placed at least each 60° around or even more densely.	Yes
5.5	The top surface of the outriggers (the main frame and the extensions as well) has a T-slot for fastening various fixtures in it and a millimetre dial starting from the center of the turntable.	Yes
5.6	Weld shield gas supply framework which allows reliably transport shield gas to an inside-cylinder root weld place. The framework should be telescopic or dismountable other way by parts, should have a supporting structure, shield gas and water hoses of appropriate length. The design of it should allow to reach the inside part of a cylinder which diameter is from 600 to 6000 mm, height from 1000 to 3000 mm above the turntable. The framework would be conducted by an operator assistant manually for weld follow-up whereas supply of the shield gas and water would be controlled from the operators' console.	Yes
5.7	Height of the table from a ground surface h	$600 \leq h \leq 1050$ mm
<b>6</b>	<b>PAW &amp; GTAW weld head on the main CAB featuring:</b>	
6.1	Water-Cooled PAW Torch.	Yes
6.2	Automatic voltage control slide for the PAW torch. The slide is driven by a servo motor with encoder feedback, gear reduction, and an electric brake to ensure accurate positioning.	Yes
6.3	Water-Cooled GTAW Torch.	Yes
6.4	Automatic voltage control slide for the GTAW torch. The slide is driven by a servo motor with encoder feedback, gear reduction, and an electric brake to ensure accurate positioning.	Yes
6.5	PAW & GTAW weld torches on the same side of the boom.	Yes
6.6	Manual torch-to-torch alignment adjustment.	Yes
6.7	Cross seam adjustment, X axis, motorised slide driven by a servo motor with encoder feedback to ensure precise positioning. The slide is programmed and controlled from an operator's console.	Yes
6.8	Cross seam adjustment slide length x.	$200 \leq x \leq 300$ mm
6.9	Y axis motorised vertical adjustment slide manually jogged from the operator's console.	Yes
6.10	Vertical adjustment slide length y.	$200 \leq y \leq 300$ mm
6.11	Weld head mounting bracket to enable the weld head to be oriented in at least seven different positions representing 0°, 15°, 30°, 45°, 60°, 75°, 90° angles to horizon. If the mechanical type of the PAW oscillator (8.4) is chosen to install, then the angle fixing device must be motorised servo driven gear allowing smooth setting of this angle between 0-90°.	Yes
6.12	Weld head mounting bracket to enable the weld head to be positioned in at least two 0° and 90° positions (direction left-right).	Yes
<b>7</b>	<b>GTAW weld head on the supplementary CAB featuring:</b>	
7.1	Water-Cooled GTAW Torch	Yes

7.2	Automatic voltage control slide for the GTAW torch. The slide is driven by a servo motor with encoder feedback, gear reduction, and an electric brake to ensure accurate positioning.	Yes
7.3	Cross seam adjustment X axis motorised slide driven by a servo motor with encoder feedback to ensure precise positioning. The slide is programmed from an operator's console and controlled by the CAB controller.	Yes
7.4	Cross seam adjustment slide length x.	$200 \leq x \leq 300$ mm
7.5	Y axis motorised vertical adjustment slide manually jogged from the operator's console.	Yes
7.6	Vertical adjustment slide length y.	$200 \leq y \leq 300$ mm
7.7	Weld head mounting bracket to enable the weld head to be positioned in at least two 0° and 90° positions (direction left-right).	Yes
8	<b>Key components/parameters supplied with the Plasma arc welding (PAW) process:</b>	
8.1	PAW process conducted either in keyhole plasma mode or with wire mode.	Yes
8.2	Wire feeder allowing the programming and control of feed rate, retract, delay, and pulsation (synchronized to current pulsation). Precise wire positioning device allowing operator to fine-tune the wire position in 2-axis directions in relation to weld torch and weld puddle, controlled from the operator's console is included. Wire feed rolls for at least 1.0, 1.2 mm wire are included. Wire spool while in operation is covered with a dust-protective case. Wire straightening, rolling gear is included.	Yes
8.3	Separate high resolution color weld camera for the PAW torch with mounting brackets, water-cooled or gas-cooled body is included. Auxiliary lighting to aid in viewing the weld joint prior to welding is included.	Yes
8.4	Oscillation module is included. The module allows to program the next oscillation parameters: frequency, left and right deviation, oscillation centerline and an amplitude of an arc motion not less than 9,5 mm.	Yes
8.5	Welding power source rated output at 38 VDC, 100% duty cycle	$\geq 400$ A
8.6	Water-cooled shield gas trailer with a separate from the torch shield gas supply nozzle, intended for protection of a seam beneath the torch.	Yes
9	<b>Key components/parameters supplied with the Gas tungsten arc welding (GTAW) process (applicable to both the main CAB and the supplementary CAB):</b>	

9.1	Wire feeder allowing the programming and control of feed rate, retract, delay, and pulsation (synchronized to current pulsation). Precise wire positioning device allowing operator to fine-tune the wire position in 2-axis directions in relation to weld torch and weld puddle, controlled from the operator's console is included. Wire feed rolls for at least 1.0, 1.2 mm wire are included. Wire spool while in operation is covered with dust-protective case. Wire straightening, rolling gear is included.	Yes
9.2	Separate high resolution color weld camera for the GTAW torch with mounting brackets, water-cooled or gas-cooled body is included. Auxiliary lighting to aid in viewing the weld joint prior to welding is included.	Yes
9.3	Magnetic oscillation module with water-cooled probe is included. The module allows to program the next oscillation parameters: frequency, left and right deviation, oscillation centreline and an amplitude of the magnetic field not less than 9,5 mm.	Yes
9.4	High frequency arc starter for establishing GTAW arc at an outset	Yes
9.5	Welding power source rated output at 38 VDC, 100% duty cycle	≥ 400 A
9.6	Welding power source can operate in programmable pulse mode	Yes
9.7	Water-cooled shield gas trailer with a separate from the torch shield gas supply nozzle, intended for protection of a seam beneath the torch.	Yes
<b>10</b>	<b>Miscellaneous other requirements:</b>	
10.1	Price of the equipment includes crating, delivery to Ulonų g. 33, 62161 Alytus, Lithuania, assembly and commissioning. Unloading and storage of the equipment at the place of delivery are undertaken by Astra LT.	Yes
10.2	Price of the equipment includes site performance acceptance testing program which aim is to check if target weld process objectives set by the Buyer are achieved. The testing program layout is presented in the Annex 2 to the Tender terms and Conditions. The successful execution of the testing program triggers the last 10% payment foreseen in the supply contract.	Yes
10.3	CE declaration of conformity in English	Yes
10.4	Safety requirements of usage of the equipment in English and Lithuanian.	Yes
10.5	Operating manual in English both paper and electronic copy.	Yes
10.6	Service manual with electrical and mechanical drawings, spare parts lists both in paper and electronic copy.	Yes
10.7	Warranty period.	≥ 24 months
10.8	The equipment must be new (unused) and manufactured no earlier than 3 years before the date of purchase.	Yes

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