

INSTRUCTION MANUAL

MACHINE FOR CONTACT WELDING

Model: KOMAND FW-32



SERIAL № 0 / г.

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<u>1. INTODUCTION</u>

In the interest of you safety please read carefully before mounting or working with the machine.

2. Functionality

The machine for butt welding is designed for smooth or periodic armature of $\phi 6.5$ mm up to No32. Machine is meant for working in covered sites. Working regime is semiautomatic–while the setting is manual. Preheating/Initialization of the ends is also done in manual mode, while final (pre)heating & welding is realized in auto mode.

Parameters	Value
Min diameter armature, mm	ф6.5
Max diameter armature, mm	Nº32
Time for closing grip, sec	1
Speed of blank in auto mode in preheating/welding mm/sec	0÷70
Speed of compression in final welding, mm/sec	70
Maximum pressing force grip, N	60000
Power push for welding, N	0÷70000
Voltage, V	380
Power welding machine, kVA	85
Maximum current of the primary winding, A	200
The maximum current of the secondary winding, A	11700
MF welding transformer /tk-12.07/, %	20
Auxiliary power, kW	3,5
Weight, kg.	1160
Overall dimensions L x B x H, mm	2100 x 1150 x 1200

<u>3. Technical Parameters</u>

4. Structure



Fig.1

- 1. Body
- 2. Safety Cap
- 3. Roller
- 4. Electrical Board
- 5. Control Panel
- 6. Power regulator with pressure welding
- 7. Speed controller in the final heating auto mode
- 8. Electrical welding current board, via jumpers
- 9. Oil pressure hydraulics



1. Main switch / interrupter;



Фиг. З

- 1. Cover tip for draining antifreeze
- 2. Level Indicator / capacity antifreeze in the circle transformer
- 3. Level Indicator / capacity antifreeze in circuit of mobile grip
- 4. Level Indicator/ capacity antifreeze in circuit of stationary grip

5. Montage

- Machine for butt welding is designed for work in covered sites, under environmental temperature $(-5 \div +40)$ °C, served by one operator;
- Machine is powered by three phase current 380V, it has to be firmly grounded in conformity with all technical & safety measures;
- Main Power Cable has to be at minimum 3x75MM²+1x35mm²;
- Power 200A
- Machine has internal cooling, but possibility exist for external source with cold water;
- Machine has to be mounted on equal firm foundation.
- Next or around the machine there must be no obstacles or subject which could potentially interfere with its the free movement /except the tray for the blanks/
- The tray towards the stationary grip /left tray/ <u>MUST BE NEVER</u> be in electrical contact with the body of the machine, /<u>THE BODY MUST BE SAFELY</u> <u>GROUNDED/</u>, and the right grip also goes to ground, i.e. on earth/.

<u>6. Operation, Parameters, Working Cycle, Maintenance</u>

6.1. Adjusting Parameters for Optimal Performance

Depending on the diameter & type of wires, before anybody commences any type of work, there are some necessary adjustments to be made, namely following / the controller will memorize parameters in its energy dependable memory/:

1. **Power of welding current** – it has been regulated by a jumper in the front side of the machine. (fig.1, pos.8). Power of the current is defined by a combo of 4 positions of the jumper, as each jumper has two states. Combinations are given on the cover board. Higher grade means bigger welding current, as the voltage of the secondary coil is bigger/:

Power of welding current							
GRADE	STATE OF JUMPER			STATE OF JUMPER		<u>U1</u> U2	
	1	2	3	4	02		
1	2	2	2	2			146
2	1		2		139		
3	2	1			133		
4	1			1	126		
5	2	2		T	119		
6	1		$\frac{2}{1}$ 1		112		
7	2				106		
8	1		I			99	
9	2	2	2	2			94
10	1		2		87		
11	2	- 1	1	1	4		81
12	1		1	2	74		
13	2	2	2	2			67
14	1		2 1		60		
15	2	- 1			54		
16	1				47		

FOR EXAMPLE, FOR ARMATURE №28, GRADE MUST BE 15;

Power press grip – regulations is done by the protecting hydraulic valve located inside the machine. <u>ATTENTION</u>: Regulation of the pressure movement has to be in the variation of (40-90) bars /factory settings 90/. When pressure is >90 bars hydro valves must be disabled due to motor overload.

It is recommended not to change the settings of the protecting valve;

3. **Power pressure welding work pieces** – regulation is done by the protecting valve on the front side of the machine (fig.1, pos.6). <u>ATTENTION: Pressure must be in</u> the variation of (40-90) bars, proportionate to the diameter of the armature, i.e. for bigger diameter armature bigger pressure.

Pressure for armature №28, around 80 bars;

4. **Stroke support for mobile welding** – stroke, which is needed for the movement of the work pieces during the cycle of preheating & welding. When increasing the stroke, please bear in mind that in final straight position the limited switch must be activated (switched on!). Factory setting of the limited switch is set in such a way that it does not have big margin of movement for the mobile support. If, it opens early, let's say still at 2-3mm, there is a possibility that during the time of welding weld metal droplets may fall on the shaft, which is categorically <u>unacceptable</u>. The end limit switch sends signal to the controller for the end of the auto mode cycle /i.e. and the end of cycle it <u>should always</u> activate/.

Regulation of the end limited switch:

- Remove the cover located on top of mobile grip;
- Unscrew the locknut latching sleeve;
- Twist/untwist sleeve contact of the end limited switch to the desired position;
- Tighten up the locknut;
- Put the cover properly back;

For armature №28, stroke must be on max /factory settings/;

5. Speed movement of the mobile support unit in auto mode /auto heating/ – it is controlled by the regulator (fig.1, pos.7). Speed movement forward must be such as to when moving forward there must permanent increased spark that brings out the slag & oxide welding, and the work pieces should not stick too early. If sparks are too intermittent then the movement is too slow.

For the periodical armature No28, *speed is somewhere in between* 3.5-4.0 *units/ the scale is on the regulator itself/;*

6. Time for final heating of the slug (T1) – it is set by the controller (fig.4, pos.7). To enter the main menu press the button **"Menu/OK"**, then by the upper button up/down choose "Parameters", then press again **"Menu/OK"**, after which on the display comes out T1 – this is the time for preheating /slow progress/. By the help of arrows up/down the value of the parameters are changing.

For armature №28, №28 *T1 is set on* 12÷20 *sec;*

7. Time for final welding with pressure between the work piece (T2) – is set in the same way as T1, /see above/.

for armature №28 T2 is set on 1.0÷1.2 sec;

8. Time to cool off welding with pressure between the work piece /without welding current/ (T3) – is set on the same way as T1 /see above/. The bigger cost of T3 gives more time for cooling off of the work pieces & the bond strength will be better.

Minimum at 5sec;

- 9. Time for magnetizing the transformer T4 / or starting time transformer/ -Usually, the transformer has quite big current at the time of starting on, this current could be sometimes even 10 times bigger than the nominal. This is helping to work out & prevent the fuses & accelerator or starter to wear down quickly. Then again, you need to run a small current through the transformer; this is exactly the time for which the resistance is working in sequence with the coil of the transformer. <u>Usually, around 0.7sec when it's cold weather, summer time could be less.</u>
- 10. Delay time of starting the transformer, after transition from modes "manual preheat" into mode "manual" T6. The idea is to reduce the number of the switching transformer, i.e. if straight after the preheating the operator is going for auto mode, then this time could be set to 2sec, for 2sec a person clicks the button for auto mode without a problem. However, sometimes after manual heating some operators flip the heated iron /understandably, looking for better end position /, and then start the auto mode. In this case, timing must be short, for example, 0.2sec, so that the transformer tripped almost immediately, otherwise it may spark exactly

when the hand of the operator is moving the wire or iron piece; as well, it is likely that he will overlap it with another piece of work piece.

Exemplary Table							
n	t1	t2	t3				
18	8	0.4	5				
20	9	0.45	5				
22	10	0.50	5				
25	11	0.9	5				
28	12	1.2	5				
32	13	1.6	5				

There are 15 degrees of the transformer;

Pressure is 80bars, speed from 2 to 4, and they don't touch, i.e. if the welder is not going to like it for some reason and change it, then he/she could switch the speed & pressure.



Figure 4.

6.2. Working Cycle

- 1. Machine is switching in manual mode switcher (fig.4, pos.4);
- 2. Set the first work piece in the ditch of the stationary unit /left one/ should grip the contact base so that the end piece must stand off at some distance (of course, it is different for the different diameters) from the electrode;
- **3.** Grip of the stationary mobile unit is closing pressure is adjusting by the pressure switcher (fig.4, pos.3) right, while the grip gets hold of the work piece well. <u>ATTENTION:</u> Work pieces must be hold in such a way as to operators hand be safely away from catching grip:
- **4.** Set on the second work piece in the ditch of the mobile support grip/ contact base in its end to be 5-10mm, from the end of the first piece;
- 5. Grip of the mobile supportT closes pressure is set by turning the switcher (fig.4, pos.2) right, while the grip gets hold of the work piece

well. <u>ATTENTION:</u> Work pieces must be hold in such a way as to operators hand be safely away from catching grip;

- 6. Switcher (fig.4, pos.4) set on mode "preheating";
- 7. So squeezed, the two work pieces nestle to each other by 'impulse' in which intervals tap by the switcher fig.4, pos.1. Purpose of these movements is preheating & registration ends. It should make so that the end face stuck with each other. Preheating of the work pieces must be around 2÷5 mm significantly heated / red zone;
- 8. Again switch into manual mode (switcher fig.4, pos.4);
- **9.** If the work pieces are not laying out into single axis, then one of them could be released momentarily, from each other, get corrected and then again tighten up into the grip;
- **10.** Mobile support unit moves towards left into such position as to which the distance between the ends will be about 5mm / could be even 4mm/, but not less, as there is a chance in initial impetus of the work pieces have been bonded to each other;
- **11.**Press the button ,,**AUTOMATIC**" (fig.4, pos.6), it activates auto mode and machine starts off the final heating & welding;
- 12. After end of cycle, the welded detail must not be touched for some time, in order not to damage the not so firm welded pieces it is recommended at least 2 minutes / please, bear in mind that MF welding cores is 20%, and it takes time to properly cool off/;
- **13.**After cooling off of the welded detail it is removed from the machine and the next cycle could begin.

6.3. Maintenance

Regular checkup & maintenance is done when the machine is switched to the mains /excluding otherwise stated or special case/.

DAILY CHECK:

- Before Work:
 - Cleaning machine from scale, metal droplets, and all metal or non-metal pollutions;
 - Check for leaks in the cooling system / when the machine is powered/;
 - Check the level of the antifreeze if the level is below the average or low, please add liquid antifreeze for up to -40°C;
 - Checking the coolant flow rate (in the display window for each lap) /rate is visible when the machine is powered up/;
- Checking the wear & tear of copper base/electrodes under big wear & tear, when cannot compress the work piece anymore, then they are replaced;
- Check the mobility of the grip if during working time it does not move freely;
- <u>Lubrication of moving shoulders, by syringe blower through the grease nipple on:</u> axis grip, axis moving shoulders, axle forks cylinder grips;
- Lubrication caliper of guiding bushes four grease nippels, 2 on the front bushes, 2 on the rear ones;

YEARLY CHECK:

• Change of oil & filter of the hydro valves;

7. Instructions for Safely Handling

- The machine frame must be **grounded & reset** at all times;
- Wearing uniform and special clothing & personal protective equipment is compulsory at all times: working suit, protective gloves, goggles;
- Before commencing work must check for flammable materials around the machine and the working place, fire extinguisher, fire extinguishing materials at hand,/droplets of burning metal could cause severe fires/;
- When handling the work pieces, hands should be kept safely away from the grip, and generally from the area of the protective cover, /it could fall on your fingers/.
- It is unacceptable that on the surface of the machine there are other details or objects except those that are to be welded.
- After completing work with the machine main switch should be turn off.
- At work should be only persons of 18th years of age, medically testes & fit, who have passed induction, and full training for working with the machine on site; These should be periodical.

When operating machine unauthorized persons shouldn't be allowed into the vicinity!

8. Hydraulics Circuit











"KOMAND" EOOD

The manufacturer certifies the correct & reliable operation of the machine only if all requirements for installation and exploitation as set in this manual are met.

GUARANTEE

Warranty Card

Machine: Machine for Butt Welding

Model: KOMAND FW-32

Serial № Year:

Warranty period: 12months

Seller: _____

Buyer: _____

/seal & signature/

/seal & signature/