PATON

USER MANUAL
INSTRUKCJA OBSŁUGI
РУКОВОДСТВО ПОЛЬЗОВАТЕЛЯ

StandardTIG-160
StandardTIG-200
StandardTIG-250
StandardTIG-270-400V
StandardTIG-350-400V

PATON INTERNATIONAL

ENGLISH

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Connection to the mains/power distribution panel (at 25°C):

CAUTION! Please, pay attention to wall wires and other extension cords

Used MMA electrode	Set current value for MMA and TIG	Wire cross-section diameter for MIG/MAG	Cross-section of the mains wire, sq. mm	Max. wire length, m
StandardTIG-160, StandardTIG-200, StandardTIG-250				
Ø2 mm	not more than 80A	not more than Ø0,6 mm	1,0	75
			1,5	115
			2,0	155
			2,5	195
			4,0	310
Ø3 mm	not more than 120A	not more than Ø0,8 mm	1,5	75
			2,0	105
			2,5	130
			4,0	205
			6,0	310
Ø4 mm	not more than 160A	not more than Ø1,0 mm	2,0	75
			2,5	95
			4,0	155
			6,0	230
Ø5 mm	not more than 200A		2,5	60
			4,0	100
			6,0	150
Ø5 mm Ø6 mm fusible	up to 250A	up to Ø1,2 mm	2,5	48
			4	80

			6	120
3 x 380/400V – StandardTIG-270-400V, StandardTIG-350-400V				
Ø3 mm	not more than 120A	not more than Ø0,8 mm	1,5	135
			2	175
			2,5	220
			4	350
			6	525
Ø4 mm	not more than 160A	not more than Ø1,0 mm	2	130
			2,5	160
			4	260
			6	385
Ø5 mm	not more than 220A		2,5	115
			4	180
			6	270
Ø6 mm fusible	not more than270A	not more than Ø1,2 mm	2,5	85
			4	135
			6	205
Ø6 mm	up to 350A	up to Ø1,4 mm	2,5	65
			4	100
			6	150

ATTENTION! Supply button on the rear panel of the machine (for StandardTIG-160/200/250) is not a power button, so it does not provide complete de-energization of internal electronic parts, when the machine is switched off. Therefore, in accordance with safety rules, disconnect the plug from the mains after completion of welding.

1. GENERAL

PATON StandardTIG-160/200/250/270-400V/350-400V argon-arc digital inverter rectifiers are designed for direct-current manual metal arc (MMA), tungsten-arc inert-gas (TIG) welding and metal-arc inert-gas welding/metal active gas welding (MIG/MAG) in an environment of shielding gases and mixtures. The advantages of using a fully digital control method in this unit are that there are no disadvantages inherent in multifunctional systems made based on analogue control systems, which by definition are always configured for a specific mode, and all other modes, as additional ones, have control disadvantages. However, in a fully digital system, the control board has absolutely all the assets of the source, within its full power, and the mode of use does not make any difference. The machine provides virtually continuous load duration at full true rated current of 160A, 200A, 250A, 270A, 350A respectively, which is enough for working with any electrodes from Ø1.6 mm up to Ø6 mm and semi-automatic welding with solid wire with a diameter from Ø0.6 mm to Ø1.4 mm. The unit has a built-in non-contact arc striking module (oscillator). Through additional adjustments, the unit can be adjusted to the most optimal settings in various situations. It is initially set to optimal values for most applications, and is quite simple, unless the extensive expertise of the welder enables the use of fine-tuned settings. For dangerous operating conditions, a no-load voltage reduction unit is integrated in the MMA mode, with the possibility of switching it on and off.

This StandardTIG model manufactured by PATON has a built-in unit protecting against short-term over-voltage and under-voltage.

The device stores under its number in each welding mode up to 16 users' settings (programs). The

device saves in memory all the current settings at the moment of switching off and restores them at the time of switching on.

Main advantages:

1. Wide range of welding parameters adjustment options:
   a) in the MMA mode - 1 (main) + 10 (optional)
   b) in the TIG mode - 1 (main) + 10 (optional)
   c) in the MIG/MAG mode - 1 (main) + 7 (optional)
2. An adjustable pulse mode is available in all types of welding;
3. In addition to protection against voltage surges, a stabilization system is installed for operation with **significant long-term** voltage drops in the supply mains from 160V to 260V (for StandardTIG-160/200/250) and from 320V to 440V (for models StandardTIG-270-400V/350-400V);
4. The unit is adapted to a standard household power supply. Due to its high efficiency, the welding current source provides **half the power consumption** compared to conventional sources;
5. Adaptive fan speed, i.e., it increases when the unit heats up and slows down when it is cold; this saves the fan life and reduces the amount of dust in the unit;
6. Convenient operation due to long load duration (LD) at **rated current**;
7. Increased reliability of the unit in dusty production conditions;
8. All heating elements of the source are equipped with a **thermal electronic protection system;**
9. All unit's electronics are impregnated with **two layers** of high-quality varnish, which ensures the reliability of the product throughout its entire service life; 10. Improved arc stability.

PARAMETERS	StandardTIG160	StandardTIG200	StandardTIG250	StandardTIG270-400V	StandardTIG350-400V
Rated supply voltage 50Hz, V	220/230	220/230	220/230	3x380 3x400	3x380 3x400
Rated current consumption from the mains, A	18 ... 21	25 ... 28	29,5 ... 35	12 ... 14	16 ... 18,5
Rated welding current, A	160	200	250	270	350
Maximum operating current, A	215	270	335	350	450
Load duration (LD)	**45%/at 160A 100%/at 106A**	**45%/at 200A 100%/at 134A**	**45%/at 250A 100%/at 167A**	**70%/at 270A 100%/at 225A**	**70%/at 350A 100%/at 290A**
Supply voltage variation limits, V	160 – 260	160 – 260	160 – 260	±15%	±15%
Limits of regulation of welding current, A	8 – 160	10 – 200	12 – 250	12 – 270	14 – 350
Limits of regulation of welding voltage, V	12 – 24	12 – 26	12 – 28	12 – 29	12 – 30
MMA electrode diameter, mm	1,6 – 4,0	1,6 – 5,0	1,6 – 6,0	1,6 – 6,0	1,6 – 6,0

Welding wire diameter, mm	0,6 – 1,0	0,6 – 1,0	0,6 – 1,2	0,6 – 1,2	0,6 – 1,4
Welding pulse modes	MMA: 0,2…500 Hz TIG: 0,2…500 Hz MIG/MAG: 5…500 Hz	MMA: 0,2…500Hz TIG: 0,2…500Hz MIG/MAG:5… 500 Hz	MMA: 0,2…500Hz TIG: 0,2…500Hz MIG/MAG:5…500 Hz	MMA: 0,2…500Hz TIG: 0,2…500Hz MIG/MAG:5…500 Hz	MMA: 0,2…500Hz TIG: 0,2…500Hz MIG/MAG:5…500 Hz
Hot-Start in the MMA mode	Adjustable				
Arc Force in the MMA mode	Adjustable				
Anti-Stick in the MMA mode	Automatic				
No-load voltage reduction unit	on / off				
MMA no-load voltage, V	12 / 70				
Arc striking voltage, V	110				
Rated power consumption, kVA	4,2 … 4,8	5,2 … 6,2	6,5 … 7,7	7,9 … 9,3	10,6 … 12,2
Maximum power consumption, kVA	6,3	8,1	9,4	11,5	15,2
Efficiency, %	90				
Cooling	Adaptive				
Operating temperature range	–25 … +45°C				
Overall dimensions, mm (length, width, height)	330 x 115 x 262	330 x 115 x 262	330 x 115 x 262	390 x 145 x 335	390 x 145 x 335
Weight without coil and accessories, kg	5,7	5,9	6,3	10,1	10,9
Protection rating	IP21	IP21	IP21	IP33	IP33

Recommended length of power welding cables when welding:

Set current value	Cable length (one way)	Cross-section area	Cable brand
not more than 100A	2 … 9 m	10 mm²	KG 1x10
	3 … 14 m	16 mm²	KG 1x16
not more than 160A	2 … 9 m	16 mm²	KG 1x16
	3 … 14 m	25 mm²	KG 1x25
not more than 200A	2 … 7 m	16 mm²	KG 1x16
	3 … 10 m	25 mm²	KG 1x25
not more than 250A	2…8 m	25 mm²	KG 1x25
	3…12 m	35 mm²	KG 1x35
not more than 270A	5 … 11 m	35 mm²	KG 1x35

up to 350A	6 ... 14 m	35 mm²	KG 1x35

1 – Digital display;

2 – Buttons for adjusting the selected parameter up and down; **3** – Source function selection button in the used welding mode; **4** – Welding mode selection button:

a) manual metal arc welding, MMA;

b) tungsten-arc inert-gas welding, TIG;

c) metal-arc inert-gas welding/metal active gas welding, MIG/MAG;

5 – Unit overheating indicator: when the unit is normal, the indicator is off, when the unit is overheated, it flashes;

6 – Socket for shielding gas supply to the torch;

7 – Connector for controlling torch buttons;

8 – Button/automatic breaker for turning the unit ON/OFF (color – decorative);

9 – Connector for feeding signals from the wire feeder to turn the source on and off; **10** – Connection for shielding gas supply from a gas bottle;

11 – Power supply cable;
12 – Grounding cable connection.
A – Bayonet-type power current socket "+":
a) MMA welding - the electrode cable is connected (in more rare cases, when using special electrodes, the ground cable is connected);
b) TIG welding – only the ground cable is connected;
c) MIG/MAG welding with **solid wire** - the cable from the wire feeder is connected;
d) MIG/MAG welding with **flux-cored wire** - the ground cable is connected; **B** – Bayonet-type power current socket "-":
a) MMA welding – the grounding cable is connected (in more rare cases, when using special electrodes, the electrode cable is connected); b) TIG welding – only the TIG torch is connected;
c) MIG/MAG welding with **solid wire** – the ground cable is connected;
d) MIG/MAG welding with **flux-cored wire** – the cable from the wire feeder is connected.

2. START-UP

Caution! Please, read Section 13 "Safety instructions" before starting-up.

2.1 INTENDED USE

The welding unit is designed exclusively for MMA welding, tungsten-arc inert-gas (TIG) welding, as well as metal-arc inert-gas welding/metal active gas welding (MIG/MAG).

Any other use of the unit is inappropriate. The manufacturer bears no liability for damage caused by using the unit for other purposes.

Proper use implies following the instructions in this user manual.

2.2 SPACE REQUIREMENTS

The welding unit is protected against penetration of foreign particles with a diameter of more than 5.5 mm.

The welding unit can be located and operated outdoors. The internal electrical parts of the unit are protected from direct exposure to moisture, but not from condensation drops. **CAUTION!** After finishing welding in hot weather, or intensive welding in any weather, do not turn off the unit immediately! Wait 5 minutes time to let the electronic components to cool down.

CAUTION! After operating in the cold season, after switching off and subsequent cooling of the unit, condensation forms inside - do not switch the unit in less than 3 to 4 hours !!! Therefore, do not turn off the unit during the cold season if you plan to turn it on in less than 4 hours.

Place the unit so that cooling air can enter and exit freely through the vents on the front and rear panels. Make sure that no metal dust (e.g. when sanding) is sucked into the unit directly by the cooling fan.

CAUTION! The unit can be life-threatening after being dropped. Place the unit on a stable solid surface.

2.3 POWER CONNECTION

The standard welding unit is rated for:

1. Mains voltage is 220V (-27% +18%) – for StandardTIG-160/200/250.
2. Three-phase mains voltage is 3x380V or 3x400V (for StandardTIG-270/350-400V), three wires are dedicated for this. Safety rules when working with welding equipment require grounding of the unit housing. There are two ways to do this: 1) by using the fourth wire in the mains yellow-green cable (international marking standard); 2) by using a bolted terminal on the rear wall of the unit (a stricter grounding standard, used in the CIS countries).

Caution! When the unit is connected to a mains voltage higher than 270V, all manufacturer's warranty obligations become invalid! This situation can occur with a very huge imbalance in the phase voltage in a standard mains or when using a non-standard connection.

The mains connector, the cross-sections of the mains cables, as well as the mains fuses needs to be selected based on the unit technical data.

2.4 CONNECTING THE MAINS PLUG

Caution! The mains plug needs to match the supply voltage and current consumption of the welding unit (see the technical data). According to safety rules, please, use the sockets with **guaranteed grounding!!!**

2.5 SELECTING THE DEVICE MENU LANGUAGE

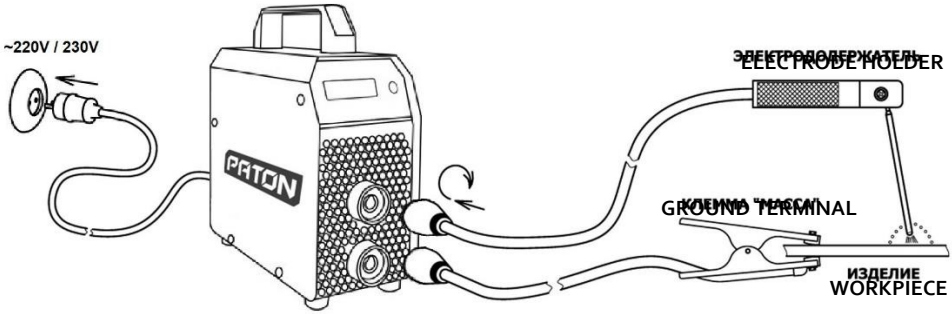
To select/change the menu language of the device, hold down button **3** and turn on the device. After that, the language selection menu will be displayed on the screen. You can select the desired language using the buttons **2**. 2 seconds after selection, the machine will continue working in the corresponding language.

3. MANUAL METAL ARC (MMA) WELDING

Procedure for preparing the unit for operation:

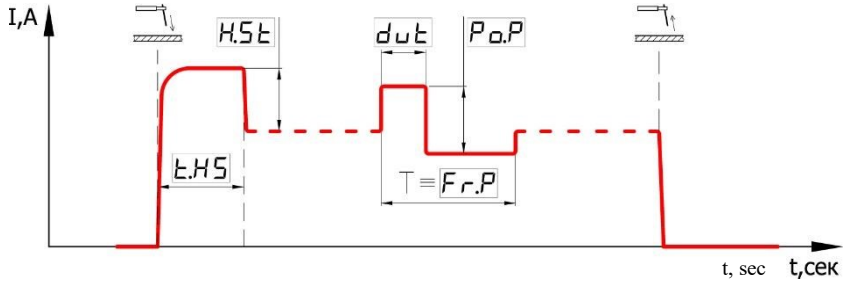
- insert the electrode cable into the socket of the source **A "+";**
- insert the ground cable into the socket of the source **B "-"**;
- connect the ground cable to the workpiece;
- connect the mains plug to the power supply;
- turn power switch **8** on the rear panel to the "I" position;

- use button **4** to set the MMA welding mode; to do this, hold the button for about 5 seconds. The indicator will start flashing, informing the user that it is ready to switch to the next welding mode. If you omitted the required welding mode, press button **4** again: the modes are switched in a circle;
- use buttons **2** to set the current main parameter, this is the welding current;
- if necessary, you can adjust additional functions of the welding process, see paragraph 6.1 for the order of switching.



Caution! In the MMA welding mode, after the mains switch is switched to the "I" position, the MMA is energized. Do not touch conductive or grounded objects such as, e.g., the housing of the welding unit, etc. with the electrode, since the unit will perceive this condition as a signal to start the welding process.

3.1 WELDING PROCESS CYCLE - MMA



See paragraph 6.1 for the procedure for switching the value of any function

3.2 "HOT-START" FUNCTION Advantages:

- improved striking even when using poorly ignited electrodes;
- better penetration of the base material during striking, therefore, less lack of penetration; - prevention of slag inclusions;
- manual setting: allows you to set the function level to the minimum value, which greatly reduces power consumption at the initial moment of striking. This allows the source to start at mains voltage values close to the minimum possible ones, but reduces the quality of the

moment of striking (the unit becomes similar to a transformer source, but it is the only possible way in certain situations). You can also increase the function to the maximum value to further improve the striking timing (when using good mains). However, do not forget that the increased current of this function can burn through the workpiece when welding thin metals, so we recommend reducing the "Hot start" in this case.

What helps to achieve this:

For a short time at the moment of arc striking, the welding current increases by the default level of +40%.

Example: welding with Ø3mm electrode, the set main value of the welding current is 90A.

Result: The hot start current will be 90A + 40% = 126A.

In the advanced settings, you can change both the "Hot Start" power and the "Hot Start" time. If necessary, do not increase the power and trigger time of the "Hot Start" too much, because it requires a very strong power supply mains at high limit values, and in the absence of good mains, the striking process will fail.

See paragraph 6.1 to change the value of any function in the current welding mode

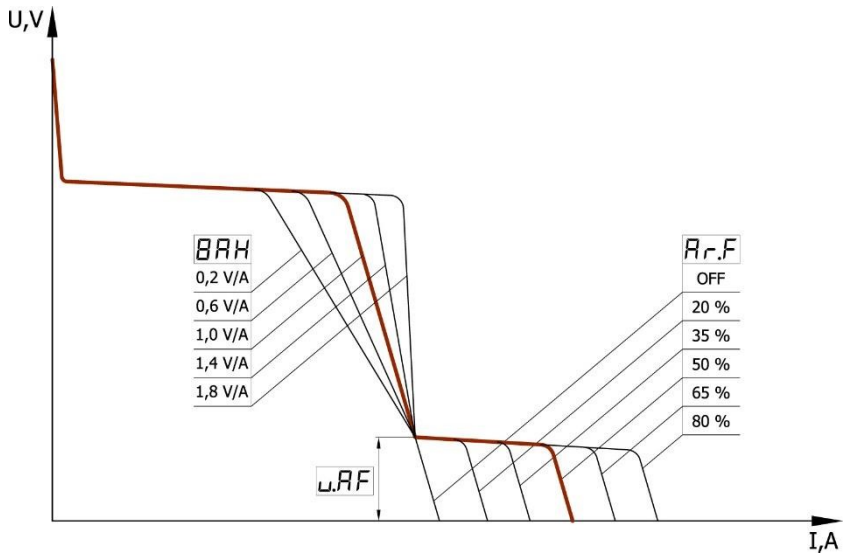
3.3 "ARC-FORCE" FUNCTION Advantages:

- increasing the stability of short-arc welding;
- improvement of the drop of metal transfer into the weld pool;
- improved arc striking;
- reduces the probability of electrode sticking, but this is not the "Anti-stick" function, which will be discussed in the next paragraph;
- manual setting: allows you to set the function level to a minimum value, which slightly reduces energy consumption, as well as the concentration of heat input when welding thin metals, which reduces the probability of burning through, but also reduces the short-arc stability (the unit becomes similar to a transformer source). You can also increase the function to the maximum value for even greater short-arc stability, but this requires a better power supply mains and increases the probability of burning the workpiece.

What helps to achieve this:

If the arc voltage is reduced below the minimum allowed for stable arcing, the welding current increases by the default level of +40%.

In the advanced settings, you can change both the "Arc Force" power and the operation level of the function. Unless required, do not increase the power and level of trigger of the "ArcForce", because this affects the operation of the "Anti-stick" function at large limit values, especially when welding with thin electrodes less than Ø3.2 mm, which will be discussed in the next paragraph.



See paragraph 6.1 to change the value of any function in the current welding mode

3.4 "ANTI-STICK" FUNCTION

During the initial striking of the arc, the electrode can stick, tack to the workpiece; this is prevented by many functions in the unit, but this can still happen, which in turn leads first to incandescence, and then to damage to the electrode.

In such a case, the unit's "Anti-stick" function is activated, which is built-in and operates in the MMA mode constantly, which reduces the welding current in 0.6...0.8 seconds after this condition is detected. This also makes it easier for the welder to separate (detach) the electrode from the workpiece without the risk of scalding the eyes by accidentally striking the arc. After the electrode is detached from the workpiece, the welding process can be continued unobstructed.

3.5 CURRENT-VOLTAGE CHARACTERISTIC SLOPE CONTROL FUNCTION

This function is primarily intended for comfortable welding with electrodes with various types of coatings. By default, the current-voltage characteristic slope is set to 1.4 V/A, which corresponds to the most common rutile-coated electrodes (ANO-21, MR-3). It is not mandatory for a more comfortable operation with electrodes with the main type of coating (UONI-13/45, LKZ-70), but we recommend setting the slope to 1.0 V/A. In turn, the cellulose-coated electrodes (CC-1, VSC-4A) even require setting the slope of the currentvoltage characteristic to a value of 0.2...0.6V/A, and sometimes it is necessary to raise the level of operation of the "Arc-Force" function up to the value of 18V.

See paragraph 6.1 to change the value of any function in the current welding mode

3.6 SHORT-ARC WELDING FUNCTION

This function is especially relevant when welding overhead joints, when you need to keep the arc from stretching too far. To do this, you can turn the "Short Arc" function to the ON position. By default, it is in the OFF position. See paragraph 6.1 to change the value of any function in the current welding mode

3.7 NO-LOAD VOLTAGE REDUCTION UNIT FUNCTION

When performing welding operations in the containers, tanks, and where an enhanced electrical safety system is required, the no-load voltage reduction function can be activated.

When the electrode is detached from the workpiece, after 0.1 seconds, the voltage at the source terminals decreases to a safe level below 12V.

To do this, you need a no-load voltage reduction unit, which is available in this model, but by default it is in the OFF position, i.e., off, since it is known that turning on any such function slightly worsens arc striking.

See paragraph 6.1 to change the value of any function in the current welding mode

3.8 PULSE CURRENT WELDING FUNCTION

This function is designed to facilitate the control of the welding process in spatial positions other than the lower one, as well as when welding non-ferrous metals. The effect occurs directly on the mixing of the molten metal of the seam and on the transfer of the drop into the weld pool, and this in turn affects the stability of the seam formation and the welding process. In other words, this process replaces the welder's hand movements to some extent, especially in hard-to-reach places. The shape and quality of the weld formation depends on the correct setting, which reduces the likelihood of the appearance of pores and reduces the grain structure, and thus increasing the strength of the weld.

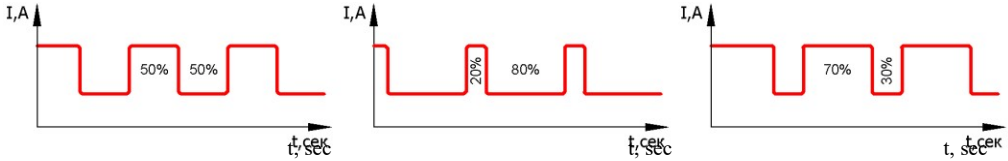
To implement this function in the unit, you need to set three parameters: pulsation power, pulsation frequency and pulse/pause ratio (or "duty cycle") [dut]. By default, pulsation power as a key parameter is set to OFF, i.e., the function is turned off, and pulsation frequency and "duty cycle" at the most common values of 5.0 Hz and 50%, respectively. To enable the function, simply set the pulsation power above zero. This parameter is set as a percentage of the used main welding current set.

Example: welding with Ø3mm electrode, the set main value of the welding current is 60A, and the pulsation power is 40%, while the pulsation frequency is 5.0Hz and the duty cycle is 50% by default.

Result: the current will pulse from 36A to 84A at a frequency of 5 Hz; the pulses will have an equal shape in amplitude and time.

The "duty cycle" parameter is set to 50% by default. Changing this parameter introduces an asymmetry between the current pulse time and the current "pause" time:

default "duty cycle" = 50% | "duty cycle" = 20% | "duty cycle" = 70%



At the same time, the unit will react in such a way that while maintaining the specified pulse difference, the average welding current level will be maintained at the level of the set main value of the welding current 60A (as it was set earlier), respectively, and the heat input into the weld will be approximately at the same level 60A, but stability the welding process and the mixing of the weld pool will change. This is a very important condition for accurate user assessment of the quality of change with equal heat input into the weld pool.

These parameters are set in different situations in different ways, according to the welder's requirements.

See paragraph 6.1 to change the value of any function in the current welding mode

4. TUNGSTEN-ARC INERT-GAS (TIG) WELDING

Caution! The default welding cycle set is TIG-2T, see paragraph 4.2.1.

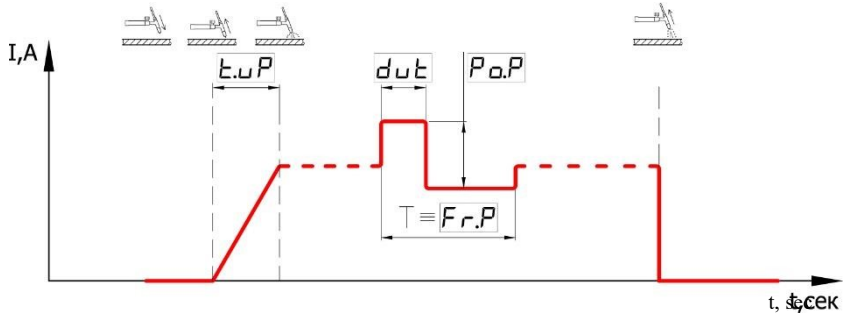
As a shielding gas, pure argon "Ar" is most often used, sometimes helium "He", as well as a mixture of them in various proportions of 40% Ar + 60% He.

DO NOT allow the use of flammable gases! Use of other gases is allowed only in agreement with the equipment manufacturer.

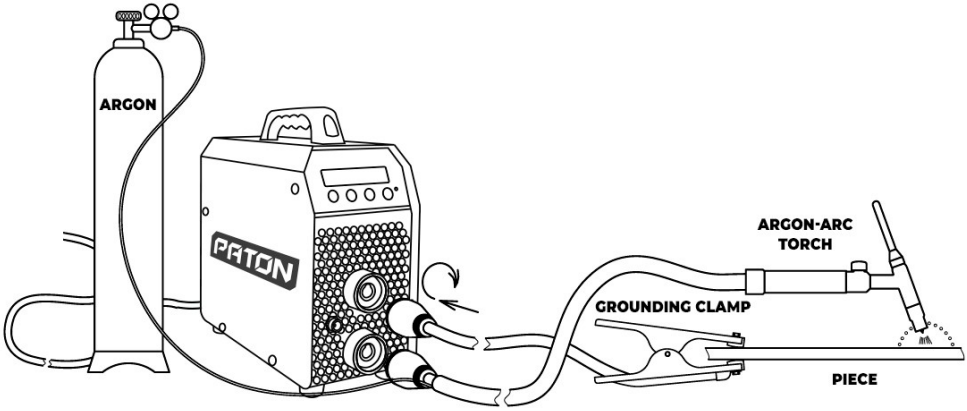
Caution! For continuous currents over 150A, be sure to use a water-cooled torch! Sold separately together with a cooling unit!

Caution! A tungsten electrode needs to be sharpened to a "needle", and a common mistake is sharpening an electrode to a "tip", while the arc can "wag" from side to side. The correct sharpening is a slightly blunted tip, and the fewer are the "needle butts" that can withstand the set current, the better. Keep in mind that at high welding currents, a very sharpened electrode is easily melted due to low heat transfer. Also, the "stripes" from sharpening should be located along the axis of the electrode.

4.1.1 WELDING PROCESS CYCLE - TIG-LIFT



See paragraph 6.1 for the procedure for switching the value of any function



Procedure for preparing the unit for operation:

- insert the torch cable into the socket of the source **B "-"**;
- insert the ground cable into the socket of the source **A "+"**;
- connect the ground cable to the workpiece;
- install the reducing valve on the gas cylinder;
- connect the torch gas hose to the gas cylinder reducing valve;
- open the gas cylinder valve, check for air-tightness;
- connect the mains plug to the power supply;
- turn power switch **8** on the rear panel to the "I" position;
- use button **4** to set the TIG welding mode, the modes are switched in a circle;
- set the TIG-LIFT torch button function; all you need to do is to hold button **3** until the "button mode" appears on the display, and using buttons **2** set the LIFT mode. If you do not take any action for a long time, the unit will exit this function. You can return in the same way, if you omitted the required mode of the button, press button **4** again: the functions are switched in a circle;

- after the unit reaches the main parameter, use buttons **2** to set the welding current; - if necessary, you can adjust the remaining additional functions of the welding process; see paragraph 6.1 for the order of switching

Caution! The TIG torch must be of valve type, with a Ø13mm bayonet connector. Choose the maximum torch current according to your operating requirements.

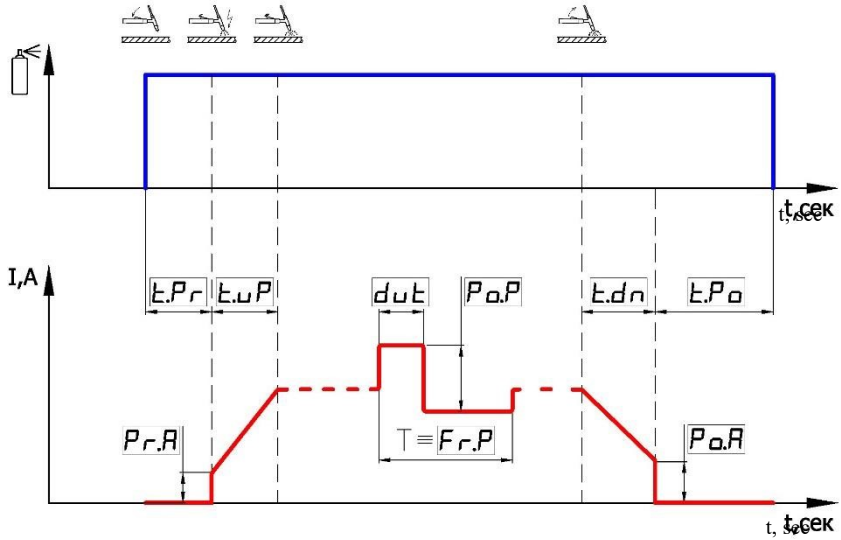
4.1.2 TIG-LIFT ARC STRIKING FUNCTION

This function is designed for torches with contact arc striking, without the use of oscillators or similar devices, but unlike the conventional contact method, it completely eliminates the shock current at the moment of striking, and this significantly reduces the destruction of the non-consumable tungsten electrode and the ingress of its inclusions into the weld, which is a very negative phenomenon.

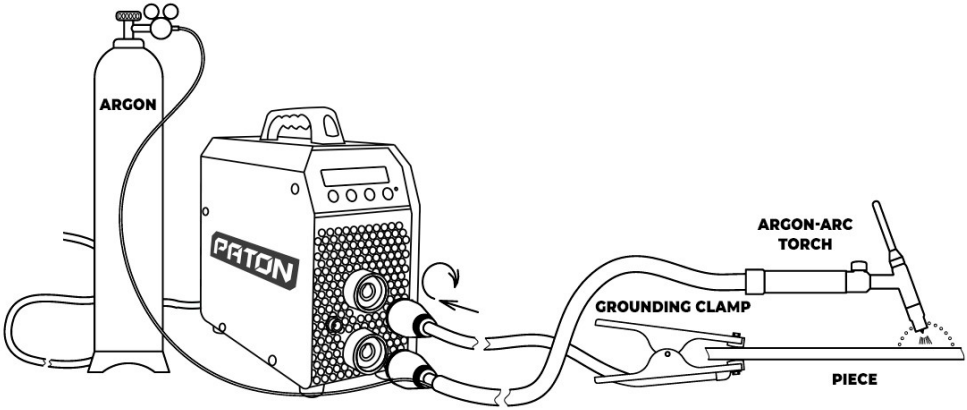
Caution! The valve on the torch must be opened manually before welding and closed after the completion of the process.

How to use this function is to touch the workpiece with the electrode, while you can hold the electrode in this position indefinitely, and when the user considers that he is ready to start welding (e.g., he lowered the protective mask over his eyes and blew the place well with shielding gas) then it is enough to start SLOWLY lifting the sharpened electrode tip away from the workpiece. The unit will detect this moment and perceive it as a signal to start the welding process, thereby starting to increase the welding current LINEARLY to the set value. The larger the main operating current, the faster you need to raise the electrode, otherwise, it will melt. The time of a smooth current build-up to the set value will be reviewed in the next paragraph.

4.2.1 WELDING PROCESS CYCLE - TIG-2T



See paragraph 6.1 for the procedure for switching the value of any function



Procedure for preparing the unit for operation:

- insert the torch cable into the socket of the source **B "-"**;
- screw tight the gas connection from the TIG torch to socket **6** (on the left);
- insert the connector of the torch control button into socket **7** (on the right);
- insert the ground cable into the socket of the source **A "+"**;
- connect the grounding cable to the product;
- install the reducing valve on the gas cylinder;
- connect the gas hose to the gas bottle reducing valve and the fitting on the rear panel of the source;

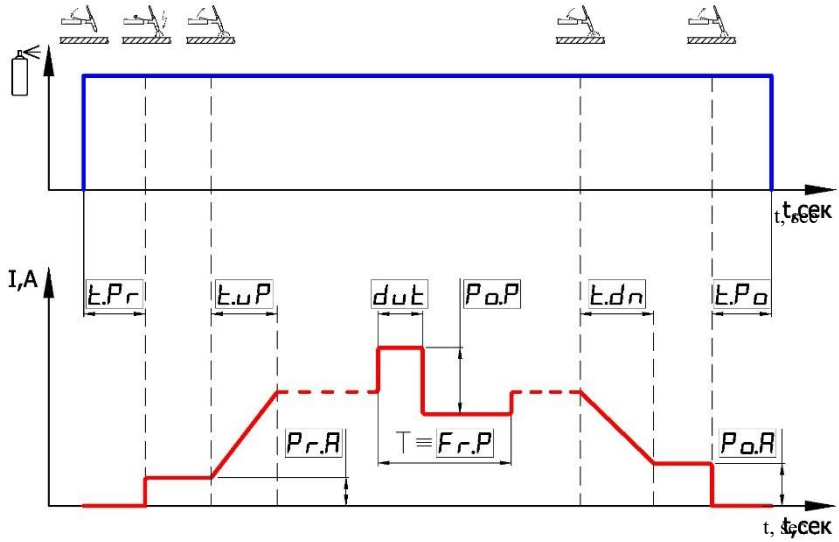
- open the gas cylinder valve, check for air-tightness;
- connect the mains plug to the power supply;
- turn power switch 8 on the rear panel to the "I" position;
- use button 4 to set the TIG welding mode, the modes are switched in a circle;
- set the TIG-2T torch button function; all you need to do is to hold button 3 until the "button mode" appears on the display, and using buttons 2 set the 2T mode. If you do not take any action for a long time, the unit will exit this function. You can return in the same way, if you omitted the required mode of the button, press button 4 again: the functions are switched in a circle;
- after the unit reaches the main parameter, use buttons 2 to set the welding current;
- if necessary, you can adjust additional functions of the welding process, see paragraph 6.1 for the order of switching.

Caution! The TIG torch must be of push-button type, with a Ø13mm bayonet connector. Choose the maximum torch current according to your operating requirements. It is supplied with the unit.

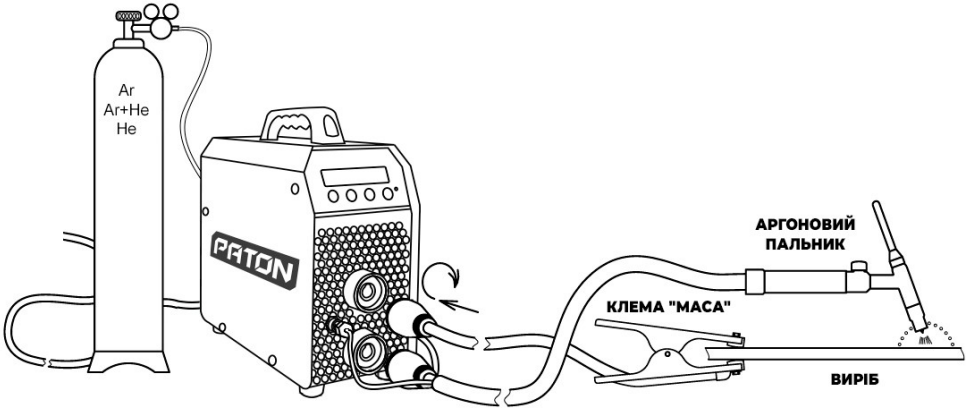
4.2.2 TIG-2T TORCH BUTTON FUNCTION

When the button on the torch is pressed, the control signal is sent to the control unit, which fulfils the function of gas pre-purge of the welding zone (turns the gas valve ON) and with a delay gives a signal to turn on the source; at the same moment, a high-frequency high-voltage pulse is sent to strike the arc. All other functions are triggered (these will be reviewed in detail in the following paragraphs) according to the cycle of the welding process given above. After releasing the button, the current ramp-down function is triggered and the source is turned off. Next, the function of gas post-purge of the welding zone is triggered (the gas valve is turned off with a delay).

4.3.1 WELDING PROCESS CYCLE - TIG-4T



See paragraph 6.1 for the procedure for switching the value of any function



Procedure for preparing the unit for operation:

- insert the torch cable into the socket of the source B "-";
- screw tight the gas connection from the TIG torch to socket 6 (on the left);
- insert the connector of the torch control button into socket 7 (on the right);
- insert the ground cable into the socket of the source A "+";
- connect the ground cable to the workpiece;
- install the reducing valve on the gas cylinder;
- connect the gas hose to the gas bottle reducing valve and fitting 9 on the rear panel of the source;

- open the gas cylinder valve, check for air-tightness;
- connect the mains plug to the power supply;
- turn power switch 8 on the rear panel to the "I" position;
- use button 4 to set the TIG welding mode, the modes are switched in a circle;
- set the TIG-4T torch button function; all you need to do is to hold button 3 until the "button mode" appears on the display, and using buttons 2 set the 4T mode. If you do not take any action for a long time, the unit will exit this function. You can return in the same way, if you omitted the required mode of the button, press button 3 again: the functions are switched in a circle;
- use buttons 2 to set the current main parameter, this is the welding current;
- if necessary, you can adjust additional functions of the welding process, see paragraph 6.1 for the order of switching.

Caution! The TIG torch must be of push-button type, with a Ø13mm bayonet connector. Choose the maximum torch current according to your operating requirements. It is supplied with the unit.

4.3.2 TIG-4T TORCH BUTTON FUNCTION

The order of pressing the control button on the torch is similar to TIG-2T (see paragraph 4.2.2), but there is the first difference at the start of welding: as long as the button is held down during the first press, gas pre-purge of the welding zone and high-voltage striking at the source output will be at a constant pre-current (pilot arc); only after the button is released, the process of current build-up will begin and the source will reach the operating current, i.e., the button does not need to be held when the operating current is fed. The second difference is at the end of welding (after the second press of the control button on the torch), the current begins to drop to the level of the crater filling current, and while the button is pressed, the current is at this level. After the second release of the button, the source is turned off and the function of gas post-purge of the welding zone is triggered (the gas valve is turned off with a delay).

4.4 SHIELDING GAS PRE-PURGE FUNCTION

This function is necessary to protect the welding zone from the harmful effects of atmospheric air, and consists in pre-purging the welding zone with shielding gas before striking the welding arc. By default, the "pre-purge time" is set to 2.0 sec; this value can be changed at any time at your discretion.

See paragraph 6.1 to change the value of any function in the current welding mode.

4.5 PRE-CURRENT FUNCTION (PILOT ARC)

This function is required for the convenience of using the torch at the time of arc

striking. It allows you to start the welding process with low current values, the value of which only maintains the process, but does not introduce significant heat input and does not burn the workpiece through. It is possible to preheat the weld spot using the TIG-4T button mode. By default, the pre-current is set to 20A.

See paragraph 6.1 to change the value of any function in the current welding mode

4.6 WELDING CURRENT BUILD-UP FUNCTION

This function, in addition to saving the life of the electrode and, to some extent, the torch itself, is also necessary for the convenience of using the torch. This eliminates the formation of the initial splashing of the weld pool, as well as for the set time of current buildup (in the case of the TIG-2T button mode), you can accurately direct the torch to the desired welding location, since the arc striking location in particularly critical workpieces is not always located at the welding location, or you can even use this function to preheat the welding location. By default, it is in the "OFF" position, i.e., the function is disabled.

See paragraph 6.1 to change the value of any function in the current welding mode

4.7 RAMP-DOWN FUNCTION

This function is necessary to improve the process of filling the crater formed under the pressure of the main working current of the welding arc, and such a crater is the nucleus of weld defects, i.e. it is an extremely negative phenomenon. Therefore, for the set time of the current ramp-down, it is possible to weld the formed cavity. By default, it is in the "OFF" position, i.e., the function is disabled.

See paragraph 6.1 to change the value of any function in the current welding mode.

4.8 CRATER FILLING CURRENT FUNCTION

This function is necessary to indicate the level to which the current drops at the end of the welding process. It is necessary for crater filling in the TIG-4T button mode (with the second press of the torch button). By default, the crater filling current is set at 20A.

See paragraph 6.1 to change the value of any function in the current welding mode.

4.9 SHIELDING GAS POST-PURGE FUNCTION

This function consists in the post-purging of the welding zone with a shielding gas after the welding arc is extinguished, since the hot weld pool is afraid of the harmful effects of atmospheric air for some time. By default, the post-purge time is set to 3.0 seconds; this value can be changed at any time at your discretion.

See paragraph 6.1 to change the value of any function in the current welding mode.

4.10 PULSE CURRENT WELDING FUNCTION

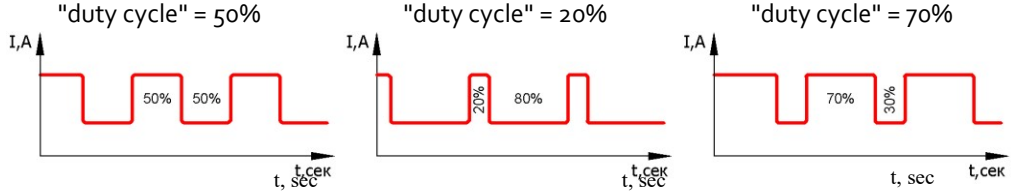
This function is designed to facilitate the control of the welding process in spatial positions other than the lower one, as well as when welding non-ferrous metals. The effect occurs directly on the mixing of the molten metal of the seam, and this, in turn, on the stability of

the seam formation. To some extent, it replaces the movement of the welder's hand during welding, especially in hard-to-reach places. There is also partially a forced effect on the transfer of a drop from the filler wire to the weld pool. The shape and quality of the weld formation depends on the correct setting, which reduces the likelihood of the appearance of pores and reduces the grain structure, and thus increasing the strength of the weld. To implement this function in the unit, you need to set three parameters: pulsation power, pulsation frequency and pulse/pause ratio (or "duty cycle") [dut]. By default, the pulsation power as a key parameter is in the OFF, i.e., the function is disabled, and the pulsation frequency and duty cycle are at 10.0Hz and 50%, respectively. To enable the function, simply set the pulsation power above zero. This parameter is set as a percentage of the used main welding current set.

Example: Welding with a refractory tungsten electrode with a diameter of 2mm, the set main value of the welding current is 100A, and the pulsation power is 30%, while the pulsation frequency is 10.0Hz and the duty cycle is 50% by default.

Result: the current will pulse from 70A to 130A at a frequency of 10 Hz; the pulses will have an equal shape in amplitude and time.

The "duty cycle" parameter is set to 50% by default. Changing this value introduces an asymmetry between the current pulse time and the current "pause" time: default



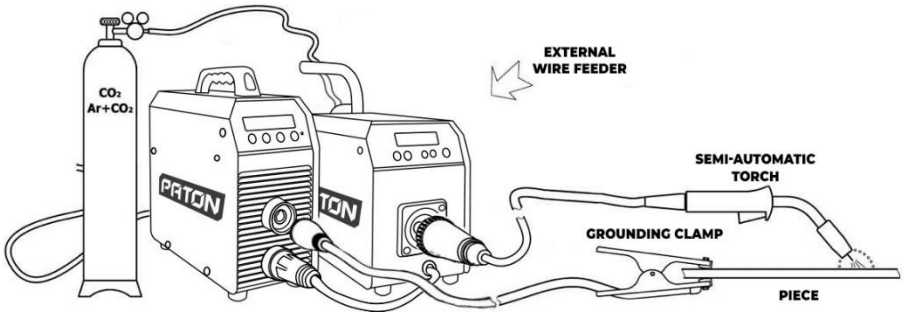
At the same time, the unit will react in such a way that while maintaining the specified pulse difference, the average current level will be maintained during the welding process at the level of the set main value of the welding current 100A (as it was set earlier), respectively, and the heat input into the weld will be at the level of the same 100A, but the stability of the welding process and the mixing of the weld pool will change. This is a very important condition for accurate user assessment of the quality of change with equal heat input into the weld pool.

These parameters are set in different situations in different ways, according to the welder's requirements.

See paragraph 6.1 to change the value of any function in the current welding mode

5. METAL-ARC INERT-GAS WELDING/METAL ACTIVE GAS WELDING (MIG/MAG)

The unit can act as a source for semi-automatic welding, and it has the necessary current-voltage characteristic at the output of the power terminals when switching to this mode.



Absolutely any independent wire feeder operating at a specific power supply voltage of the built-in motor can serve as an external feed mechanism for wire feeding. For this purpose, it must have its own power source, or be powered from the power source voltage (however, this is a lower priority option, since very rarely such systems have a good and stable wire feeding).

Caution! In the simplest case, carbon dioxide "CO_2" is used as a shielding gas when welding ferrous metals, and when welding aluminium, only inert gases such as argon "Ar", sometimes expensive helium "He" are suitable. Alternatively, for stainless and high-alloy steels, mixtures in various proportions "80% Ar+20% CO_2" are often used.

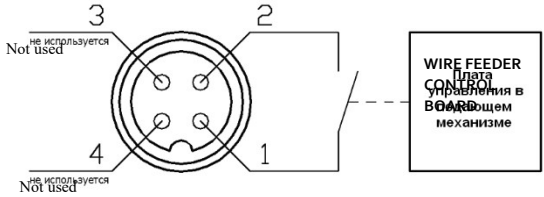
Use of other gases is allowed only in agreement with the equipment manufacturer.

Preparation for operation:

- insert the ground cable into the socket of the source **B "-"**;
- connect the ground cable to the workpiece;
- a pre-made power jumper with a cable cross-section of at least 16 mm^2 must be connected to the socket of the source **A "+",** and the other end is connected to the power terminal of the wire feeder, in each case it is individual, so it makes no sense to list all the options;
- connect the TIG torch to the wire feeder;
- install the reducing valve on a gas bottle with shielding gas "CO_2" or "Ar + CO_2" or "Ar"; - connect the gas hose to the gas cylinder reducing valve and the fitting on the wire feeder, the connection method may be different;
- open the gas cylinder valve, check for air-tightness;
- connect the power supply unit of the wire feeder to the power supply mains (if the wire feeder is independently powered);
- turn on the wire feeder with its own switch;
- connect the mains plug to the power supply;
- turn power switch **8** on the rear panel to the "I" position;
- use button **4** to set the MIG/MAG welding mode, the modes are switched in a circle;
- use buttons **2** to set the required welding voltage;
- set the required wire feeding speed on the wire feeder;

- if necessary, you can adjust additional functions of the welding process, see paragraph 6.1 for the order of switching.

To control turning the source on and off, there is a control connector **9** on the rear panel. Connection diagram:



Only contacts 1 and 2 are used, which are closed at the right time. When the source should be operational, close the contacts, and when the source should be turned off, open them.

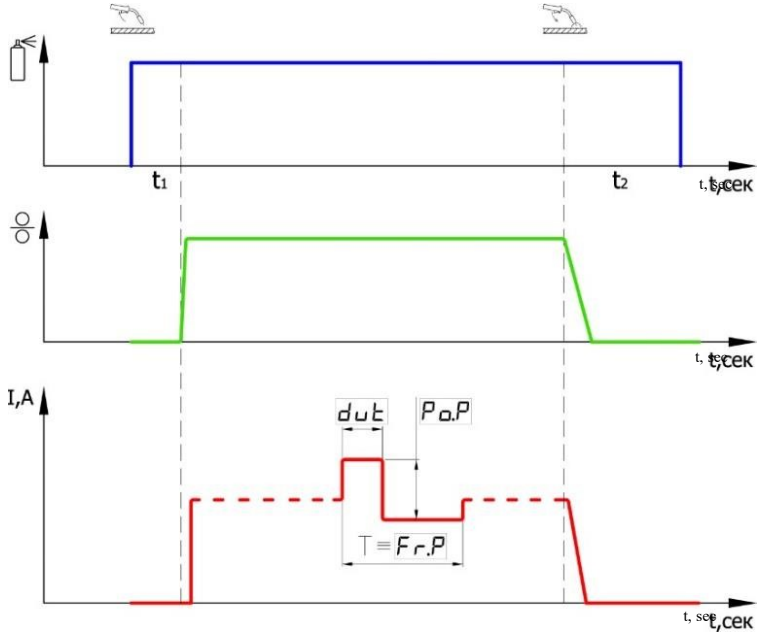
CAUTION!!! The connection diagram and implementation in wire feeders is **individual** for each specific case, therefore, it is not given in this user manual for the power source. See the operating instructions of the wire feeder for this.

In independent wire feeders by PATON, **Feeder-15-2** (2-roll) and **Feeder-15-4** (4-roll), adaptation of control connectors is already provided, thus the assembly will require minimal effort.

Do not forget about the supply of shielding gas. If you are a beginner and have no experience in setting the optimal pressure for welding a particular product, then at the first moment the gas pressure can be set higher than the optimal value of ~0.2 MPa. This will have little effect on the process, only the shielding gas consumption will increase. But in the future, to save money, follow the general recommendations for semi-automatic welding operations.

Also, start with the middle position of the wire feed speed controller on the wire feeder (~ 4..5 m/min) and medium voltage at the source (~ 19V) for any diameter of the installed wire (Ø0.6 ... 1.0m). It may not be optimal, but with correct operation and even wire feed (without jerks), as well as correct connection, such a "source + wire feeder" link should already provide welding. To achieve the best result, you need to adjust the voltage at the source with buttons **2** and the wire feed speed on the wire feeder in accordance with the general recommendations for carrying out the welding process with semi-automatic units. Remember, these parameters are different for each specific case.

5.1 WELDING PROCESS CYCLE - MIG/MAG-2T

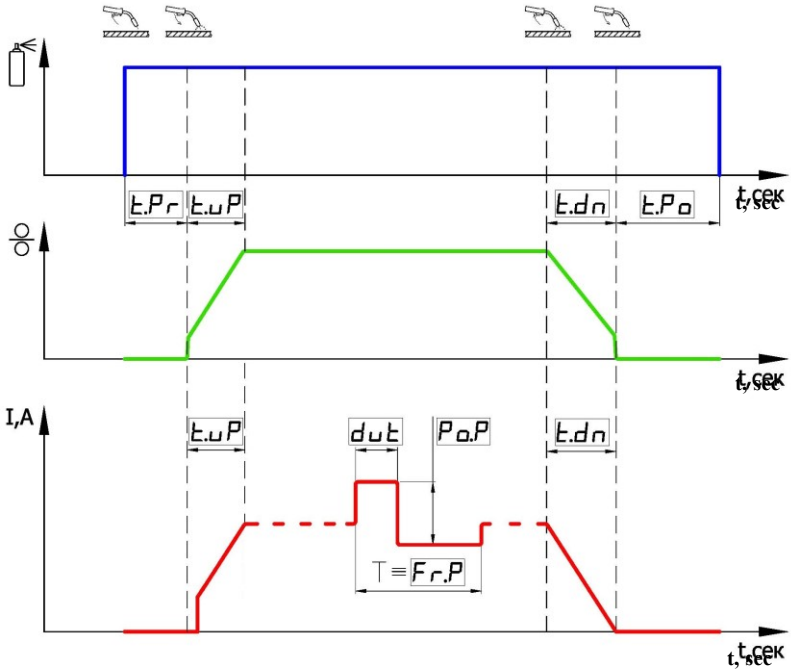


See paragraph 6.1 for the procedure for switching the parameter value of the function. The pre-blowing time (t1) and post-blowing time (t2) with shielding gas are set on the wire feeder.

5.1.1 2T TORCH BUTTON FUNCTION

It is used for welding short and medium length welds. The function is as follows: when the button on the torch is pressed, the control signal is given to the control unit, the gas pre-purge function of the welding zone is triggered for the time [t.Pr] (gas valve opens), then a signal is given to turn on the source and the wire feed motor. From this moment, the welding process begins, at the same time the function of smooth reaching the welding mode for the time [t.uP] is triggered, as well as additional functions (e.g., pulse mode) can be triggered, all this according to the cycle of the welding process shown in the sequence diagram in paragraph 5.1. After releasing the button, the function of the ramp-down of the current and the wire feed speed for the time [t.dn] is triggered, and the source is turned off. Next, the function of gas post-purge of the welding zone for the time [t.Po] is triggered (the gas valve closes with a delay).

5.2 WELDING PROCESS CYCLE - MIG/MAG - 4T



See paragraph 6.1 for the procedure for switching the value of any function

5.2.1 4T AND alt.4T TORCH BUTTON FUNCTION

a) the global standard of the button mode is 4T

b) alternative button mode is alt.4T

It is used when welding long welds. The function is as follows: when the button on the torch **is pressed for the first time**, the control signal is given to the control unit, the gas pre-purge function of the welding zone is triggered (gas valve opens); after the **first release of the button**, a signal is given to turn on the source and the wire feed motor. From this moment, the welding process begins, at the same time the function of smooth reaching the welding mode for the time [t.uP] is triggered, as well as additional functions (e.g., pulse mode) can be triggered, all this according to the cycle of the welding process shown in the sequence diagram in paragraph 5.2. After **the second press** of the torch button, the function of the voltage and wire feed speed ramp-down for the time [t.dn] is triggered, and the source is turned off.

After **the second release** of the button, the function of gas post-purge of the welding zone for the time [t.Po] is triggered (the gas valve closes with a delay).

In the alternative mode of the Alt 4T button, it skips the second cycle (the first

release of the button), and in this way it differs from the global standard 4T. Let us explain: in this case, the system does not wait for **the first release** of the torch button, but immediately after the function of gas pre-purge of the welding zone for the time [t.Pr] starts the process of arc striking - this is the same as in the 2T button mode. In this case, after **the first release**, the welding process continues unchanged. This mode is provided by PATON as a bonus one, use it as desired, since it is more common from the point of view of more frequent use of 2T mode by customers in conventional semi-automatic units, therefore, it is more user-friendly.

5.3 INDUCTANCE FUNCTION

This function is required to change the rate of current build-up when the arc voltage changes. As a result, spatter is reduced, but it also affects the drop transfer process, which at high inductance values leads to a slowdown in the welding process and a strong decrease in the drop transfer frequency. By changing the value of this function, each user can choose the optimal welding process for themselves. In general, the minimum values are used for welding thickness of more than 3 mm, and the maximum values are used for thinner products.
By default, the inductance is set to OFF, i.e. set to zero stage. See paragraph 6.1 to change the value of any function in the current welding mode.

5.4 BEGINNING OF WELDING VOLTAGE BUILD-UP FUNCTION

This function is necessary to smoothly reach the welding mode in the set time [t.uP], which reduces splashing of the weld pool and splatter at the moment of striking, when the wire is still cold. The extended smooth reach time is used for the initial weld pool formation. The voltage build-up time [t.up] is responsible for regulating the smoothness of this process, both in the source and in the wire feed speed control unit. For maximum correct operation, these values must be consistent (not every feed unit has the ability to change the wire feed speed at the end of welding).

CAUTION! The longer the build-up time, the smaller the initial weld, so it is used only for medium and long seams. For this reason, do not increase the time by more than 0.1 seconds when welding with tacks, etc.
By default, the reach time is set to OFF, i.e. disabled. See paragraph 6.1 to change the value of any function in the current welding mode.

CAUTION! When welding with steel wire, the build-up time [t.uP] at the source must be either equal to or slightly less than that at the wire feeder. When welding with aluminium wire, the build-up time [t.uP] at the source must be longer (+0.2...+ 0.5 sec) than that at the wire feeder.

5.5 END OF WELDING VOLTAGE REDUCTION FUNCTION

This function is designed for smooth welding of the crater formed in the weld pool

under the influence of electromagnetic blast with an electric arc and subsequently being a source of welding seam defects. The signal to start the function is to release the button on the torch at the end of the welding process, and the movement of the torch must be stopped and a pit (which is essentially a crater) in the welding seam must be welded with a reducing voltage. The default voltage reduction time is responsible for regulating the smoothness of this process, which is set to OFF, i.e., disabled, but it can be changed at your discretion.

See paragraph 6.1 to change the value of any function in the current welding mode.

5.6 PULSE VOLTAGE WELDING FUNCTION

This function is designed to facilitate the control of the welding process in spatial positions other than the lower one, as well as when welding non-ferrous metals. The effect occurs directly on the mixing of the molten metal of the seam, so it primarily affects the shape of the seam. There is also a forced effect on the transfer of a drop into the weld pool, which in turn affects the stability of the process. As with other types of welding, this process replaces the welder's hand movements to some extent, especially in hard-to-reach places. In addition to the shape, the quality of the weld formation also depends on the correct setting, which reduces the likelihood of pores and reduces the grain structure, and this increases the strength of the weld.

To implement this function in the source, you need to set three parameters: pulsation power, pulsation frequency and pulse/pause ratio (or "duty cycle"). By default, the pulsation power as a key parameter is in the OFF, i.e., the function is disabled, and the pulsation frequency and duty cycle are at 20Hz and 50%, respectively.

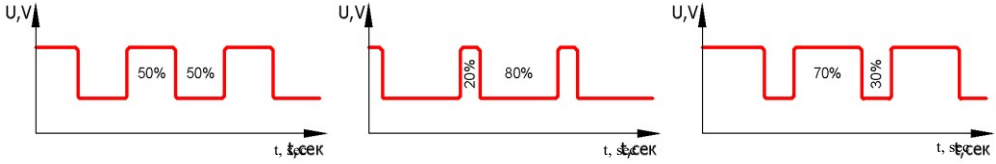
To enable the function, simply set the pulsation power above zero. This parameter is set as a percentage of the used main welding voltage set.

Example: Welding with 0.8mm wire, set wire feed speed 4.5 m/min, the set main value of welding voltage is 18V, and pulsation power is 20%, while the pulsation frequency is 20Hz and the duty cycle is 50% by default.

Result: the source voltage will pulse from 14.4 V to 21.6 V at a frequency of 20 Hz; the pulses will have an equal shape in amplitude and time.

The "duty cycle" parameter is set to 50% by default. Changing this value introduces an asymmetry between the voltage pulse time and the voltage "pause" time: default

"duty cycle" = 50% "duty cycle" = 20% "duty cycle" = 70%



The unit will react in such a way that the average voltage level during the welding

process will be at the level of the set basic value of the welding voltage of 18V (as it was set earlier), respectively, and the heat input to the welding seam will be at the level of the same 18V, but the stability of the welding process, the mixing of the weld pool and penetration will change.

This is a very important condition for accurate user assessment of the quality of change with equal heat input into the weld pool.

If the task is to reduce the heat input to the seam by using a pulse mode, e.g., when welding thin metals, then it is enough to reduce the main source voltage in a standard way, while the amplitude of pulses and pauses set earlier will automatically adjust to this voltage. Therefore, the user will clearly understand how much the current heat input to the seam has decreased compared to the previous mode, while simultaneously changing, in any combination, the power and "duty cycle" of the pulses to obtain the desired process. This task is not easy, since several parameters are regulated at once.

These parameters are set in different situations in different ways, according to the welder's requirements.

See paragraph 6.1 to change the value of any function in the current welding mode.

6. CONFIGURING THE UNIT

When the buttons on the front panel are not touched, the unit always displays the value of the main parameter of the used welding mode on the digital indicator:

1) in the MMA mode – welding current; 2)
in the TIG mode – welding current;
3) in the MIG/MAG mode – welding voltage.

Buttons **2** on the front panel are responsible for changing the value of the selected function or main parameter.

Button **3** on the front panel of the unit is multifunctional and is responsible for the following:

3) circular selection of any function in the current welding mode (quick press);
4) reset all functions to the factory settings of the current welding mode (hold for more than 12 seconds).

Button **4** on the front panel is responsible for changing the welding mode; switching in a circle.

6.1 SWITCHING TO THE REQUIRED FUNCTION

If the unit has a system of protection against unauthorized access to the function menu, then if you press button **3**, no changes are made on the indicator, i.e., this button is locked. To unlock it, hold it down for more than 3.5 seconds. When unlocking, the indicator displays an image of opening locks, indicating the process of unlocking the function menu. After successful unlocking, by pressing button **3**, the current name of the function and its value are displayed on the digital display.

Caution! After releasing button **3** after 2 seconds, the screen will return to the main parameter of the current welding mode. While the display is showing the current function, its value can be changed up or down using buttons **2**. Alternatively, by quickly pressing and releasing button **3**, you can switch to the next function, in a circle.

Caution! If you hold down button **3** for a long time, when you see the name of the function, after about 10 seconds, a countdown 333...222...111 will start on the digital display warning about resetting all settings of the current mode. This will be reviewed in the next paragraph.

6.2 SWITCHING TO THE REQUIRED WELDING MODE

Pressing button **4** leads to switching to the next welding mode in a circle, this can be seen on display 1 on the front panel.

6.3 RESET ALL FUNCTIONS OF THE WELDING MODE USED

Situations may occur when the unit's settings have somewhat confused the user. In order to reset them to the standard factory settings, it is enough to hold down button **3** for more than 10 seconds (ignore the animation of lock symbols). As mentioned in the previous paragraph, the scoreboard will start counting down 333...222...111 and when "000" is reached, all settings of the current welding mode will be updated to factory settings.

Reset parameters for each welding mode are made separately. This is provided for convenience, so as not to reset individual settings in the other two modes.

6.4 CHANGE PROGRAM NUMBER IN CURRENT WELDING MODE

In each MMA, TIG, and MIG / MAG welding mode, it is possible for the user to save up to 16 different presets. The current preset (program) number is displayed in the upper right corner of the LCD of the source on the front panel. At the moment of the first switching on of the machine, the program is always under No. 1 for each welding mode. All changes in the setting of the machine in this welding mode and the current program number are saved. To switch to another program number and start setting again from the basic parameters, just press button **3** and if the function selection menu is locked, then the LCD displays the current program number, which can be changed up or down using buttons **2**. If the function selection menu is not locked, for example, the user just before that changed the additional parameters of the functions described in clause 6.1, then it is necessary to lock the function selection menu by holding button 3 for more than 3.5 seconds, in the same way as when unlocking, when the LCD will show closing locks, after this operation the menu will be locked and now you can try again to change the program number using button **3**. In this case, all the parameters of the previous program will be saved and you can always return to it again.

7. GENERAL LIST AND SEQUENCE OF FUNCTIONS

MMA welding mode

0) main display parameter CURRENT = 90A (by default)
   a) 8 ... 160A (change step 1A) for StandardTIG-160
   b) 10 ... 200A (change step 1A) for StandardTIG-200
   c) 12 ... 250A (change step 1A) for StandardTIG-250
   d) 12 ... 270A (change step 1A) for StandardTIG-270-400V
   e) 14...350A (change step 1A) for StandardTIG-350-400V
1) "Hot start" power = 40% (by default)
   a) 0[OFF] ... 100% at low currents (change step 5%)
2) "Hot start" time = 0.3 sec (by default)
   a) 0.1 ... 1.0 sec (change step 0.1 sec)
3) "Arc Force" power = 40% (by default)
   a) 0[OFF] ... 100% at low currents (change step 5%) 4) "Arc Force" trigger level = 12V (by default) a) 9 ... 18V (change step 1V)
5) slope of current-voltage characteristic = 1.4V/A (by default)
a) 0.2 ... 1.8 V/A (change step 0.4 V/A) 6) short arc welding =
OFF (by default)
a) ON
b) OFF
7) voltage reduction unit = OFF (by default)
   a) ON
   b) OFF
8) current pulsation power = OFF (by default) a) 0[OFF] ... 80% (change step 5%)
9) current pulsation frequency = 50Hz (by default) a) 0.2 ... 500Hz (dynamic step)
10) pulse/pause ratio (duty cycle) – it is the percentage of the current pulse to the period of repetition of these pulses = 50% (by default) a) 20 ... 80% (change step 5%)

TIG welding mode

0) main displayed parameter CURRENT = 100A (by default) a) 8 ... 160A (change step 1A) for StandardTIG-160
   b) 10 ... 200A (change step 1A) for StandardTIG-200
   c) 12 ... 250A (change step 1A) for StandardTIG-250
   d) 12 ... 270A (change step 1A) for StandardTIG-270-400V
   e) 14...350A (change step 1A) for StandardTIG-350-400V

1) torch button mode = [2T] (by default)
   a) [LIFT] - TIG-LIFT contact striking mode
   b) [2T] - non-contact striking mode, TIG-2T button mode
   c) [4T] - non-contact striking mode, TIG-4T button mode
2) pre-purge time = 2.0 sec (by default)
   a) 0.5 ... 25.0 sec (change step 0.1 sec)
3) gas post-purge time = 3.0 sec (by default)
   a) 1.0 ... 25.0 sec (change step 0.1 sec)
4) pre-current (pilot arc) = 15A (by default)
   a) 8 ... 40A (change step 1A) for StandardTIG-160
   b) 10 ... 40A (change step 1A) for StandardTIG-200
   c) 12 ... 40A (change step 1A) for StandardTIG-250
   d) 12 ... 40A (change step 1A) for StandardTIG-270-400V
   e) 14 ... 40A (change step 1A) for StandardTIG-350-400V
5) crater filling current = 20A (by default)
   a) 8 ... 60A (change step 1A) for StandardTIG-160
   b) 10 ... 60A (change step 1A) for StandardTIG-200
   c) 12 ... 60A (change step 1A) for StandardTIG-250
   d) 12 ... 60A (change step 1A) for StandardTIG-270-400V
   e) 14 ... 60A (change step 1A) for StandardTIG-350-400V
6) current build-up time = 0.3 sec (by default)
   a) 0.1 ... 5.0 sec (change step 0.1 sec) 7) current ramp-down time = 0.3 sec (by default) a) 0.1 ... 5.0 sec (change step 0.1 sec) 8) current pulsation power = OFF (by default) a) o[OFF] ... 80% (change step 5%)
9) current pulsation frequency = 5.0Hz (by default) a) 0.2 ... 500Hz (dynamic step)
10) pulse/pause ratio (duty cycle) – it is the percentage of the current pulse to the period of repetition of these pulses = 50% (by default) a) 20 ... 80% (change step 5%)

MIG/MAG welding mode

0) main display VOLTAGE = 19.0V (by default)
   a) 12,0...24,0V (change step 0,1V) for StandardTIG-160
   b) 12,0...26,0V (change step 0,1V) for StandardTIG-200
   c) 12,0...28,0V (change step 0,1V) for StandardTIG-250
   d) 12,0...29,0V (change step 0,1V) for StandardTIG-270-400V
   e) 12,0...30,0V (change step 0,1V) for StandardTIG-350-400V 1) [But] torch button mode = [2T] (by default) a) [2T] - 2T torch button mode
b) [4T] - 4T torch standard button mode

c) [alt.4T] - 4T torch alternative button mode
2) [Ind] inductance = OFF (by default)
a) 0 [OFF] ... stage 3 (change step 1 stage) 3)
[t.up] voltage build-up time = OFF (by default)
a) 0 [OFF] ... 5.0 sec (change step 0.1 sec)
4) voltage reduction time = 1.0 sec (by default)
a) 0.1 ... 5.0 sec (change step 0.1 sec)
5) voltage pulsation power = OFF (by default) a) o[OFF] ... 80% (change step 5%)
6) voltage pulsation frequency = 20Hz (by default) a) 5 ... 500 Hz (change step 1 Hz)
7) pulse/pause ratio (duty cycle) – it is the percentage of the current pulse to the period of repetition of these pulses = 50% (by default) a) 20 ... 80% (change step 5%)

8. GENERATOR OPERATION

The power supply is suitable for generator operation, provided as follows:

When working with an electrode	Set current value for MMA and TIG	When working with a wire diameter of MIG/MAG	Minimum generator power
Ø2	not more than 80A	not more than Ø0.6 mm	3.0 kVA
Ø3	not more than 120A	not more than Ø0.8 mm	4.5 kVA
Ø4	not more than 160A	not more than Ø1.0 mm	6.0 kVA
Ø5	not more than 200A	not more than Ø1.0 mm	7.7 kVA
Ø6 fusible	not more than 250A	not more than Ø1.2 mm	10 kVA
Ø6 fusible	not more than 270A	not more than Ø1.2 mm	12.0 kVA
Ø6	not more than 350A	not more than Ø1.4 mm	16.0 kVA

For trouble-free operation! The output voltage of the generator must not exceed the permissible limits:
- 160-260V (for StandardTIG-160/200/250);
- 320-440V for all three phases (for StandardTIG -270/350-400V).

9. CARE AND MAINTENANCE

Caution! Before opening the unit, be sure to turn it off, remove the mains plug. Allow the internal circuits of the unit to discharge (about 5 minutes), and only then proceed to other actions. When leaving, install a sign prohibiting to start the unit.

In order to keep the unit operational for many years, be sure to follow several rules:

- carry out a safety inspection at specified intervals (see Section "Safety instructions");
- with intensive use, we recommend that you blow the unit with dry compressed air every six months. **Caution!** Blowing from a short distance can result in damage to the electronic components;
- if there is a lot of dust, clean the cooling system ducts manually.

10. STORAGE

Store the conserved and packaged source under storage conditions 4 in accordance with GOST 15150-69 for a period of 5 years.

The de-conserved source should be stored in dry closed premises at an air temperature not lower than +5 °C. The premises should be free of acid vapours and other active substances.

11. TRANSPORTATION

The packed source is suitable to be transported by all transport means ensuring its safety in compliance with the transport rules established for the applicable type of transport.

12. SCOPE OF SUPPLY

1. Arc power source with mains cable	- 1 pc;
2. Shoulder strap	- 1 pc;
3. User manual	- 1 pc;
For StandardTIG-160/200:	
- TIG torch ABICOR BINZEL, 4 m	- 1 pc;
- Welding cable with ABICOR BINZEL ground terminal, 3 m	- 1 pc;
For StandardTIG-160/200/250:	
- Branded PATON plastic case	- 1 pc.

13. SAFETY RULES

GENERAL PROVISIONS

The welding unit is manufactured in accordance with technical standards and established safety rules. However, if handled incorrectly, there is a hazard of:

- injury to service personnel or a third party;

- damage to the unit itself or to the company's material assets; - disruptions to an effective workflow.

All persons involved in the commissioning, operation, care and maintenance of the unit must
- be appropriately certified;
- have expertise in welding;
- strictly follow these instructions.

The malfunctions that could impair safety must be urgently rectified.

USER RESPONSIBILITIES

The User undertakes to admit to work on the welding unit only the persons who:
- reviewed the basic safety rules, received training on the use of welding equipment; - read the Section "Safety instructions" and the instructions on necessary precautions given in this manual, and confirm this with their signature.

PERSONAL PROTECTIVE EQUIPMENT

For personal protection, observe the following rules:
- wear protective footwear that retains insulating properties, even in wet conditions; - protect hands with insulating gloves;
- protect eyes with a protective mask with an anti-UV filter that meets safety standards; - use only suitable (highly inflammable) clothing.

HAZARD OF HARMFUL GASES AND VAPOURS
- remove generated smoke and harmful gases from the working area with special means;
- ensure sufficient supply of fresh air;
- vapours of solvents should not get into the radiation zone of the welding arc.

HAZARD OF SPARKLES
- remove flammable objects from the working area;
- do not perform welding works on containers where gases, fuel, oil products are or were stored. Potential explosion hazard for residues of these products;
- in fire and explosion hazardous areas, observe the special rules in accordance with national and international standards.

HAZARD OF MAINS AND WELDING CURRENT
- electric shock can be fatal;
- magnetic fields created by the high current can have a negative effect on the performance of electrical devices (e.g., a pacemaker). Persons with such devices should seek the advice of a physician before approaching a welding area;

- the welding cable must be robust, undamaged and insulated. Loose connections and damaged cables must be replaced immediately. An electrician must systematically check the mains cables and cables of the welding unit for proper insulation; -
do not remove the outer casing of the unit during use.

INFORMAL PRECAUTIONS

- keep the instruction near the place of use of the welding unit at all times;
- in addition to the instructions, observe the applicable general and local safety and environmental regulations;
- keep all instructions on the welding unit legible.

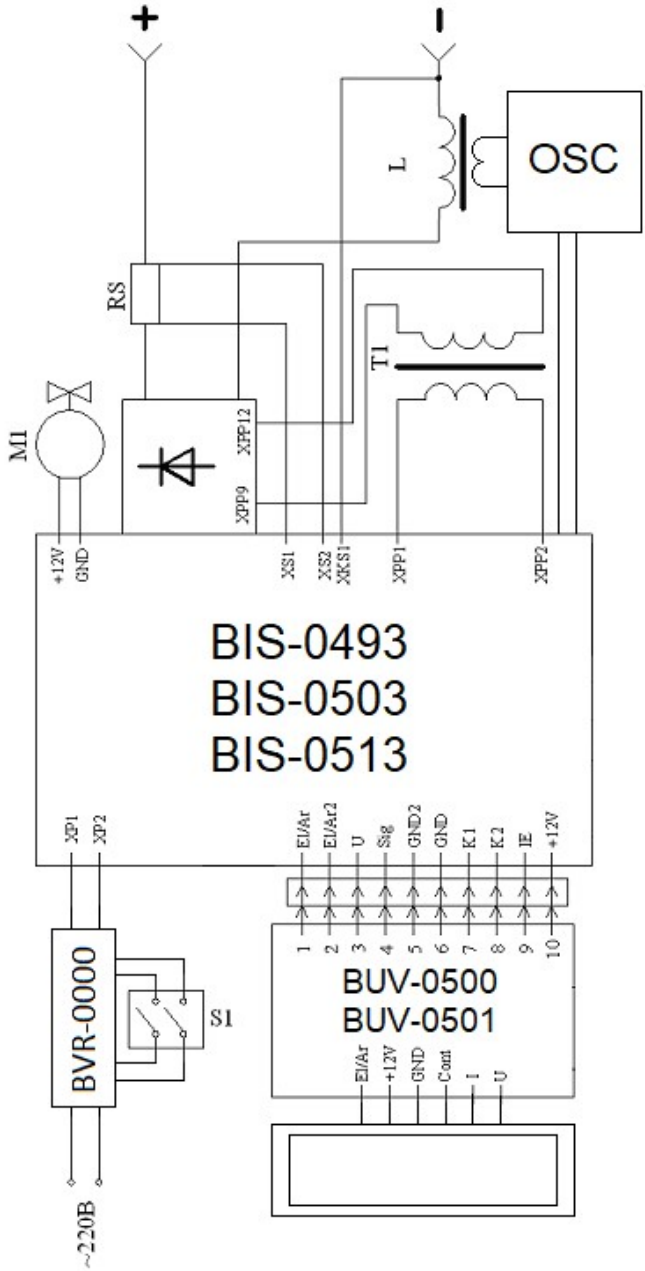
STRAY WELDING CURRENTS

- make sure that the ground cable terminal is firmly connected to the unit;
- if possible, do not install the welding unit directly on an electrically conductive floor or work table, use insulating gaskets.

REGULAR USE PRECAUTIONS

Check the unit at least once a week for external damage and the operation of the safety units.

Wiring schematic diagram
Source: PATON Standard TIG-160/200/250 DC MMA/TIG/MIG/MAG



Wiring schematic diagram
Source: PATON Standard TIG-270-V/400

14. WARRANTY OBLIGATIONS

PATON INTERNATIONAL guarantees the correct operation of the power supply provided that the consumer observes the rules of operation, storage and transportation.

CAUTION! There is no free warranty service for mechanical damage to the welding unit!

Unit model	Warranty period
StandardTIG-160	**5 years**
StandardTIG-200	
StandardTIG-250	**3 years**
StandardTIG-270-400V	
StandardTIG-350-400V	**2 years**

The main warranty period starts from the date the inverter equipment is sold to the end customer.

During the main warranty period, the seller undertakes, free of charge for the owner of PATON inverter equipment:

- to make diagnostics and identify the cause of the malfunction,
- to provide assemblies and elements necessary for the repair, - to carry out work to replace the failed elements and assemblies, - to test the repaired equipment.

The main warranty obligations do not apply to the equipment:

- with mechanical damage that affected the performance of the unit (deformation of the housing and parts as a result of falling from a height or falling of heavy objects on the equipment, falling out of buttons and connectors),
- with traces of corrosion, which caused a malfunction,
- failed due to exposure of abundant moisture to its power and electronic elements,
- failed due to the accumulation of conductive dust inside (coal dust, metal shavings, etc.), - in case of an attempt to independently repair its components and/or replace electronic elements,
- it is recommended to clean the internal elements and assemblies of this equipment, with compressed air, to remove the protective cover, depending on the operating conditions, once every six months, in order to avoid the breakdown of the unit. Cleaning should be done carefully, keeping the compressor hose at a sufficient distance to avoid damage to the soldering of the electronic components and mechanical parts.

Also, the main warranty obligations do not apply to failed external elements of the equipment exposed to physical contact, and related/consumable materials; the claims to the following are accepted no later than two weeks after the sale:

- on and off button,
- knobs for adjusting welding parameters,

- connectors for connecting cables and hoses,
- control connectors,
- mains cable and mains cable plug,
- carrying handle, shoulder strap, case, box,
- electrode holder, ground terminal, torch, welding cables and hoses.

In the event of warranty service, the customer must ship the welder at his own expense.

The seller reserves the right to refuse to provide warranty repairs, or to set the month and year of manufacture of the unit as the start date for the fulfilment of warranty obligations (established by the serial number): - if the owner loses the data sheet,

- in the absence of correct or even any kind of entries in the data sheet by the seller when selling the unit,
- the warranty period is extended for the period of warranty service of the unit in the service centre.