# PT-350

# User Manual

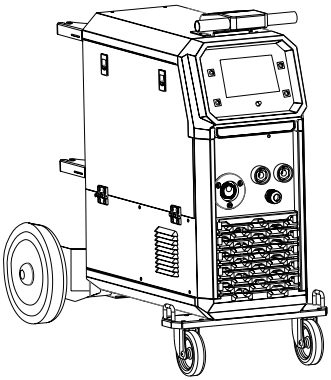
**For Your Safety**

**Read and understand this manual before use. Keep this manual for future reference.**

POWERTHERM®

HEAVY DUTY WELDING

PT-350



We are still constantly improving this welder, therefore, some parts of this welder may be changed in order to achieve the better quality, but the main functions and operation will not be alternated and changed.
Your understanding would be greatly appreciated.

# Table of Contents

# 1. SAFETY

**Welding is dangerous, and may cause damage to you and others, so take good protection when welding. For details, please refer to the operator safety guidelines in conformity with the accident prevention requirements of the manufacturer.**

**Professional training is needed before operating the machine.**
- Use labor protection welding supplies authorized by national security supervision department.
- The operator must be qualified personnel with a valid “metal welding (OFC) operations” operation certificate.
- Cut off power before maintenance or repair.

**Read the instructions before starting the device.**
- Use the original equipment supplied by the manufacturer.

**Static voltage can damage electronic components.**

**Arc radiation – may damage eyes or burn skin.**
- Use approved face shields and welding shields.
- Always use protective clothing designed for welders.
- Metal splinters can damage your eyes. Always use safety glass.

**Electric shock – may lead to serious injury or even death.**
- Install earth device according to the application criteria.
- Never touch the live parts when skin bore or wearing wet gloves/clothes.
- Make sure that you are insulated from the ground and work piece.
- Make sure that your working position is safe.

**Smoke & gas – may be harmful to health.**
- Keep the head away from smoke and gas to avoid inhalation of exhaust gas from welding.
- Keep the working environment in good ventilation with exhaust or ventilation equipment when welding.

**Moving parts of the device can cause injuries.**

**Long and continuous operation can cause device to overheat. Wait until the device cools down.**

**Damaged technical gas cylinders may explode.**
- Make sure that cylinders are handled and stored in accordance with health and safety and fire protection requirements.

**Hot work piece may cause severe scalding.**
- Do not contact hot work piece with bare hands.
- Cooling is needed during continuous use of the welding torch.

**The protruding wire from the torch is sharp and can cause skin puncture.**

**Danger of fire and explosion.**
- During welding a fire may result.
- The welding station must be remote and protected against flammable and explosive materials.

**Magnetic fields affect cardiac pacemaker.**
- Pacemaker users should be away from the welding spot before medical consultation.

**Please seek professional help when encountering machine failure.**
- Consult the relevant contents of this manual if you encounter any difficulties in installation and operation.
- Contact the service center of your supplier to seek professional help if you still cannot fully understand or solve the problem after reading the manual.

## SAFE USE OF THE WELDING TORCH

- Parts of the machine, such as the end of the filler wire and welding torch become burning hot during use. The wire is also sharp and moves quickly, so be careful when threading it to place.
- Never carry the machine on your shoulder during welding, but place it on an even surface. Also, do not store the machine by hanging it from the shoulder strap. The shoulder strap is for carrying only.
- Do not keep the machine near or on hot objects, as the plastic cover may melt.
- Do not move the shielding gas bottle when the control value is in place. Fix the gas bottle securely in an upright position to a separate wall rack or bottle cart.
- Always close the gas bottle after use.

## ATTENTION

- This device is intended for conducting professional welding works in industrial conditions by personnel having valid qualification certificates in accordance with applicable standards.
- Electrical connection must be performed by qualified personnel in accordance with relevant national and local regulations.

# 2. GENERAL DESCRIPTION

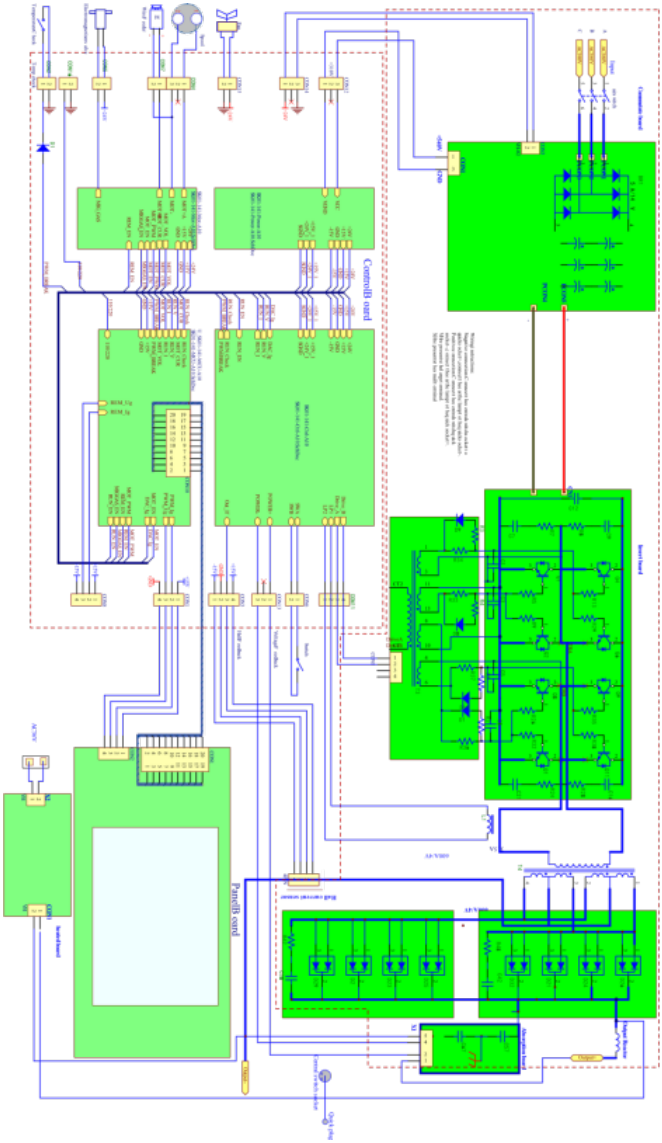
PT-350 is the advanced inverter sources offering very high welding versatility. Thanks to the use of modern IGBT technology and high-quality components, it is ideal for works related to the automotive industry, steel constructions, welding of aluminum alloys and others. It has characteristics as below:

(1) IGBT technology, controlled by current, stable and good quality.
(2) Able to carry out work in three welding methods : MIG / MAG, Lift TIG and MMA
(3) Provides SYNERGY mode help to set welding parameters based on users' choice of material and welding wire diameter
(4) Able to use single or double pulse current in MIG or MAG mode.
(5) VRD, 2T/4T function, 4 drive feeder
(6) Support 5 languages and 18 sets of welding data memories through LCD display

# 3. MAIN PARAMETERS

| Model | | PT-350 |
|---|---|---|
| Rated Input Voltage (V) | | 3P AC 400V, 50Hz |
| Max Input Power (KVA) | | 13.9 |
| Output Current (A) | MIG/MAG | 40~350 |
| | Lift TIG | 10~300 |
| | MMA | 30~300 |
| Output Voltage (V) | MIG/MAG | 16~31.5 |
| | Lift TIG | 10.4~22 |
| | MMA | 21.2~32 |
| No-load Voltage (V) | | 71 |
| Rated Duty Cycle (40°C) | | 30% @ 350A<br>60% @ 250A<br>100% @ 200A |
| Efficiency (%) | | 85 |
| Wire Feeder | | Internal (4 rolls) |
| Wire Spool | | 5kg / 15kg |
| Wire Diameter (mm) | | 0.8 / 1.0 / 1.2 |
| Protection Class | | IP21S |
| Insulation class | | F |
| Net weight (kg) | | 44.2 |
| Dimensions (mm) | | 810 x 510 x 800 |

# 4. ELECTRIC BLOCK DIAGRAM



# 5. INSTALLATION DEBUGGING AND OPERATION

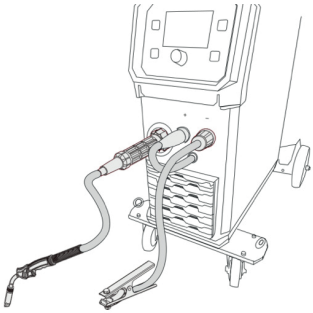
## WIRE CONNECTION

**(1) Input Power Cable Connection**

PT-350 is 3ph 400V power input supply.

**(2) Output Power Cable Connection**

**1) MIG / MAG (DCEP)**

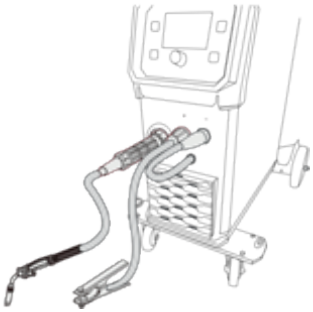


① Use earth cable to connect to Negative (-) socket and the other head with work piece.

② Connect welding torch to torch connector and fix welding wire in the welding torch as well.

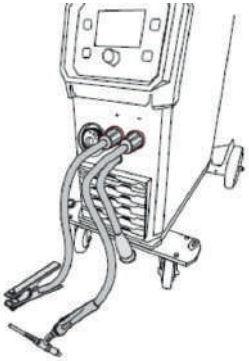
③ Welder's current plug shall be connected to Positive (+) socket.

**2) FLUX-CORED (DCEN)**



① Use earth cable to connect to Positive (+) socket and the other head with work piece.
② Connect welding torch to torch connector and fix welding wire in the welding torch as well.
③ Welder's current plug shall be connected to Negative (-) socket.

3) **TIG (LIFT TIG, DCEN)**

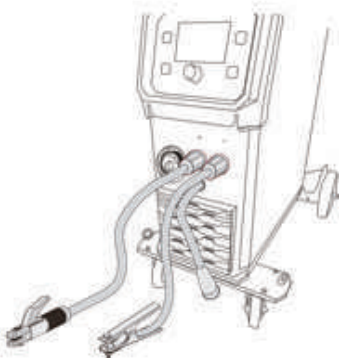


TIG torch

① Use earth cable to connect to Positive (+) socket and the other head with work piece.
② Connect TIG torch to Negative (-) socket.
③ To ignite the welding arc in the TIG LIFT method, unscrew the valve on the handle, press the button, then gently rub the tungsten electrode against the work piece and raise the torch lightly so that the arc ignites. Releasing the switch button ends the welding process (2T).

**ATTENTION :** TIG torch is not standard equipment.

4) **MMA (STICK, DCEP)**



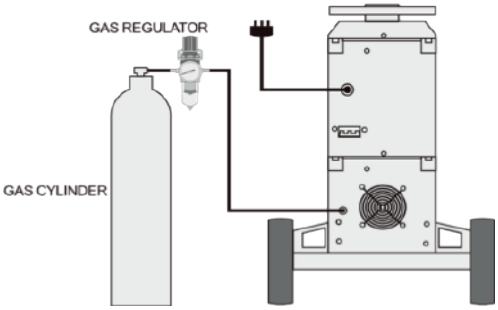
① Use earth cable to connect to Negative (-) socket and the other head with work piece.

② Connect electrode holder to Positive (+) socket.

**(3) Fix the gas cylinder**

Use gas pipe to connect gas supply connecter on the back of machine and gas cylinder with CO2 gas regulator.

1) A cylinder with a suitable shielding gas must always be properly secured against falling over. If possible, attach to an approved welding carriage with the MIG / MAG device. The trolley is not standard equipment of the set.
2) Connect the semi-automatic machine to the cylinder with a suitable hose.
3) Unscrew the regulator valve before starting welding.
**ATTENTION :** Always close the cylinder valve after welding.



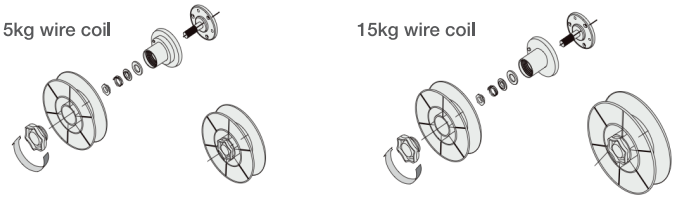

**CAUTIONS :**

1) Make sure don't put the gas cylinder in nearby places of hot temperature or sunshine. It will increase the gas pressure and cause accident.
2) Fix the connector of gas cylinder very well to avoid the gas creep and ensure good welding effect.
3) You should not hammer the gas cylinder or lay it on the ground.
4) Ensure there is nobody in front of adjustment and pressure gauge to close gas cylinder.
5) Put the heater power plug into the 36V AC connector of the machine back.
6) The flow meter should be vertical illustration; otherwise it can indicate the correct flows. In addition, ensure correct utilize the CO2 and mixed gas. For example, to utilize Argon flow meter, it cannot indicate flows because of the gas with different proportion.
7) Before illustrating the gas regulator, make sure it should be opened and gas cylinder power is off. Blow off the dust on the cylinder connection, preventing the dust from blocking gas regulator.

**NOTICE:** Before the operation, user must wear mask for protecting light, as the welding arc of shield welding is strong than by manual.

**(4) Assembling wire spool**

This machine is equipped with professional wire feeder; it has 4 rolls feeder enabling work with 2 handles max 4mb when welding with steel wire and with 3mb when welding with aluminum alloy wire. The welding wire holder allows the installation of reels with a diameter of 300mm - 15kg.

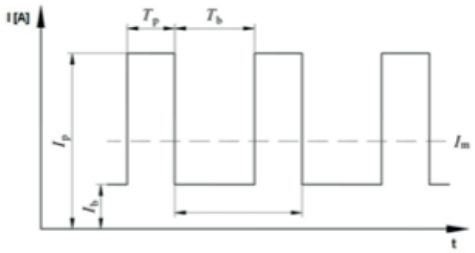



1) Lift the side cover of the semi-automatic housing.
2) Ensure that the rollers fitted in the drive unit match the type and diameter of wire used. Rolls should be used for steel wires with "V" shaped grooves, while for aluminum wires with "U" type grooves.
3) Apply welding wire spools to the spool clamping mechanism, paying attention that the unwinding direction of the wire is consistent with the direction of the wire's entry into the drive unit. Lock the spools before slipping by tightening the nut on the spool mounting body.
4) The end of the wire should be straightened or cut off a bent section.
5) To feed wire into the feeder, release the pressure of the feed rollers.
6) Insert the end of the wire into the guide located at the back of the feeder and route it over the drive roller by inserting it into the welding gun stub.
7) Tighten the wire in the drive roller groove and tighten.
8) Remove the gas nozzle from the burner and unscrew the contact tip.
9) Turn the device on.
10) Unwind the welding gun cable so that it is straight.
**ATTENTION** : Do not drive the welding torch ends towards the face or other people.
11) Press the welding button on the welding gun and hold it until the wire appears behind the torch.
12) When the end of the welding wire passes through the connector in the torch, release the button approx. 5 cm and replace the contact tip and gas nozzle.
13) Adjust the clamping force by turning the knob, clockwise - increases the clamping force, to the left - decreases the clamping force. Too low clamping force will cause the drive roller to slip. Too much pressure increases the feed resistance and deforms the wire.

**(5) Pulse function**

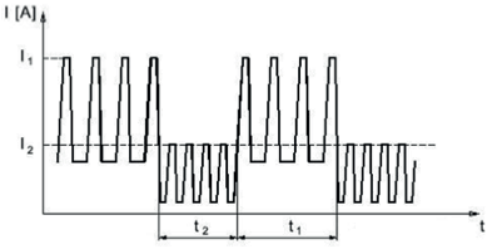
1) **Single Pulse**

MIG PULSE is an advanced form of welding that uses the best of the forms of the transfer of molten electrode material to the work piece. Unlike short circuits, pulse welding does not produce spatter and there is a risk of cold "leakage". Welding positions in the pulse are not limited because they are derived from globular or spray forms, and their use is definitely more efficient. By cooling the spray arc process, pulsed MIG is able to extend the welding range, and smaller heat input does not cause a problem with burning thin materials. MIG PULSE is one of the best welding processes for a wide range of applications and types of metal.




2) **Double Pulse**

Welding with the MIG / MAG method with double pulse can get a high level of face appearance (husk effect). In addition, the use of automatic wire feed affects welding performance. It allows the regulation of current pulsation (pulse balance) and adjustment of the wire feed speed. Thanks to this, we improve the appearance of the weld. When welding with MIG / MAG method with double pulse, current pulses occur in two ranges. The sequential system of our devices automatically combines two levels of pulses.



# 6. OPERATION CONTROL AND DESCRIPTION

## PANEL ILLUSTRATION


(1) LCD display

(2) 'Select' button (Left)

- for choosing the previous menu, hold for 5 seconds to save the current setting in memory.

(3) 'Select' button (Right)

- for choosing the next menu, hold for 5 seconds to recall memories; this device has 18 memory programs.

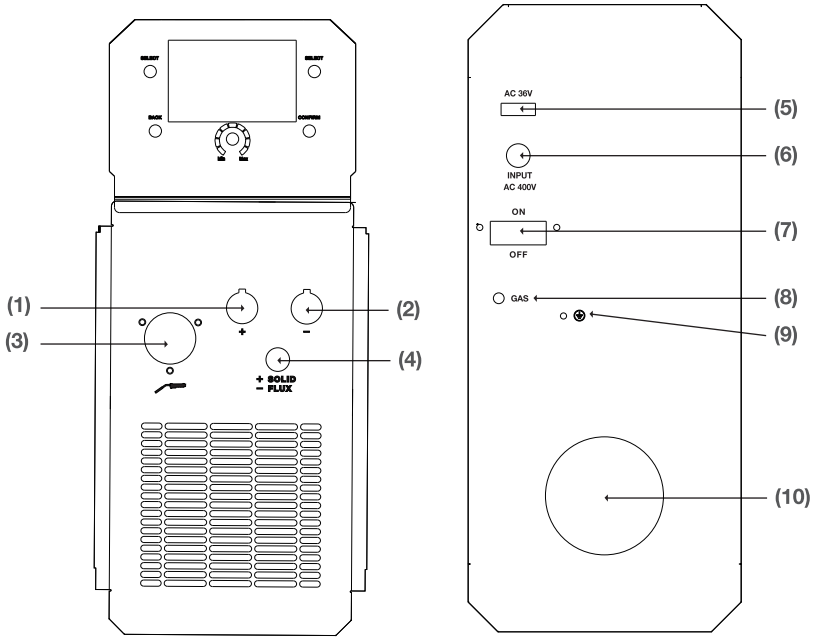
(4) 'Back' button

- Hold for 5 seconds to return to the factory setting (RESET)

(5) 'Confirm' button

(6) Adjustment knob

- Turn - select and adjust; Press - confirm and switch to next.




(1) Quick Connector (Positive)
(2) Quick Connector (Negative)
(3) MIG Torch Connector
(4) Reverse Polarity Plug
(5) AC 36V Regulation Power Connector
(6) Power Input
(7) ON/OFF Switch
(8) Gas Input Terminal
(9) Grounding Connector
(10) Fan

## LANGUAGE SETTING

The device allows you to set the following control languages: English, Germany, France, Russian and Dutch. Turn the red knob of the front panel to select the language then press for confirmation.

## WELDING METHOD SETTING

This device allows you to set the following welding method: AUTO, MIG, TIG, MMA
Turn the red knob of the front panel to select the language then press for confirmation.

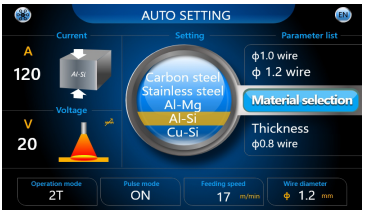
(1) **AUTO**


In **AUTO** mode, user can select the basic welding parameters such as the type of material, thickness of the material to be welded and diameter of the welding wire. Then other parameters of the device will be selected automatically using the database of uploaded programs.

**NOTE :**

1) **AUTO** mode only allows continuous welding. Adjusting PULSE settings (single/double) is not available.
2) User can correct the settings manually.
3) If settings of material type and thickness are changed, remaining parameters will be returned to default factory settings.

## OPERATING AUTO MODE

| Step | Images as example | Operation |
|---|---|---|
| Step 1 |  | Choose the material (and welding wire) to be welded from the list of alloys available in the program. |
| Step2 |  | Choose the thickness of material to be welded. This device will automatically select the intensity of basic welding current, arc voltage and feeder speed. |
| Step3 |  | Choose the welding wire diameter you plan to use.<br>**ATTENTION!**<br>This device automatically increases or reduces its maximum power depending on wire diameter. |

According to the programmed welding parameters, the welding wire diameters selected by the user directly influence the welding current, voltage, and wirefeeder speed. For example, choosing a 0.8mm wire will automatically limit the maximum welding current to e.g. 140A, choosing a 1.0mm wire will allow welding 200A current. These actions are aimed at optimizing the welding process and avoiding problems associated with

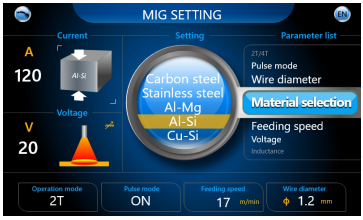
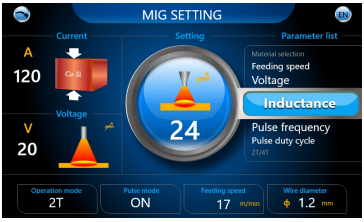
burning the wire too quickly just after the contact tip in a situation where it is no longer possible to increase the feeder speed. The inability to set the maximum welding current is not a software error and results from the welding wire diameter selected.

### (2) MIG/MAG

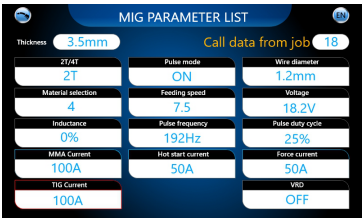

In MIG/MAG mode, user sets the all welding parameters one after the other. The system suggests the selection of optimal welding parameters by indicating at their adjustment thickness of material to be welded. Depending on the welding style (forced positions, fast welding with higher/slower current with lower intensity), these settings may require a slight adjustment by the user.

### OPERATING MIG/MAG MODE

| Images as example | Operation |
|---|---|
|  | **Choose functions for welding**<br>2-step (2T), 4-step (4T) and SPOT |
|  | **Choose welding current**<br>Continuous (without pulse)<br>Single Pulse<br>Double Pulse |

| Images as example | Operation |
|---|---|
|  | Choose the welding wire diameter you plan to use. |
|  | Choose the material (and welding wire) to be welded from the list of alloys available in the program. |
|  | **Set the speed of wirefeeder.**<br>**ATTENTION!**<br>This device will show estimated thickness of the welded material automatically in order to select the optimal welding parameter. |
|  | **Adjust the ARC voltage.**<br>Increasing or decreasing this value will lengthen or shorten the arc length. |
|  | **Adjust inductance regulation.**<br>Properly selected welding inductance reduces the amount of spatter. Reducing the inductance makes the arc more stable and concentrated, while increasing contributes to the formation of a more fluid pool and reduces the amount of spatter. |

## SAVE AND RECALL

| Images as example | Operation |
|---|---|
|  | For saving data:<br>Hold ◀ button for 5 seconds.<br>The save page will be called; user can select the job number and confirm. |
|  | For recalling data:<br>Hold ▶ button for 5 seconds.<br>The save page will be called; user can select the job number and confirm. |

## MIG WELDING PARAMETER TABLE

| Wire diameter | Plate thickness | 1mm | 2mm | 3mm | 4mm | 5mm | 6mm |
|---|---|---|---|---|---|---|---|
| AL-Si1.0/(4043) (DCEP) | Wire speed(M/min) | 2.0 | 4.2 | 5.8 | 7.0 | 8.5 | 10.0 |
| | Welding current (A) | 24 | 58 | 85 | 107 | 133 | 160 |
| | Arc voltage | 16.0 | 18.3 | 19.2 | 21.0 | 22.5 | 23.6 |
| AL-Si1.2/(4043) (DCEP) | Wire speed(M/min) | 1.5 | 3.0 | 4.5 | 6.5 | 7.8 | 9.0 |
| | Welding current (A) | 27.0 | 64 | 100 | 143 | 173 | 200 |
| | Arc voltage | 16.5 | 17.8 | 19.5 | 22.5 | 24.5 | 25.3 |
| Al-Mg1.0/ (5356) (DCEP) | Wire speed(M/min) | 2.5 | 6.0 | 8.0 | 11.0 | 12.5 | 14.0 |
| | Welding current (A) | 30 | 70 | 95 | 130 | 148 | 167 |
| | Arc voltage | 14.8 | 18.3 | 19.8 | 22.8 | 23.4 | 23.9 |
| Al- Mg1.2/(5356) (DCEP) | Wire speed(M/min) | 2.2 | 4.0 | 5.3 | 7.5 | 8.5 | 9.5 |
| | Welding current (A) | 33 | 65 | 89 | 128 | 141 | 152 |
| | Arc voltage | 15.7 | 17.2 | 17.7 | 19.3 | 20.0 | 21.2 |
| AL1.0/(1070) (DCEP) | Wire speed(M/min) | 2.8 | 5.3 | 7.0 | 8.5 | 10.0 | 11.3 |
| | Welding current (A) | 37 | 77 | 107 | 133 | 160 | 179 |
| | Arc voltage | 16.9 | 18.9 | 21.0 | 22.5 | 23.6 | 24.1 |
| Al-Si 1.2/(1070) (DCEP) | Wire speed(M/min) | 1.7 | 3.2 | 4.0 | 5.8 | 6.9 | 8.0 |
| | Welding current (A) | 30.0 | 68.0 | 88.0 | 127.0 | 152.0 | 178.0 |
| | Arc voltage | 16.7 | 18.0 | 18.8 | 21.6 | 22.9 | 24.9 |
| Cu-Si1.0/(CuSi) (DCEP) | Wire speed(M/min) | 4.0 | 9.0 | 12.0 | 14.0 | 16.0 | 18.0t7 |
| | Welding current (A) | 70.0 | 156.0 | 200.0 | 237.0 | 260.0 | 290.0 |
| | Arc voltage | 19.0 | 23.8 | 25.5 | 27.0 | 29.0 | 31.0 |
| Cu-Si1.2/(CuSi) (DCEP) | Wire speed(M/min) | 2.8 | 5.4 | 6.8 | 8.5 | 9.4 | 10.2 |
| | Welding current (A) | 72.0 | 153.0 | 194.0 | 220.0 | 241.0 | 264.0 |
| | Arc voltage | 19.7 | 23.5 | 25.6 | 28.5 | 29.6 | 30.8 |

**INSTRUCTION :**

**4xxx Means Al-Si Wire, 5xxx Means Al-Mg Wire, 1xxx Al Wire, Al And Al-Si Wire Both Use Al-Si Funcion.**

## I SQUARE BUTT WELDING

| | Plate thickness (mm) | Wire Diameter (mm) | Interval (mm) | Current (A) | Voltage (V) | Welding Rate (cm/min) | Wire Extension (mm) | Gas Flow (L/min) |
|---|---|---|---|---|---|---|---|---|
| Low welding speed | 0.8 | 0.8, 0.9 | 0 | 60~70 | 16~16.5 | 50~60 | 10 | 10 |
| | 1.0 | 0.8, 0.9 | 0 | 75~85 | 17~17.5 | 50~60 | 10 | 10~15 |
| | 1.2 | 0.8, 0.9 | 0 | 80~90 | 16~16.5 | 50~60 | 10 | 10~15 |
| | 1.6 | 0.8, 0.9 | 0 | 95~105 | 17~18 | 45~50 | 10 | 10~15 |
| | 2.0 | 1.0, 1.2 | 0~0.5 | 110~120 | 18~19 | 45~50 | 10 | 10~15 |
| | 2.3 | 1.0, 1.2 | 0.5~1.0 | 120~130 | 19~19.5 | 45~50 | 10 | 10~15 |
| | 3.2 | 1.0, 1.2 | 1.0~1.2 | 140~150 | 20~21 | 45~50 | 10~15 | 10~15 |
| | 4.5 | 1.0, 1.2 | 1.0~1.5 | 160~180 | 22~23 | 45~50 | 15 | 15 |
| | | 1.2 | 1.2~1.6 | 220~260 | 24~26 | 45~50 | 15 | 15~20 |
| | | 1.2 | 1.2~1.6 | 220~260 | 24~26 | 45~50 | 15 | 15~20 |
| | | 1.2 | 1.2~1.6 | 300~340 | 32~34 | 45~50 | 15 | 15~20 |
| | | 1.2 | 1.2~1.6 | 300~340 | 32~34 | 45~50 | 15 | 15~20 |
| High welding speed | 0.8 | 0.8, 0.9 | 0 | 100 | 17 | 130 | 10 | 15 |
| | 1.0 | 0.8, 0.9 | 0 | 110 | 17.5 | 130 | 10 | 15 |
| | 1.2 | 0.8, 0.9 | 0 | 120 | 18.5 | 130 | 10 | 15 |
| | 1.6 | 1.0, 1.2 | 0 | 180 | 19.5 | 130 | 10 | 15 |
| | 2.0 | 1.0, 1.2 | 0 | 200 | 21 | 100 | 15 | 15 |
| | 2.3 | 1.0, 1.2 | 0 | 220 | 23 | 120 | 15 | 20 |
| | 3.2 | 1.2 | 0 | 260 | 26 | 120 | 15 | 20 |

## FILLET BUTT WELDING

| Plate thickness (mm) | Wire Diameter (mm) | Current (A) | Voltage (V) | Welding Rate (cm/min) | Wire Extension (mm) | Gas Flow (L/min) |
|---|---|---|---|---|---|---|
| 1.6 | 0.8, 0.9 | 60 ~ 80 | 16 ~ 17 | 40 ~ 50 | 10 | 10 |
| 2.3 | 0.8, 0.9 | 80 ~ 100 | 19 ~ 20 | 40 ~ 55 | 10 | 10~15 |
| 3.2 | 1.0, 1.2 | 120 ~ 160 | 20 ~ 22 | 35 ~ 45 | 10~15 | 10~15 |
| 4.5 | 1.0, 1.2 | 150 ~ 180 | 21 ~ 23 | 30 ~ 40 | 10~15 | 10~15 |

## HORIZONTAL FILLET BUTT WELDING T JOINT

| | Plate thickness (mm) | Wire Diameter (mm) | Welding gun vertical angle (*) | Current (A) | Voltage (V) | Welding Rate (cm/min) | Wire Extension (mm) | Gas Flow (L/min) |
|---|---|---|---|---|---|---|---|---|
| Low welding speed | 1.0 | 0.8, 0.9 | 450 | 70~80 | 17~18 | 50~60 | 10 | 10~15 |
| | 1.2 | 0.9, 1.0 | 450 | 85~90 | 18~19 | 50~60 | 10 | 10~15 |
| | 1.6 | 1.0, 1.2 | 450 | 100~110 | 19~20 | 50~60 | 10 | 10~15 |
| | 2 | 1.0, 1.2 | 450 | 115~125 | 19~20 | 50~60 | 10 | 10~15 |
| | 2.3 | 1.0, 1.2 | 450 | 130~140 | 20~21 | 50~60 | 10 | 10~15 |
| | 3.2 | 1.0, 1.2 | 450 | 150~170 | 21~22 | 45~50 | 15 | 15~20 |
| | 4.5 | 1.0, 1.2 | 450 | 140~200 | 22~24 | 45~50 | 15 | 15~20 |
| | 6 | 1.2 | 450 | 230~260 | 24~27 | 45~50 | 20 | 15~20 |
| | 8.9 | 1.2, 1.6 | 500 | 270~380 | 29~35 | 45~50 | 25 | 20~25 |
| | 12 | 1.2, 1.6 | 500 | 400 | 32~36 | 35~40 | 25 | 20~25 |
| High welding speed | 1.0 | 0.8, 0.9 | 450 | 140 | 19~20 | 160 | 10 | 15 |
| | 1.2 | 0.8, 0.9 | 450 | 130~150 | 19~20 | 120 | 10 | 15 |
| | 1.6 | 1.0, 1.2 | 450 | 180 | 22~23 | 120 | 10 | 15~20 |
| | 2 | 1.2 | 450 | 210 | 24 | 120 | 15 | 20 |
| | 2.3 | 1.2 | 450 | 230 | 25 | 110 | 20 | 25 |
| | 3.2 | 1.2 | 450 | 270 | 27 | 110 | 20 | 25 |
| | 4.5 | 1.2 | 500 | 290 | 30 | 80 | 20 | 25 |
| | 6 | 1.2 | 500 | 310 | 33 | 70 | 25 | 25 |

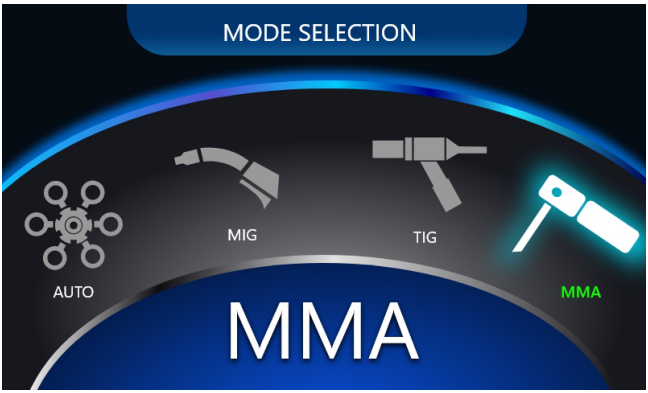
| | Plate thickness (mm) | Wire Diameter (mm) | Welding gun vertical angle (*) | Current (A) | Voltage (V) | Welding Rate (cm/min) | Wire Extension (mm) | Gas Flow (L/min) |
|---|---|---|---|---|---|---|---|---|
| Low welding speed | 0.8 | 0.8, 0.9 | 100 | 60~70 | 16~17 | 40~45 | 10 | 10~15 |
| | 1.2 | 0.8, 0.9 | 300 | 80~90 | 18~19 | 40~45 | 10 | 10~15 |
| | 1.6 | 0.8, 0.9 | 300 | 90~100 | 19~20 | 40~45 | 10 | 10~15 |
| | 2.3 | 0.8, 0.9 | 470 | 100~130 | 20~21 | 40~45 | 10 | 10~15 |
| | | 1.0, 1.2 | 470 | 120~150 | 20~21 | 40~45 | 10~15 | 10~15 |
| | 3.2 | 1.0, 1.2 | 470 | 150~180 | 20~22 | 35~45 | 10~15 | 20~25 |
| | 4.5 | 1.2 | 470 | 200~250 | 24~26 | 45~50 | 15 | 20~25 |
| High welding speed | 2.3~3.2 | 1.2 | 470 | 220 | 24 | 150 | 15 | 15 |
| | | | 470 | 300 | 26 | 250 | 15 | 15 |

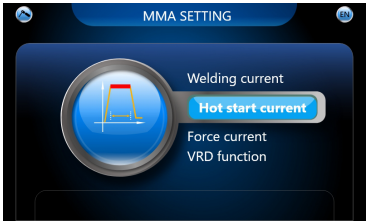
(3) TIG (Lift TIG)


| Images as example | Operation |
|---|---|
|  | TIG setting is an additional option.<br>User can adjust the welding current only. |



(4) MMA



| Images as example | Operation |
|---|---|
|  | Adjust the welding current by spinning the knob. |
|  | **HOT-START**<br>A function that makes welding easier. When the arc strikes, the welding current is temporarily increased to heat up the material and electrode at the point of contact, and to properly shape the penetration and weld face at the initial s tage of welding. |
|  | **ARC FORCE**<br>Stabilizes the arc regardless of fluctuations in its length, reduces the amount of spatter. |
|  | **VRD**<br>This device has a VRD (Voltage Reduction Device) system, which significantly increases user safety.<br>In special cases of using electrodes with high arc ignition current, problems with its initiation may occur. |

## (5) ERROR CODE

In special cases, the following messages may appear on the display indicating a problem with the operation of the device. Errors on the display will appear until the defect is removed.

| Images as example | Operation |
|---|---|
|  | **Error 001 Over current**<br>The device is operated beyond its rated efficiency. This message may also appear if you use an extension cord with the wrong diameter. After this message appears, turn the devices off for 5 minutes. If this message still appears after switching it on again, contact |
|  | **Error 002 Over heat**<br>The device is equipped with overheating protection. If the installed sensors find the temperature too high (e.g. fan failure or blocking), the device will switch off automatically and this message will appear |
|  | **Error 003 Wirefeeder plugging**<br>The message appears when the wire in the feeder is blocked. This can happen when using 0.8mm wire when welding aluminum alloys. |

# 7. CAUTION

**Environment**

(1) Ambient temperature is between -10°C and 40°C.
(2) Avoid welding in sunshine or drippings.
(3) Do not allow water to get inside the device.
(4) Do not use this device in environment where condition is polluted with conductive dust or corrosive gas in the air.
(5) Avoid gas welding in the environment of strong airflow or with flammables.

**Safety Norm**

This device has installed protection circuit of over voltage, over current and heat. When voltage, output current and temperature of this device are exceeding the rate standard, device will stop working automatically. As such can damage the device, user may pay attention to follows:

(1) This device is powerful. When being operated high current is generated, and natural wind won't provide enough cooling. Therefore for maintaining its stability, this device is equipped with an internal cooling system. Make sure the intake is not in block or covered. The distance between the device and the work piece shall not be shorter than 0.3 meters. User must always pay attention to the ventilation of the device, because it depends not only on the obtained quality and welding results, but also on the service life of the device.

(2) Do not overload!
User shall observe (the load determined as the maximum permissible load for a given current) whether the welding current does not exceed the highest electric current permissible for the load. Electrical overload can significantly reduce the service life of the welder and even lead to the burning of its components.

(3) No over voltage!
The values given in the supply voltage line in the "Technical data" table shall be kept. Under normal operating conditions, the automatic voltage compensation circuit ensures that the voltage remains within the permissible range. Supply voltage higher than the permissible value may damage the welder.
User shall be fully aware of this threat and be able to take the appropriate steps.

(4) If the standard load is exceeded, this device can be entered to protection mode and suddenly stop working. This means that the standard load has been exceeded; thermal energy has tripped the thermal switch, which caused the device to stop. The indicator light on the welder's control panel lights up.
In this situation, do not unplug the power plug to allow the fan to cool the welding machine. If the lamp turned off means the temperature drops to a normal level and user can continue working.

# 8. MAINTENANCE

(1) Safety alarming: all maintenance and overhaul should be carried out in the situation of completely power off, and please ensure pull out attaching plug before opening machine.

(2) Scheduled check electronical circuit connecting inside the machine, make sure it is the correct connecting and connector is firm (especially plug-in bond and components). If identify rust and loose, it should utilize sand paper to get off rust and oxide film, try to connect and solid again.

(3) When the machine in electricity, ensure and hand, hair associated with tools are far away from components with electricity, such as hair dryer, which avoid hurting or machine damage.

(4) Regularly use dry and clean compressed air to blow off dust. If the machine is utilized in the situation of strong smoke and serious air pollution, which should be cleaned the machine every day.

(5) The pressure of compressed air should be in the reasonable level to avoid damaging the components.

(6) Avoiding water and water vapor into the machine inside. If finding the situation, it should adopt the way of dry environment. And then use megawatt to measure the machine's insulated situation (including connection point as well as the point between connector and case). As long as investigate there are no special situations, which then can continue to work.

(7) If the machine does not work for long time, machine should be repacked and stored in dry environment.

# 9. TROUBLESHOOTING

| Malfunctions | Solutions |
|---|---|
| Meter show nothing;<br>Fan does not rotate;<br>No welding output | • Confirm the power switch is on.<br>• Check available power supply for input cable.<br>• Check if the three phase commute bridge is damaged.<br>• Malfunction might occur in the supplementary power source on control board. |
| Meter shows data;<br>Fan works normally;<br>No welding output | • Check if all the sockets in the machine are connected well.<br>• There might have open circuit or badness of connect at the joint of output terminal.<br>• Control cable on the torch could be broken off or switch be damaged.<br>• Control circuit could be damaged. |
| Meter shows data;<br>Fan works normally;<br>Abnormal indicator lights | • This might be over-current protection.<br>Please turn off the power switch; restart the machine after the abnormal indicator light winked.<br>• This might be overheating protection.<br>Please wait for about 2-3 minutes until the machine renew without turn off the power switch.<br>• This might be multifunction of inverter circuit. |

Above-mentioned abnormal phenomenon may be caused by some reasons. For example: loosen parts, forget to switch on, wrong setup, broken cable and cracked gas rubber pipe, etc. Therefore, please test and inspect these factors before deliver it back as large numbers of troubles may be easily solved.
For this reason, an initial diagnosis list for general welding troubles is shown below. A trouble happened may be found in the column of “Abnormal items” on up-right of the list, please inspect and maintain for the corresponding items which have “O" mark in the column according to the following list respectively.

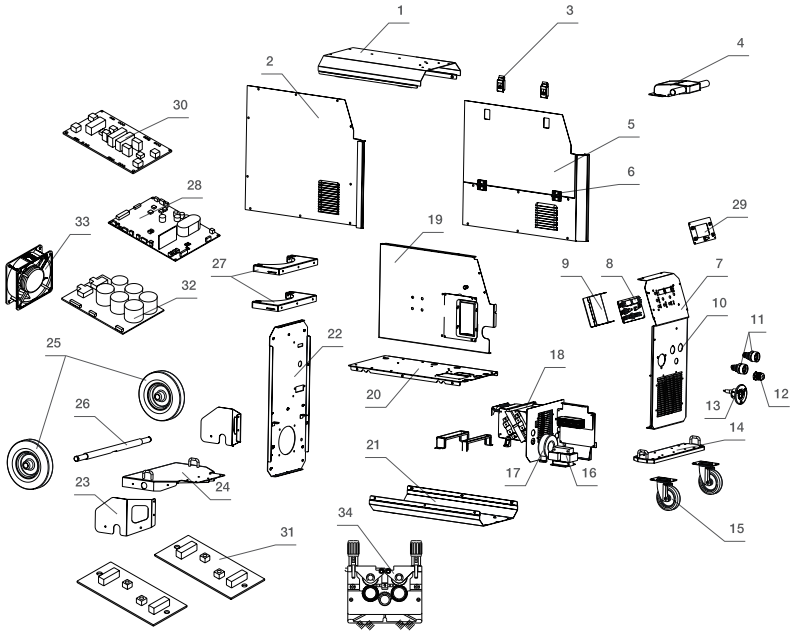
| Area and Item to be Inspected and Maintained / Abnormal Items | | No Arc Starting | No Gas out | No Wire Feeding | Bad Arc Ignition | Unstable Arc |
|---|---|---|---|---|---|---|
| Distribution Boxes (Input Protection Devices) | · Check power supply<br>· Examine if fuse burnt out<br>· Check connection joint | O | O | O | O | O |
| Input Cable | · Examine if cable is cut off<br>· Check connection joint<br>· Check if the device is overheat | O | | | O | O |
| Welding Power Operation | · Check power supply<br>· Examine if phase Lacks | O | O | O | O | O |
| Gas Cylinder and Gas Regulator | · Turn on gas supply<br>· Check residual amount of gas in the cylinder<br>· Set value for flow<br>· Check connection joint | | | | | O |
| Gas supply hose (the whole line from the high pressure cylinder to the weld gun) | · Check connection joint<br>· Examine if gas hose is damaged | | | | | |

| Area and Item to be Inspected and Maintained / Abnormal Items | | Dirt on Edge of Weld Seam | Wire Stick to Parent material | Wire Stick to Conductive Tip | Blowhole Formed |
|---|---|---|---|---|---|
| Distribution Boxes (Input Protection Devices) | · Check power supply<br>· Examine if fuse burnt out<br>· Check connection joint | O | | | |
| Input Cable | · Examine if cable is cut off<br>· Check connection joint<br>· Check if the device is overheat | O | | | |
| Welding Power Operation | · Check power supply<br>· Examine if phase Lacks | O | O | O | |
| Gas Cylinder and Gas Regulator | · Turn on gas supply<br>· Check residual amount of gas in the cylinder<br>· Set value for flow<br>· Check connection joint | | | | O |
| Gas supply hose (the whole line from the high pressure cylinder to the weld gun) | · Check connection joint<br>· Examine if gas hose is damaged | | | | O |

| Area and Item to be Inspected and Maintained | Abnormal Items | No Arc Starting | No Gas out | No Wire Feeding | Bad Arc Ignition | Unstable Arc |
|---|---|---|---|---|---|---|
| Wire Feeding Device | · Wire feeding wheel does not match with the diameter of wire in texturing tube<br>· Crackle on wire feeding wheel, groove blocked up or defect<br>· Handle is too tight or loose<br>· Wire powder accumulated on the inlet of SUS pipe | | | O | O | O |
| Weld Gun and Cable | · Weld gun cable rolled up or over curved<br>· Check adaptability of conductive tip<br>· Wire feeding pipe and cable diameter can be worn, blocked up or have deformation | | | | O | O |
| Body of weld gun | · Connection of conductive tip, nozzle or nozzle contactor is loose<br>· Contactor of weld gun body is not plunged in or tightened well | | | | | |
| Power supply cable of weld gun (cable of switch control) | · Break off (bending fatigue)<br>· Damaged by weighted drop | O | O | O | | O |
| Surface Condition of Parent material and length of wire stretched out | · Oil, dirt, rust or paint residues<br>· Length of wire stretched out is too long | | | | O | O |
| Output Cable | · Cross-section of cable that connects to parent material is not enough<br>· Connection of positive & negative output cable are loose<br>· Bad electric conductivity of parent material | | | | O | O |
| Lengthened Cable | · Cross-section of cable is not enough, rolled up or folded | | | | O | O |
| Welding work condition | · Welding current, voltage, angle of weld gun, welding rate and length of wire stretched out shall be confirmed once again | | | | O | O |

| Area and Item to be Inspected and Maintained / Abnormal Items | | Dirt on Edge of Weld Seam | Wire Stick to Parent material | Wire Stick to Conductive Tip | Blowhole Formed |
|---|---|---|---|---|---|
| Wire Feeding Device | · Wire feeding wheel does not match with the diameter of wire in texturing tube<br>· Crackle on wire feeding wheel, groove blocked up or defect<br>· Handle is too tight or loose<br>· Wire powder accumulated on the inlet of SUS pipe | O | | O | |
| Weld Gun and Cable | · Weld gun cable rolled up or over curved<br>· Check adaptability of conductive tip<br>· Wire feeding pipe and cable diameter can be worn, blocked up or have deformation | O | | O | |
| Body of weld gun | · Connection of conductive tip, nozzle or nozzle contactor is loose<br>· Contactor of weld gun body is not plunged in or tightened well | O | | | O |
| Power supply cable of weld gun (cable of switch control) | · Break off (bending fatigue)<br>· Damaged by weighted drop | | O | | |
| Surface Condition of Parent material and length of wire stretched out | · Oil, dirt, rust or paint residues<br>· Length of wire stretched out is too long | O | O | | O |
| Output Cable | · Cross-section of cable that connects to parent material is not enough<br>· Connection of positive & negative output cable are loose<br>· Bad electric conductivity of parent material | O | | | |
| Lengthened Cable | · Cross-section of cable is not enough, rolled up or folded | O | O | | |
| Welding work condition | · Welding current, voltage, angle of weld gun, welding rate and length of wire stretched out shall be confirmed once again | O | O | O | |

# 10. EXPLODED DRAWING




PT-350

1. Top Cover
2. Left Cover
3. Buckle
4. Handle
5. Right Cover
6. Hinge
7. Panel Cover
8. LCD screen operation control circuit board
9. PCB Shell
10. Front Cover
11. Quick Connector
12. Cable Holder
13. Torch Connector
14. Front Wheel Board
15. Front Wheel
16. Reactor
17. Main Transformer
18. Core Radiator Unit
19. Vertical Septum
20. Central Septum
21. Bottom Board
22. Rear Cover
23. Dam Board
24. Gas Cylinder Shelf
25. Rear Wheel
26. Wheel Axis
27. Gas Cylinder Fixer
28. Main Control Circuit Board
29. Operation Panel Sticker
30. Inverter Circuit Board
31. Secondary Recifier Circuit Board
32. Power Supply Circuit Board
33. Fan
34. Wirefeeder

**List of parts typically replaced due to wear**

8. LCD screen operation control circuit board
11. Quick Connector
12. Cable Holder
13. Torch Connector
28. Main Control Circuit Board
30. Inverter Circuit Board
31. Secondary Recifier Circuit Board
32. Power Supply Circuit Board
33. Fan

**Correct Disposal of this product**

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased.

# EC Declaration of Conformity

CE 2020

We :

Nederlandse Ijzerwaren BV
Centurionbaan 60-10, 3769AL Soesterberg, Netherlands
**www.powertherm.eu**

Declare that the product detailed below :
**WELDING MACHINE**
**MODEL :** PT-350

Satisfies the requirements of the Council Directives :
Low Voltage Directive 2014/35/EU
Electromagnetic Compatibility Directive 2014/30/EU
RoHS Directive 2011/65/EU Annex II

and conform with the norms :
EN IEC 60974-1:2018+A1:2019
EN 50445:2008
EN 60974-10:2014+A1:2015
EN 61000-3-12:2011
EN 61000-3-11:2000
Amending Annex(EU) 2015/863
Amending Annex(EU) 2017/2102