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REV10

INVERTEC® V205, V270 & V405

OPERATOR'S MANUAL

ENGLISH

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12/05

THANKS! For having choosen the QUALITY of the Lincoln Electric products.

- Please Examine Package and Equipment for Damage. Claims for material damaged in shipment must be notified immediately to the dealer.
- For future reference record in the table below your equipment identification information. Model Name, Code & Serial Number can be found on the machine rating plate.

Model Name:	
.....	
Code & Serial number:	
.....	.....
Date & Where Purchased:	
.....	.....

ENGLISH INDEX

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Technical Specifications

NAME	INDEX
INVERTEC® V205-S 230/400V	**K12019-1**
INVERTEC® V205-S AUS 230/400V	**K12019-2**
INVERTEC® V205-TP 230/400V	**K12021-1**
INVERTEC® V205-TP AUS 230/400V	**K12021-2**

INPUT			
Input Voltage	Input Power at Rated Output	EMC Class	Frequency
230 / 400V ± 10% Single Phase	5.5kW @ 100% Duty Cycle 6.5kW @ 35% Duty Cycle	A group 2	50/60 Hz

RATED OUTPUT AT 40°C		
Duty Cycle (Based on a 10 min. period)	Output Current	Output Voltage
100% 35%	170A 200A	26.8 Vdc 28.0 Vdc

OUTPUT RANGE	
Welding Current Range	Maximum Open Circuit Voltage
5 - 200 A	48 Vdc (CE model) 32 Vdc (AUSTRALIA model)

RECOMMENDED INPUT CABLE AND FUSE SIZES	
Fuse or Circuit Breaker Size	Input Power Cable
32A Superlag (230 / 400V input)	3 Conductor, 4mm^2

PHYSICAL DIMENSIONS			
Height	Width	Length	Weight
385 mm	215 mm	480 mm	14.1 - 15.1 Kg

Operating Temperature	Storage Temperature
–10°C to +40°C	-25°C to +55°C

NAME	INDEX
INVERTEC® V270-S	**K12022-1**
INVERTEC® V270-S AUS	**K12022-2**
INVERTEC® V270-S	**K12022-3**
INVERTEC® V270-T	**K12023-1**
INVERTEC® V270-T	**K12023-4**
INVERTEC® V270-T	**K12023-5**
INVERTEC® V270-T CCC	**K12023-6**
INVERTEC® V270-TP	**K12024-1**
INVERTEC® V270-TP AUS	**K12024-2**
INVERTEC® V270-TP	**K12024-3**
INVERTEC® V270-TP CCC	**K12024-6**

INPUT			
Input Voltage	Input Power at Rated Output	EMC Class	Frequency
400V ± 15% (V270) 230 / 400V ± 10% (V270 2V) Three Phase	6.5kW @ 100% Duty Cycle 9.9kW @ 35% Duty Cycle	A group 2	50/60 Hz

RATED OUTPUT AT 40°C		
Duty Cycle (Based on a 10 min. period)	Output Current	Output Voltage
100% 35%	200A 270A	28.0 Vdc 30.8 Vdc

OUTPUT RANGE	
Welding Current Range	Maximum Open Circuit Voltage
5 - 270 A	48 Vdc (CE model) 32 Vdc (AUSTRALIA model)

RECOMMENDED INPUT CABLE AND FUSE SIZES	
Fuse or Circuit Breaker Size	Input Power Cable
20A Superlag (400V input) 35A Superlag (230V input)	4 Conductor, 2.5mm^2 (V270) 4 Conductor, 4mm^2 (V270 2V)

PHYSICAL DIMENSIONS			
Height	Width	Length	Weight
385 mm	215 mm	480 mm	13.5 - 14.5 Kg

Operating Temperature	Storage Temperature
–10°C to +40°C	-25°C to +55°C

NAME	INDEX
INVERTEC® V405-S 400V	**K12025-1**
INVERTEC® V405-S 400V AUS	**K12025-2**
INVERTEC® V405-TP 400V AUS	**K12025-4**
INVERTEC® V405-TP 400V	**K12027-1**
INVERTEC® V405-TP 400V CCC	**K12027-6**

INPUT			
Input Voltage	Input Power at Rated Output	EMC Class	Frequency
400V ± 15% Three Phase	11.3 kW @ 100% Duty Cycle 17.2 kW @ 35% Duty Cycle	A group 2	50/60 Hz

RATED OUTPUT AT 40°C		
Duty Cycle (Based on a 10 min. period)	Output Current	Output Voltage
100% 35%	300A 400A	32.0 Vdc 36.0 Vdc

OUTPUT RANGE	
Welding Current Range	Maximum Open Circuit Voltage
5 - 400 A	48 Vdc (CE model) 32 Vdc (AUSTRALIA model)

RECOMMENDED INPUT CABLE AND FUSE SIZES	
Fuse or Circuit Breaker Size	Input Power Cable
30A Superlag	4 Conductor, 4mm^2

PHYSICAL DIMENSIONS			
Height	Width	Length	Weight
500 mm	275 mm	610 mm	31 - 33 kg

Operating Temperature	Storage Temperature
–10°C to +40°C	-25°C to +55°C

ECO design information

The equipment has been designed in order to be compliant with the Directive 2009/125/EC and the Regulation 2019/1784/EU.

Efficiency and idle power consumption:

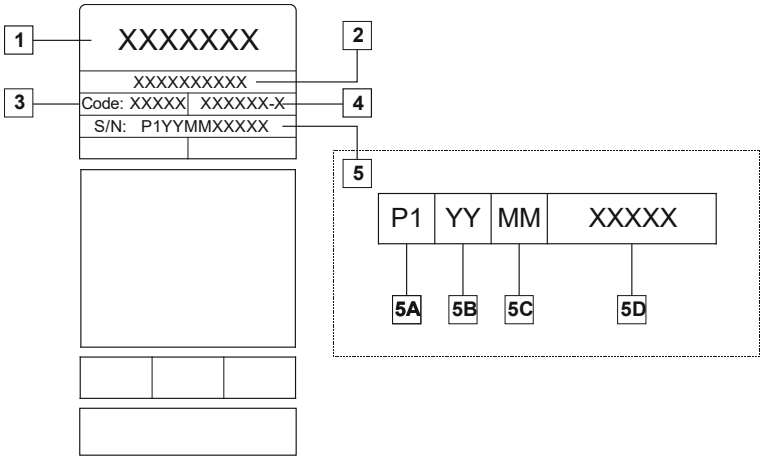
Index	Name	Efficiency when max power consumption / Idle power consumption	Equivalent model
K12022-3	**INVERTEC V270-S 230/400V**	84,2 % / 25W	No equivalent model
K12023-1	**INVERTEC V270-T 400V**	84,2 % / 25W	No equivalent model
K12023-6	**INVERTEC V270-T 400V CCC**	84,2 % / 25W	No equivalent model
K12024-1	**INVERTEC V270-TP 400V**	84,2 % / 25W	No equivalent model
K12024-6	**INVERTEC V270-TP 230/400V CCC**	84,2 % / 25W	No equivalent model

Idle state occurs under the condition specified in below table

IDLE STATE	
Condition	**Presence**
MIG mode	
TIG mode	X
STICK mode	
After 30 minutes of non-working	
Fan off	

The value of efficiency and consumption in idle state have been measured by method and conditions defined in the product standard EN 60974-1:20XX.

Manufacturer's name, product name, code number, product number, serial number and date of production can be read from rating plate.



Where:

1- Manufacturer name and address
2- Product name
3- Code number
4- Product number
5- Serial number
5A- country of production
5B- year of production
5C- month of production
5D- progressive number different for each machine

Typical gas usage for **MIG/MAG** equipment:

Material type	Wire diameter [mm]	DC electrode positive		Wire Feeding [m/min]	Shielding Gas	Gas flow [l/min]
		Current [A]	Voltage [V]			
Carbon, low alloy steel	0,9 ÷ 1,1	95 ÷ 200	18 ÷ 22	3,5 – 6,5	Ar 75%, CO_2 25%	12
Aluminium	0,8 ÷ 1,6	90 ÷ 240	18 ÷ 26	5,5 – 9,5	Argon	14 ÷ 19
Austenic stainless steel	0,8 ÷ 1,6	85 ÷ 300	21 ÷ 28	3 - 7	Ar 98%, O_2 2% / He 90%, Ar 7,5% CO_2 2,5%	14 ÷ 16
Copper alloy	0,9 ÷ 1,6	175 ÷ 385	23 ÷ 26	6 - 11	Argon	12 ÷ 16
Magnesium	1,6 ÷ 2,4	70 ÷ 335	16 ÷ 26	4 - 15	Argon	24 ÷ 28

Tig Process:

In TIG welding process, gas usage depends on cross-sectional area of the nozzle. For comonnly used torches:

Helium: 14-24 l/min
Argon: 7-16 l/min

Notice: Excessive flow rates causes turbulence in the gas stream which may aspirate atmospheric contamination into the welding pool.

Notice: A cross wind or draft moving can disrupt the shielding gas coverage, in the interest of saving of protective gas use screen to block air flow.

End of life

At end of life of product, it has to be disposal for recycling in accordance with Directive 2012/19/EU (WEEE), information about the dismantling of product and Critical Raw Material (CRM) present in the product, can be found at https://www.lincolnelectric.com/en-gb/support/Pages/operator-manuals-eu.aspx

Electromagnetic Compatibility (EMC)

01/11

This machine has been designed in accordance with all relevant directives and standards. However, it may still generate electromagnetic disturbances that can affect other systems like telecommunications (telephone, radio, and television) or other safety systems. These disturbances can cause safety problems in the affected systems. Read and understand this section to eliminate or reduce the amount of electromagnetic disturbance generated by this machine.

This machine has been designed to operate in an industrial area. The operator must install and operate this equipment as described in this manual. If any electromagnetic disturbances are detected the operator must put in place corrective actions to eliminate these disturbances with, if necessary, assistance from Lincoln Electric. This equipment does not comply with IEC 61000-3-12. If it is connected to a public low-voltage system, it is responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment may be connected.

Before installing the machine, the operator must check the work area for any devices that may malfunction because of electromagnetic disturbances. Consider the following.

- Input and output cables, control cables, and telephone cables that are in or adjacent to the work area and the machine.
- Radio and/or television transmitters and receivers. Computers or computer controlled equipment.
- Safety and control equipment for industrial processes. Equipment for calibration and measurement.
- Personal medical devices like pacemakers and hearing aids.
- Check the electromagnetic immunity for equipment operating in or near the work area. The operator must be sure that all equipment in the area is compatible. This may require additional protection measures.
- The dimensions of the work area to consider will depend on the construction of the area and other activities that are taking place.

Consider the following guidelines to reduce electromagnetic emissions from the machine.

- Connect the machine to the input supply according to this manual. If disturbances occur if may be necessary to take additional precautions such as filtering the input supply.
- The output cables should be kept as short as possible and should be positioned together. If possible connect the work piece to ground in order to reduce the electromagnetic emissions. The operator must check that connecting the work piece to ground does not cause problems or unsafe operating conditions for personnel and equipment.
- Shielding of cables in the work area can reduce electromagnetic emissions. This may be necessary for special applications.

WARNING

The Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radio-frequency disturbances.

Safety

WARNING

This equipment must be used by qualified personnel. Be sure that all installation, operation, maintenance and repair procedures are performed only by qualified person. Read and understand this manual before operating this equipment. Failure to follow the instructions in this manual could cause serious personal injury, loss of life, or damage to this equipment. Read and understand the following explanations of the warning symbols. Lincoln Electric is not responsible for damages caused by improper installation, improper care or abnormal operation.

	WARNING: This symbol indicates that instructions must be followed to avoid serious personal injury, loss of life, or damage to this equipment. Protect yourself and others from possible serious injury or death.
	READ AND UNDERSTAND INSTRUCTIONS: Read and understand this manual before operating this equipment. Arc welding can be hazardous. Failure to follow the instructions in this manual could cause serious personal injury, loss of life, or damage to this equipment.
	ELECTRIC SHOCK CAN KILL: Welding equipment generates high voltages. Do not touch the electrode, work clamp, or connected work pieces when this equipment is on. Insulate yourself from the electrode, work clamp and connected work pieces.
	ELECTRICALLY POWERED EQUIPMENT: Turn off input power using the disconnect switch at the fuse box before working on this equipment. Ground this equipment in accordance with local electrical regulations.
	ELECTRICALLY POWERED EQUIPMENT: Regularly inspect the input, electrode, and work clamp cables. If any insulation damage exists replace the cable immediately. Do not place the electrode holder directly on the welding table or any other surface in contact with the work clamp to avoid the risk of accidental arc ignition.
	ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS: Electric current flowing through any conductor creates electric and magnetic fields (EMF). EMF fields may interfere with some pacemakers and welders having a pacemaker shall consult their physician before operating this equipment.
	CE COMPLIANCE: This equipment complies with the European Community Directives.
	ARTIFICIAL OPTICAL RADIATION: According with the requirements in 2006/25/EC Directive and EN 12198 Standard, the equipment is a category 2. It makes mandatory the adoption of Personal Protective Equipment (PPE) having filter with a protection degree up to a maximum of 15, as required by EN169 Standard.
	FUMES AND GASES CAN BE DANGEROUS: Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. To avoid these dangers the operator must use enough ventilation or exhaust to keep fumes and gases away from the breathing zone.
	ARC RAYS CAN BURN: Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing. Use suitable clothing made from durable flame-resistant material to protect you skin and that of your helpers. Protect other nearby personnel with suitable, non-flammable screening and warn them not to watch the arc nor expose themselves to the arc.

	WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION: Remove fire hazards from the welding area and have a fire extinguisher readily available. Welding sparks and hot materials from the welding process can easily go through small cracks and openings to adjacent areas. Do not weld on any tanks, drums, containers, or material until the proper steps have been taken to insure that no flammable or toxic vapors will be present. Never operate this equipment when flammable gases, vapors or liquid combustibles are present.
	WELDED MATERIALS CAN BURN: Welding generates a large amount of heat. Hot surfaces and materials in work area can cause serious burns. Use gloves and pliers when touching or moving materials in the work area.
	CYLINDER MAY EXPLODE IF DAMAGED: Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. Always keep cylinders in an upright position securely chained to a fixed support. Do not move or transport gas cylinders with the protection cap removed. Do not allow the electrode, electrode holder, work clamp or any other electrically live part to touch a gas cylinder. Gas cylinders must be located away from areas where they may be subjected to physical damage or the welding process including sparks and heat sources.
	MOVING PARTS ARE DANGEROUS: There are moving mechanical parts in this machine, which can cause serious injury. Keep your hands, body and clothing away from those parts during machine starting, operating and servicing.
HF	CAUTION: The high frequency used for contact-free ignition with TIG (GTAW) welding, can interfere with the operation of insufficiently shielded computer equipment, EDP centers and industrial robots, even causing complete system breakdown. TIG (GTAW) welding may interfere with electronic telephone networks and with radio and TV reception.
S	SAFETY MARK: This equipment is suitable for supplying power for welding operations carried out in an environment with increased hazard of electric shock.

The manufacturer reserves the right to make changes and/or improvements in design without upgrade at the same time the operator's manual.

Installation and Operator Instructions

Read this entire section before installation or operation of the machine.

Location and Environment

This machine will operate in harsh environments. However, it is important that simple preventative measures are followed to assure long life and reliable operation.

- Do not place or operate this machine on a surface with an incline greater than 15° from horizontal.
- Do not use this machine for pipe thawing.
- This machine must be located where there is free circulation of clean air without restrictions for air movement to and from the air vents. Do not cover the machine with paper, cloth or rags when switched on.
- Dirt and dust that can be drawn into the machine should be kept to a minimum.
- This machine has a protection rating of IP23S. Keep it dry when possible and do not place it on wet ground or in puddles.
- Locate the machine away from radio controlled machinery. Normal operation may adversely affect the operation of nearby radio controlled machinery, which may result in injury or equipment damage. Read the section on electromagnetic compatibility in this manual.
- Do not operate in areas with an ambient temperature greater than 40°C.

Input Supply Connection

Check the input voltage, phase, and frequency supplied to this machine before turning it on. The allowable input voltage is indicated in the technical specification section of this manual and on the rating plate of the machine. Be sure that the machine is grounded.

Make sure the amount of power available from the input connection is adequate for normal operation of the machine. The fuse rating and cable sizes are both indicated in the "Technical Specification" section of this manual.

The machines:

- V205 2V: (230 / 400Vac, single phase)
- V270: (400Vac, three phase)
- V270 2V: (230 / 400Vac, three phase)
- V405: (400Vac, three phase)

are designed to operate on engine driven generators as long as the auxiliary can supply adequate voltage, frequency and power as indicated in the "Technical Specification" section of this manual. The auxiliary supply of the generator must also meet the following conditions:

- Vac peak voltage: below 410V (for 230Vac input) or 720V (for 400Vac input).
- Vac frequency: in the range of 50 and 60 Hertz.
- RMS voltage of the AC waveform:
  V270, V405: 400Vac ± 15%
  V205 2V, V270 2V: 230Vac or 400Vac ± 10%

It is important to check these conditions because many engine driven generators produce high voltage spikes. Operation of this machine on engine driven generators not conforming to these conditions is not recommended and may damage the machine.

Output Connections

A quick disconnect system using Twist-Mate™ cable plugs is used for the welding cable connections. Refer to the following sections for more information on connecting the machine for operation of stick welding (MMA) or TIG welding (GTAW).

Stick Welding (MMA)

First determine the proper electrode polarity for the electrode to be used. Consult the electrode data for this information. Then connect the output cables to the output terminals of the machine for the selected polarity. For example, if DC(+) welding will be used then connect the electrode cable to the (+) terminal of the machine and the work clamp to the (-) terminal. Insert the connector with the key lining up with the keyway and rotate approximately ¼ turn clockwise. Do not over tighten.

For DC(-) welding switch the cable connections at the machine so that the electrode cable is connected to (-) and the work clamp is connected to (+).

TIG Welding (GTAW)

This machine does not include a TIG torch necessary for TIG welding, but one may be purchased separately. Refer to the accessories section for more information. Most TIG welding is done with DC(-) polarity; connect the torch cable to the (-) terminal of the machine and the work clamp to the (+) terminal. Insert the connector with the key lining up with the keyway and rotate approximately ¼ turn clockwise. Do not over tighten.

For "V###-S" machine, connect the gas hose from the TIG torch to a gas regulator on the cylinder of gas to be used.

For "V###-T / -TP" machine, connect the gas hose from the TIG torch to the gas connector (B) on the front of the machine. If necessary, an extra gas connector for the fitting on the front of the machine is included in the package. Next, connect the fitting on the back of the machine to a gas regulator on the cylinder of gas to be used. An input gas line and the required fittings are also included in the package. Connect the TIG torch trigger to the trigger connector (A) on the front of the machine.

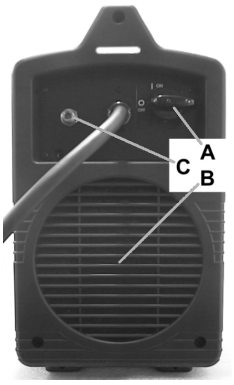
Remote Control Connection

Refer to the accessories section for a list of remote controls. If a remote control is used, it will be connected to the remote connector (C) on the front of the machine. The machine will automatically detect the remote control, turn on the REMOTE LED, and switch to remote control mode. More information on this mode of operation will be given in the next section.

Controls and Operational Features

⚠ WARNING

Arc Striking Machine Usage Information (ASG machines only)
The EN 60974-3 Standard specifies that the "ASG" equipment is intended to be used with mechanically guided torch.



A. Power Switch: Controls the input power to the machine. Make sure the machine is properly connected to the input supply before turning the machine on.

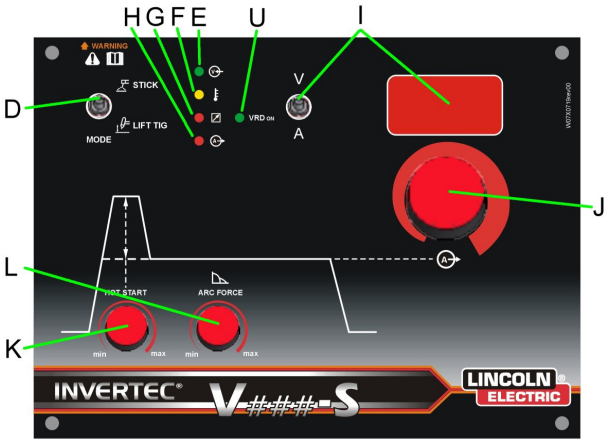
B. Fan: The cooling fan will turn ON when the machine is turned ON and it will continue to run whenever the output of the machine is ON. If the output of the machine is OFF for more than five minutes, the fan will turn OFF. This reduces the amount of dirt that is deposited inside the machine and reduces power consumption. Refer to the Output LED section below for more information about conditions when the output of the machine is ON.

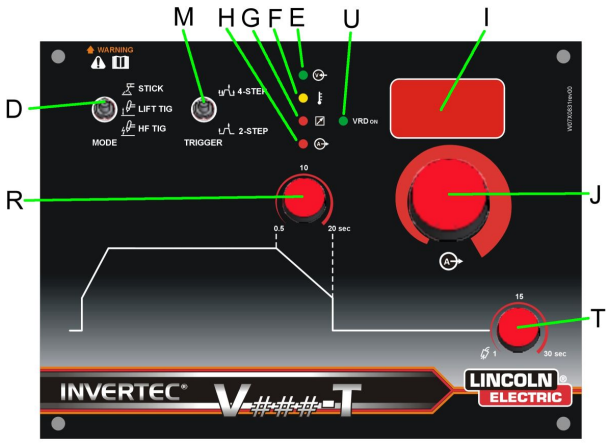
If a Coolarc 20 is connected to a "V2##-T / -TP", it will be turned ON and OFF with the operation of the fan. When Stick welding mode is used the Coolarc 20 will be OFF.

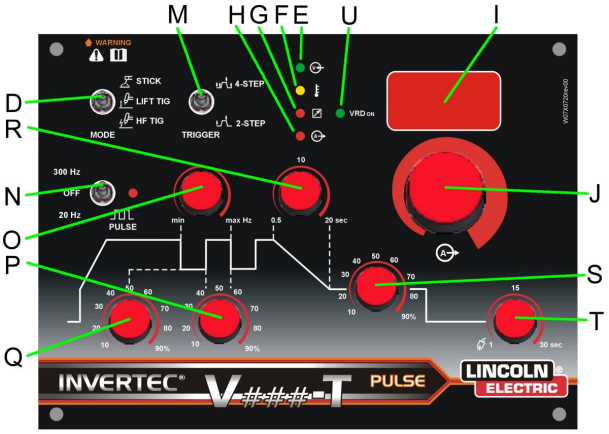
If a Coolarc 30 is connected to a "V405-T / -TP", it will be turned ON and OFF with the operation of the fan. When Stick welding mode is used the Coolarc 30 will be OFF.

C. Gas Inlet (V###-T / -TP only): Connector for the TIG shielding gas. Use the supplied gas line and connector to connect the machine to the gas source. The gas source must have a pressure regulator and flow gage installed.

D. Mode Switch: This switch changes the welding modes of the machine. The "V###-S" has two welding modes: Stick (SMAW) and Lift TIG (GTAW). The "V###-T / -TP" machines have three welding modes: Stick (SMAW), Lift TIG (GTAW) and HF TIG (GTAW).







When the mode switch is in the Stick position, the following welding features are enabled:

- Hot Start: This is a temporary increase in the output current during the start of the stick welding process. This helps ignite the arc quickly and reliably. The amount of hot start can be adjusted on the "V###-S", refer to Hot Start, described below.
- Arc Force: This is a temporary increase in the output current during normal stick welding. This temporary increase in output current is used to clear intermittent connections between the electrode and the weld puddle that occur during normal stick welding. The amount of arc force can be adjusted on the "V###-S", refer to Arc Force, described below.
- Anti-Sticking: This is a function which decreases the output current of the machine to a low level when the operator makes an error and sticks the electrode to the work piece. This decrease in current allows the operator to remove the electrode from the electrode holder without creating large sparks which can damage the electrode holder.

When the mode switch is in the Lift TIG position, the stick welding functions are disabled and the machine is ready for Lift TIG welding. Lift TIG is a method of starting a TIG weld by first pressing the TIG torch electrode on the work piece in order to create a low current short circuit. Then, the electrode is lifted from the work piece to start the TIG arc.

The last mode switch position, HF TIG, is only available on the "V###-T / -TP". When the mode switch is in this position, the stick welding functions are disabled and the machine is ready for HF TIG welding. During the HF TIG mode, the TIG arc is started by HF

without pressing the electrode on the work piece. The HF used for starting the TIG arc will remain on for 6.5 seconds; if the arc is not started in this time limit, the trigger sequence must be restarted.

E. Power LED: This indicator will flash on and off when the machine is first turned on. After approximately 2 seconds it will stop flashing and remain on to signal that the machine is ready.

F. Thermal LED: This indicator will turn on when the machine is overheated and the output has been disabled. This normally occurs when the duty cycle of the machine has been exceeded. Leave the machine on to allow the internal components to cool. When the indicator turns off, normal operation is again possible.

G. Remote LED: This indicator will turn on when a remote control is connected to the machine via the remote control connector. Using a remote control will change the function of the output current control, refer to the output current control section.

H. Output LED: This indicator turns on when the output of the machine is on. Both the type of machine and the position of the mode switch determine when the output of the machine is turned on.

V###-S: In the stick welding mode, the output of the machine is automatically turned ON. However, in the Lift TIG welding mode, the connection of a remote control determines if the output is ON or OFF. If a remote control is not connected (the Remote LED is OFF) then the output of the machine is automatically turned ON. If a remote control is connected (the Remote LED is ON) then the output of the machine is turned ON and OFF by the remote connector on the front of the machine.

V###-T / -TP: In stick welding mode, the output of the machine is automatically turned ON. However, in both of the TIG welding modes, the output of the machine is turned ON and OFF by the TIG torch connected to the trigger connector on the front of the machine.

I. Meter: This meter displays the preset welding current before welding and the actual welding current during welding. Like the output current control, the function of the meter is changed if a remote control is connected. If the Remote LED is ON, this indicates that a remote control is connected and the meter will display the following information before welding (during welding, the meter always displays the actual welding current):

Stick Welding Mode: The meter displays the preset welding current but this is adjusted from the remote control as explained in the Output Current Control section.

TIG Welding Modes: The meter displays the maximum output current which is set by the output current control knob. The preset welding current is then adjusted by the remote control, but it is not displayed on the meter.

V###-S: The machine has a Voltage / Current switch to change the displayed value on the meter. If this switch is set to voltage, the meter will always display the output voltage of the machine.

J. Output Current Control: This controls the output, or welding, current of the machine.

The function of this control knob is changed if a remote control is connected. If the Remote LED is ON, this indicates that a remote control is connected and the function of the output current control will be:

Stick Welding Mode: The remote control will adjust the output current of the machine:

- V205: from 5 to 200A
- V270: from 5 to 270A
- V405: from 5 to 400A

The output current control knob on the display panel is not used.

TIG Welding Modes: The maximum output current of the machine is set by the output current control knob. Then the remote control adjusts the output current from the minimum output (5A) to the value set by the output current control knob. For example, if the output current control knob on the machine is set to 100A then the remote control will adjust the output current from a minimum of 5A to a maximum of 100A.

K. Hot Start (V###-S only): In stick welding mode, this controls the amount of current used during the start of the arc to help ignite the arc quickly and reliably. In TIG welding mode, this is not used.

L. Arc Force (V###-S only): In stick welding mode, this controls the amount of current used during any intermittent short circuiting of the electrode during welding. In TIG welding mode, this is not used.

M. Trigger Mode Switch (V###-T / -TP only): This switch changes between 2-step and 4-step trigger sequences. For an explanation of these trigger sequences refer to the trigger sequences explained below.

N. Pulsing Mode Switch (V###-TP only): In the TIG welding modes, this switch turns the pulsing function ON and controls the pulsing frequency range (20Hz or 300Hz). In Stick welding mode, this is not used.

The Pulsing LED next to the Pulsing Mode Switch shows the pulsing frequency when pulsing is turned ON. With this indication, the operator can adjust the frequency to the desired value before welding. (Note: At higher frequencies the LED flashes very fast and seems to be continuously ON however it is pulsing.)

O. Pulsing Frequency Control (V###-TP only): When the pulsing function is ON, this control knob will adjust the pulsing frequency. The pulsing frequency adjustment range is 0.2-20Hz or 3-300Hz depending on the Pulsing Mode Switch position.

P. Pulsing On-time Control (V###-TP only): When the pulsing function is ON, this control knob will adjust the pulsing on-time. The on-time can be adjusted from 10% to 90% of the pulsing period.

Q. Pulsing Background Current Control (V###-TP only): When the pulsing function is ON, this control knob will adjust the pulsing background current. This is the current during the low portion of the pulse waveform; it can be adjusted from 10% to 90% of the welding current.

R. Downslope Control (V###-T / -TP only): In the TIG welding modes, this control knob will adjust the downslope time from 0.5 to 20 seconds. (The upslope time is always 0.5 seconds.) Refer to the trigger sequence section below to understand how downslope is activated. In Stick welding mode, this is not used.

S. Start/Crater Current Control (V###-TP only): This control knob will adjust the Start/Crater current from 10% to 90% of the welding current. For an explanation of the start/crater operation, refer to the trigger sequences explained below.

T. Postflow Control (V###-T / -TP only): In the TIG welding modes, this control knob will adjust the shielding gas postflow time from 0.5 to 30 seconds. (The preflow time is always 0.5 seconds.) In Stick welding mode, this is not used.

U. VRD LED's (enabled on Australian Machines only): This machine is provided by VRD (Voltage Reduction Device) function: this reduces the voltage at the output leads.

The VRD function is enabled by factory default only on machines that meet the AS 1674.2 Australian Standards. (C-Tick logo "" on/near the Rating Plate applied on the machine).

The VRD LED is ON when the Output Voltage is below 32V with the Machine at idle (no welding time).

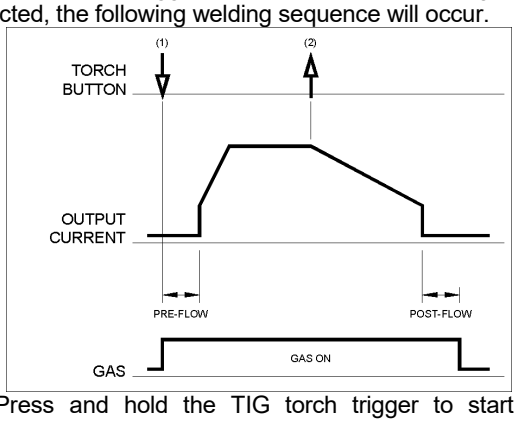
For others machines this function is disabled (the LED is always OFF).

TIG Trigger Sequences

TIG welding can be done in either the 2-step or 4-step mode. The specific sequences of operation for these two trigger modes are explained below.

2-Step TIG Sequence

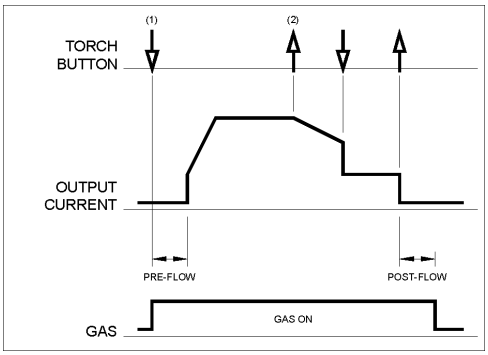
With the 2-step trigger mode and a TIG welding mode selected, the following welding sequence will occur.



1. Press and hold the TIG torch trigger to start the sequence. The machine will open the gas valve to start the flow of the shielding gas. After the preflow time, to purge air from the torch hose, the output of the machine is turned ON. At this time the arc is started according to the selected welding mode. After the arc is started the output current will be increased at a controlled rate, or upslope time, until the Welding current is reached.

2. Release the TIG torch trigger to stop welding. The machine will now decrease the output current at a controlled rate, or downslope time, until the Crater current is reached and the output of the machine is turned OFF.

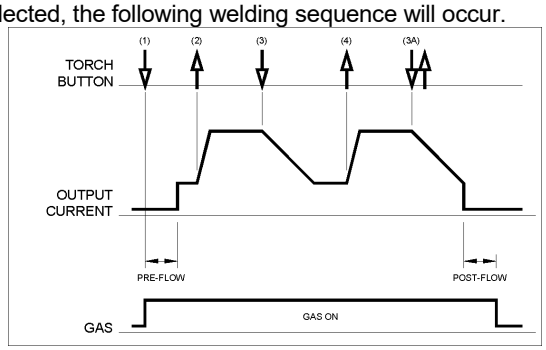
   After the arc is turned OFF, the gas valve will remain open to continue the flow of the shielding gas to the hot electrode and work piece.



As shown above, it is possible to press and hold the TIG torch trigger a second time during downslope to end the downslope function and maintain the output current at the Crater current. When the TIG torch trigger is released the output will turn OFF and the postflow time will start. This operation, 2-step restart disabled, is the default setting from the factory.

4-Step Sequence

With the 4-step trigger mode and a TIG welding mode selected, the following welding sequence will occur.



1. Press and hold the TIG torch trigger to start the sequence. The machine will open the gas valve to start the flow of the shielding gas. After the preflow time, to purge air from the torch hose, the output of the machine is turned ON. At this time the arc is started according to the selected welding mode. After the arc is started the output current will be at the Start current. This condition can be maintained as long or as short as necessary.

   If the Start current is not necessary, do not hold the TIG torch trigger as described at the beginning of this step. In this condition, the machine will pass from Step 1 to Step 2 when the arc is started.

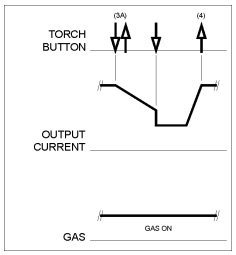
2. Releasing the TIG torch trigger starts the upslope function. The output current will be increased at a controlled rate, or upslope time, until the Welding current is reached.

3. Press and hold the TIG torch trigger when the main part of the weld is complete. The machine will now decrease the output current at a controlled rate, or downslope time, until the Crater current is reached. This Crater current can be maintained as long or as short as necessary.

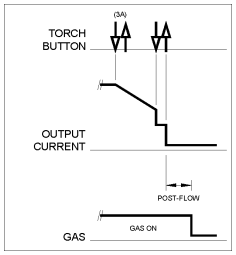
   This sequence has an automatic restart so welding will continue after this step. This operation, 4-step restart enabled, is the default setting from the factory. If the weld is completely finished, use the following sequence instead of step 3 described above.

   3A. Quickly press and release the TIG torch trigger. The machine will now decrease the output current at a controlled rate, or downslope time, until the Crater current is reached and the output of the machine is turned OFF. After the arc is turned OFF the postflow time will start.

4. Release the TIG torch trigger. The output current will again increase to the Welding current, like in step 2, to continue welding. When the main part of the weld is complete go to step 3.



As shown here, after the TIG torch trigger is quickly pressed and released from step 3A, it is possible to press and hold the TIG torch trigger another time to end the downslope time and maintain the output current at the Crater current. When the TIG torch trigger is released the output will again increase to the Welding current, like in step 4, to continue welding. When the main part of the weld is complete go to step 3.



As shown here, again after the TIG torch trigger is quickly pressed and released from step 3A, it is possible to quickly press and release the TIG torch trigger a second time to end the downslope time and stop welding.

Maintenance

⚠ WARNING

For any maintenance or repair operations it is recommended to contact the nearest technical service center or Lincoln Electric. Maintenance or repairs performed by unauthorized service centers or personnel will null and void the manufacturers warranty.

The frequency of the maintenance operations may vary in accordance with the working environment. Any noticeable damage should be reported immediately.

- Check cables and connections integrity. Replace, if necessary.
- Keep clean the machine. Use a soft dry cloth to clean the external case, especially the airflow inlet / outlet louvers.

⚠ WARNING

Do not open this machine and do not introduce anything into its openings. Power supply must be disconnected from the machine before each maintenance and service. After each repair, perform proper tests to ensure safety.

Customer Assistance Policy

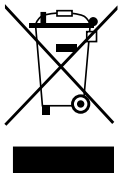
The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

WEEE

07/06



Do not dispose of electrical equipment together with normal waste!
In observance of European Directive 2012/19/EC on Waste Electrical and Electronic Equipment (WEEE) and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative.
By applying this European Directive you will protect the environment and human health!

Spare Parts

12/05

Part List reading instructions

- Do not use this part list for a machine if its code number is not listed. Contact the Lincoln Electric Service Department for any code number not listed.
- Use the illustration of assembly page and the table below to determine where the part is located for your particular code machine.
- Use only the parts marked "X" in the column under the heading number called for in the assembly page (# indicate a change in this printing).

First, read the Part List reading instructions above, then refer to the "Spare Part" manual supplied with the machine, that contains a picture-descriptive part number cross-reference.

REACh

11/19

Communication in accordance with Article 33.1 of Regulation (EC) No 1907/2006 – REACh.
Some parts inside this product contain:

Bisphenol A, BPA,	EC 201-245-8, CAS 80-05-7
Cadmium,	EC 231-152-8, CAS 7440-43-9
Lead,	EC 231-100-4, CAS 7439-92-1
Phenol, 4-nonyl-, branched,	EC 284-325-5, CAS 84852-15-3

in more than 0,1% w/w in homogeneous material. These substances are included in the “Candidate List of Substances of Very High Concern for Authorisation” of REACh.
Your particular product may contain one or more of the listed substances.
Instructions for safe use:

- use according to Manufacturer instructions, wash hands after use;
- keep out of reach of children, do not put in mouth,
- dispose in accordance with local regulations.

Authorized Service Shops Location

09/16

- The purchaser must contact a Lincoln Authorized Service Facility (LASF) about any defect claimed under Lincoln's warranty period.
- Contact your local Lincoln Sales Representative for assistance in locating a LASF or go to www.lincolnelectric.com/en-gb/Support/Locator.

Electrical Schematic

Refer to the "Spare Part" manual supplied with the machine.

Accessories

V205-TP V270-T / -TP V405-TP W6100316R	Trigger Connector (5 pins).
V205 V270 V405 W6100317R	Remote Connector (6 pins).
V205-TP V270-T / -TP V405-TP W8800072R	Male Quick Connect Gas Fitting.
V205 V270 V405 K10095-1-15M	Hand Amptrol.
V205-TP V270-T / -TP V405-TP K870	Foot Amptrol.