



MARTIN® Air Cannon Controller



Operating Instructions

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1 Introduction

1.1 Important notes

Please observe the instructions stated here. You can forfeit any entitlement to damages and/or rights to claim under a guarantee as a result of non-compliance.

1.1.1 Area of application

These operating instructions are valid for the MARTIN® Air Cannon Controllers. They are directed at the persons who assemble the Air Cannon Controller, put them into operation and monitor their use. This is not a technical manual. Please contact our staff if you have any questions, which go beyond the subject matter of these instructions.

1.1.2 Copyright

The devices described and these instructions are protected by copyright. Unlicensed reproduction will be prosecuted. All rights to these instructions are reserved, including the reproduction and/or duplication in every conceivable method, be this by copying, printing, on any data media or in translated form. The reprinting of these instructions is only authorised with the written approval of Martin Engineering GmbH.

The technical standard at the point in time of the delivery of the product and the instructions is decisive, as long as different information is not provided. We reserve the right to make technical changes without prior notice. Previous instructions cease to be valid. The General Terms and Conditions of Sale and Delivery of Martin Engineering GmbH shall apply.

1.1.3 Exclusion of liability

We guarantee the correct functioning of our products in accordance with our advertising, the product information issued by Martin Engineering GmbH and these instructions. No commitment is made concerning further product features. We do not assume liability for economic efficiency or proper functioning if the product is used for a different purpose than is described in the section on “Intended use”.

Entitlement to damages is generally excluded, unless wilful intent or gross negligence on the part of Martin Engineering GmbH is proven, or if promised product features are missing. We are not responsible for the possible consequences if the product is used in environments for which it is not suitable or which do not comply with the technical standard.

We disclaim any responsibility for damage to installations and systems in the vicinity of the product resulting from a fault in the product or an error in these instructions. We are not responsible for the infringement of patents

and/or other rights of third parties outside the Federal Republic of Germany.

We are not liable for damage resulting from improper operation not in compliance with these instructions. We are not liable for lost profit and consequential losses resulting from non-compliance with safety instructions and warnings. We do not accept any liability for damage resulting from the use of accessories and/or spare parts, which have not been supplied and/or certified by Martin Engineering GmbH.

The products of Martin Engineering GmbH are designed for a long service life. They comply with the current state of science and technology and were checked thoroughly prior to delivery. Martin Engineering GmbH constantly carries out product and market surveys for the continuous further development of the products.

In the event that malfunctions and/or technical problems occur, please speak to the service department at Martin Engineering GmbH. We guarantee to implement suitable measures immediately. The guarantee provisions of Martin Engineering GmbH apply; we will gladly send these to you on request.

1.1.4

Intended use

The MARTIN® Air Cannon Controllers are used to control a maximum of 10 MARTIN® Air Cannons.

Every other use of the MARTIN® Air Cannon Controller is not regarded as intended. If you wish to use the Air Cannon Controller for a different purpose, please contact MARTIN's service department. We would be pleased to help you with the product configuration.

1.1.5

Duties of the operator

The operator of this product must ensure that only persons who

- know the rules defined for safety at work and accident prevention
- have been instructed in the operation of the product
- have read and understood these instructions

can assemble and operate this product. Persons who assemble or operate this product are obliged

- to comply with all rules defined for safety at work and accident prevention
- to read these instructions in full and to comply with all instructions and instructions.

1.1.6

Authorised personal

Persons are regarded as being authorised who are able to show professional training, technical experience, as well as knowledge of the relevant standards and guidelines, and who in addition are able to estimate their tasks and recognise possible hazards in good time.

Operating staff

Persons are regarded as being authorised who have been instructed in the operation of the product and have read these instructions in full and understood them.

Personnel for installation and maintenance

Persons are regarded as being authorised who have been instructed in all aspects of the product and have read these instructions in full and understood them.

1.2

Safety instructions, safety at work

These operating instructions must be read through in full before starting work on the Air Cannon Controller.

The operator must ensure that all assembly, inspection and maintenance work is carried out by authorised and qualified members of staff who have kept themselves adequately informed by thoroughly studying the operating instructions.

As a basic principle, work on the plant and machinery should only be carried out when these are at standstill. The procedure described in the particular operating instructions for shutting down the plant must always be complied with.

All safety and protective devices must be refitted and put into operation immediately after completion of the work. Check that all steps have been carried out properly before putting the plant into operation. Please observe all instructions for installing and putting into service the product.

1.3

Symbols in these instructions

The following symbols can be used in this document to point out hazards during the installation and/or operation of the product:



Immediate hazard! Immediate hazard, which can result in serious or fatal injuries.



Hazards and dangerous work! Hazards and dangerous work, which can result in injuries.



Dangerous and unsafe procedures! Dangerous and unsafe procedures, which can result in damage to the product or property.



Important instructions for the proper installation and the correct operation of the devices.



General, useful instructions.

1.4

References

The following standards and guidelines were taken note of during the writing of these operating instructions:

- EU Machinery Directive (98/37 EEC)
- EU Directive for pressure reservoirs; Addendum I (97/23/EC); important safety requirements
- ISO/IEC Guide 37 „Instructions for use of products of customer interest“, issue 1995
- DIN/EN 1050 “Safety of machinery – Principles for risk assessment”, issue 1997-01
- DIN 1421 “Structuring and numbering in texts”, Issue 1983-01
- DIN/EN 12100-1 “Safety of machinery - Basic concepts, general principals for design”, Issue 2004-04
- DIN/ISO 16016 “Technical product documentation – Protection notices for restricting the use of documents and products”, issue 2002-05
- DIN/EN 60204-1 “Safety of machinery - Electrical equipment of machinery, Part 1 General requirements”, issue 1998-11

2 Description of the product

2.1 General description

The MARTIN® Air Cannon Controllers, hereinafter referred to as controller, serve to control a maximum of 10 MARTIN® Air Cannons. These can either be triggered by a programmable time control, an external impulse or manually.

2.2 Control and display elements

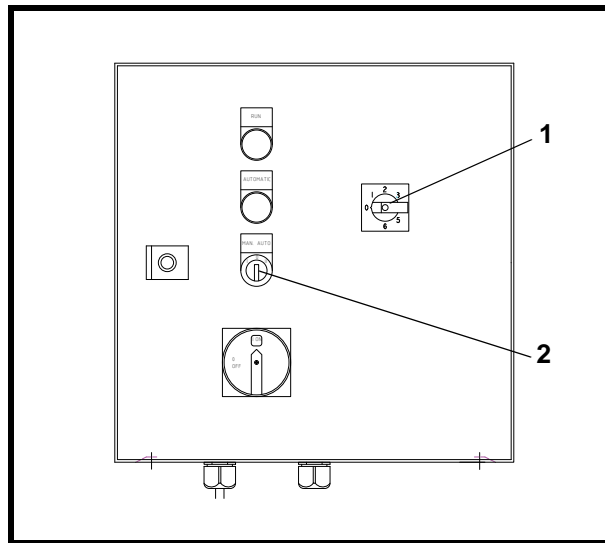


Figure 1: Control and display elements

The operation mode selector switch (2) is used to adjust the desired operation mode:

- **HAND** stands for manual operation, the air cannons are triggered by means of the air cannon selector switch (1).
- **OFF** means: controller is switched off, air cannons are not triggered.
- **AUTO** stands for automatic operation, the air cannons are triggered according to the programmed time control.

2.3

Serial and model number

The serial and model numbers are stated on the type plate which is attached to the upper right of the switch cabinet. Please state these numbers when ordering spare parts at Martin Engineering or an authorised dealer, as well as in all correspondence.



Figure 2: Type plate; parts no. 21313G

2.4

Structure of the product numbers

All products are clearly specified worldwide by a five-digit part number with extension for the different types. They are comprehensible for Martin Engineering employees and their representations.

Five-digit part numbers, which begin with "1", "2" or "3" or a combination of characters refer to development and manufacture in the main factory in the USA. If the part number is extended with a "+E" at the last digit, this refers to manufacture in Europe. The component parts are, however, structurally identical and compatible worldwide.

If a part number begins with "4", the product concerned was specially developed for European requirements. Wearing parts used in these products are, however, compatible worldwide.

Before Installation

IMPORTANT

The delivery service is responsible for damage occurring in transit. Martin Engineering does not accept any liability here. Contact your deliver service for more information.

1. Inspect shipping container for damage. Report damages immediately to the carrier and complete his transport damage form. Keep any damaged goods subject to later examination.
2. Take the MARTIN® Air Cannon Controller out of the transport packaging. This should contain:
 - MARTIN® Air Cannon Controller
 - Warning label High-pressure discharge, part no. 31913G
3. If anything is missing contact Martin Engineering or the relevant representative.

⚠ WARNING

Before installing, turn off energy source to air cannon and all air cannon accessories. Secure the power supply against unauthorised switching on.

4. Turn off energy source in accordance with the valid standards and directives.

⚠ WARNING

In applications installed in an enclosed area, gas level and dust content must be tested before using a cutting torch or welding. Otherwise an explosion could occur.

5. In applications installed in an enclosed area, gas level and dust content must be tested before using a cutting torch or welding. Cover conveyor belt with fire retardant material.

4 System installation

IMPORTANT

Read through these Operating Instructions in full before starting the installation. Otherwise you run the risk of missing important information for appropriate installation.

The installation of the Air Cannon Controller is carried out in several steps:

1. Assembly of the MARTIN® Air Cannon Controller
2. Connection of the air cannons
3. Programming the MARTIN® Air Cannon Controller
4. Trial run

4.1

Assembly of the MARTIN® Air Cannon Controller

The MARTIN® Air Cannon Controller is completely assembled upon delivery and only has to be installed firmly in a suitable location.

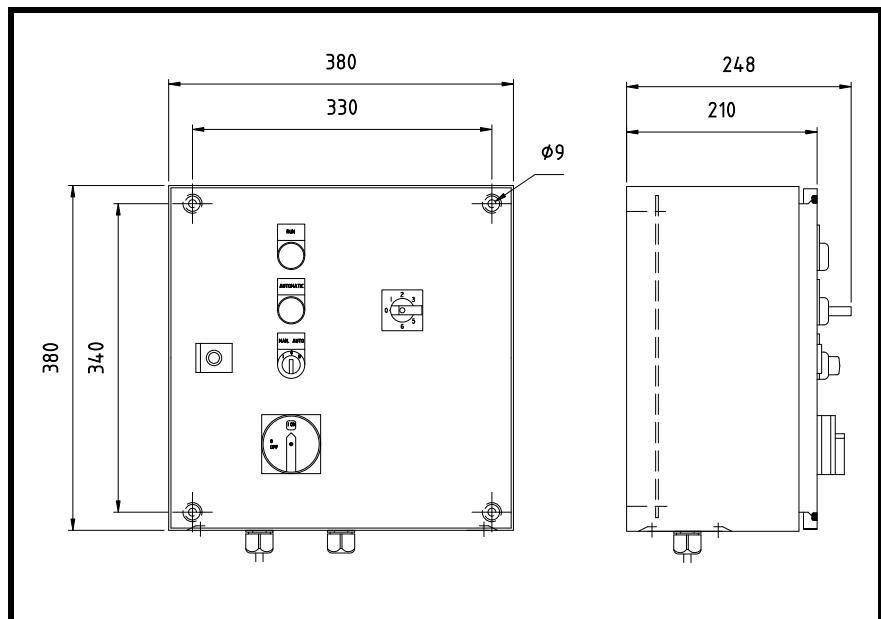


Figure 3: Controller dimensions

1. Install the MARTIN® Air Cannon Controller in a location that is easily accessible and as close as possible to the air cannons to be triggered.
2. Please observe the dimensions in fig. 3 and draw the drilling template on a wall or similar. Use all four provided attachment points.
3. Use suitable suspension devices (e.g. dowels and screws) that are adequate for the weight of the MARTIN® Air Cannon Controller.
4. Install the MARTIN® Air Cannon Controller firmly on a suitable wall or similar.

Connection of the air cannons

IMPORTANT

The electric installation must only be carried out by a suitable person.
Electricians or similarly qualified persons are regarded as suitable.

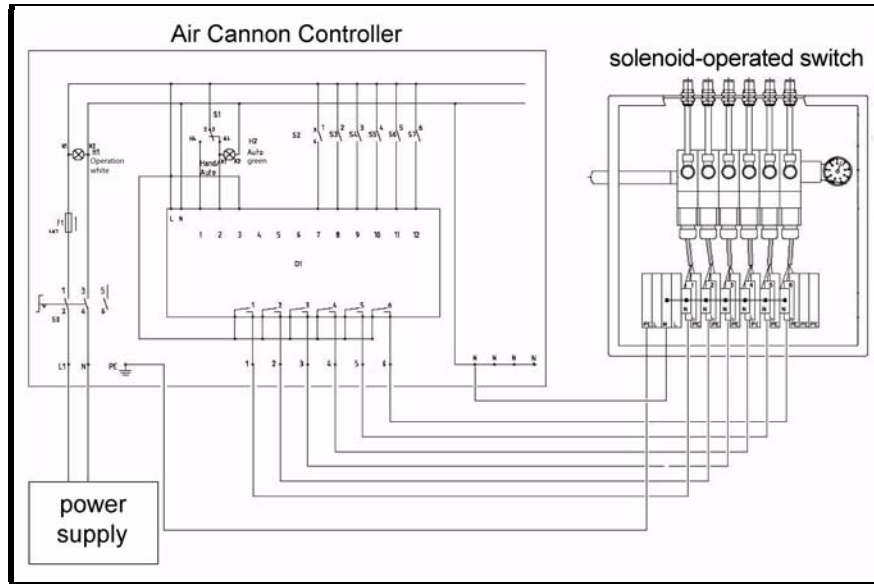


Figure 4: Connection diagram

1. Open the MARTIN® Air Cannon Controller.
2. Make the connections as shown in the diagram.
3. Lay all pipes in such a way that a risk of stumbling is excluded and the pipes are protected against damage.

4.3

Programming the Air Cannon Controllers

The control programme is stored in the controller upon delivery and should not be changed. The programme can be adapted by changing the following time variables

- T01 Switch-on delay
- T02 Air cannon pause
- T03 Cycle pause
- T13 Discharge time

The following picture emphasises the programme sequence with the four programmable time variables:

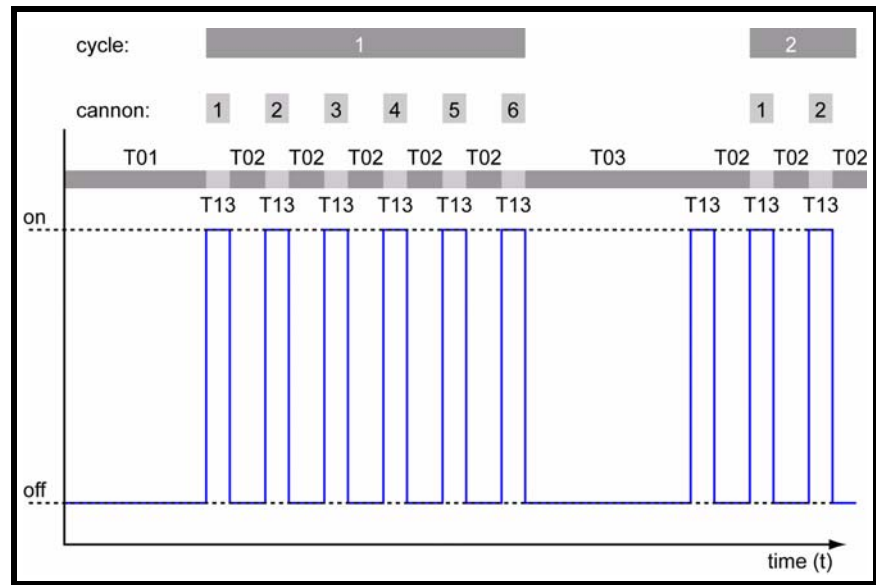


Figure 5: Programme sequence

The time variables are deposited as parameters in the controller. These can be changed as described in the following:

⚠ DANGER

Dangerous electric voltage! Different component parts in the controller are served by dangerous electric voltages. You can suffer severe electric shocks by coming into contact with these. Please be particularly careful when working on the open controller.



Figure 6: Controller operator device

1. Open the control unit.
2. Press (OK) on the operator device in order to call up the main menu.
3. Press the down arrow keys until the „PARAMETER“ menu entry is marked.
4. Press (OK) to call up the parameter.
5. Mark the desired parameter using the down arrow key.
6. Press (OK) to change the parameter.
7. Enter the new value.
8. Press (OK) to confirm the value.
9. Repeat steps 5 to 8 for all parameters that you want to change.
10. Press (Esc) to exit the parameter display.
11. Press (Esc) to exit the main menu.

NOTE

Please consult the controller operating instructions for a detailed description of the controller functions.

NOTE

Depending on the design, the controller has fixed programming for a maximum of 6 or 8 air cannons. In the event that fewer air cannons than the intended maximum number are operated with this, the pause times still exist nevertheless. The overall cycle time is calculated from the total of the pause times and the cycle pause times.

4.4

Changing the password

1. Press the (DEL) and (ALT) keys simultaneously.
2. Use (OK) to select the "SAFETY" menu item.
3. Choose the "AREA" menu item to select the areas to be protected.

NOTE

We recommend disabling all areas in order to prevent manipulation by unauthorised third parties.

4. Select every individual area by inserting a tick.
5. Use (ESC) to exit this menu item.
6. Select the "PASSWORD" menu item.
7. Select the "CHANGE PASSWORD" menu item.

IMPORTANT

Make a note of the password with the serial number of the controller cabinet. Following loss a complete new start is not sufficient to restore access.

8. Press (OK) to change the password.
 - a. Use the down or up arrow keys to choose a new numeric character. Use the right or left arrow keys to choose between the numeric characters.

NOTE

Password entry is restricted to numbers.

9. Once the password has been established, use (ESC) to leave the menu item.
10. Select the "ACTIVATE PASSWORD" menu item in the following menu.
11. The system now automatically switches back to operating mode.

5

Operation of the Air Cannon Controller

5.1

Imminent danger when discharging air cannons



Fatal injuries due to the discharge of air cannons or flying parts or material. Please be sure to observe the following explanations.

The following risks can arise due the discharge of one or more air cannons:

- Fatal injuries following direct impact of the air cannon jet on humans or animals
- Fatal injuries due to the sudden flying open of unsecured maintenance flaps and doors if humans are in the effective range of these flaps/doors
- Fatal injuries due to flying material, e.g. due to opened maintenance flaps or in the area of chutes and filler openings.
- Injuries due to extreme acoustic pressure.
- Material damage due to inadequately fastened or secured component parts in the area of silos, filler openings and chutes.

5.2

Measures for avoiding risks

To minimise the risks as described above, you must take the following safety precautions before every discharge sequence of the air cannons (automatic or manual):

- Apply decal information to the installations in the area of air cannons. These should draw attention to discharges without prior warning and prohibit standing in the danger area as well as the opening of access doors or maintenance flaps.
- Please ensure that nobody is in the effective range of the air cannons and that all access doors and maintenance flaps are closed and secured.
- Please follow all in-house regulations that were set up for the discharge of air cannons.
- Let your behaviour ensure that no unauthorised persons have the possibility of discharging the air cannons.

5.3 Discharging air cannons

Discharging the connected air cannons by means of the controller is carried out either manually or automatically.

5.3.1 Manual discharge

DANGER

Fatal injuries due to high-pressure discharge! The connected air cannons are discharged without prior warning after triggering on the controller.

1. Set the operating mode selector switch to „Hand“.
2. Turn the air cannon selector switch in succession to positions 1 to 6. The connected air cannons are discharged. As a result, the connected air cannons are discharged in succession.

NOTE

Even if you switch the air cannon selector switch rapidly to position 6, the connected air cannons are not discharged until the programmed pauses have expired. It is not possible to accelerate a programmed sequence.

5.3.2 Automatic discharge

DANGER

Fatal injuries due to high-pressure discharge! The connected air cannons are discharged without prior warning after triggering on the controller.

Set the operating mode selector switch to „Auto“. The connected air cannons are discharged according to the control programme.

Operation of the Air Cannon Controller

6 Part numbers

This section contains the product names and the appropriate parts numbers for the MARTIN® Air Cannon Controller and the appropriate accessories. Please refer to the respective parts numbers when ordering the parts.

6.1 MARTIN® Air Cannon Controller

- MARTIN® Air Cannon Controller:
parts no. 41294-XXXX (see figure 7)

6.2 Accessories

- Adapter cable USB to RS232 - parts no. 41294-EAD01
Adapter cable RS232 to USB.
- Control unit for the controller - parts no. 41294-ECU01
Digital outputs: 6 relais; digital inputs: 12.
Operational voltage: 115/240 V/AC.
- Extension for the controller - parts no. 41294-EEX01
Digital outputs: 2 relais.
- Data transfer cable - parts no. 41294-EPC01
Cable with serial port (D-Sub 9) on interface connector plug of the control unit.
- Programming and operating software - parts no. 41294-ESW01
Software for programming the control unit
Menu choice for the control unit in 13 languages.
System requirements: Win98, NT-SP6 or greater, Windows 2000, XP-SP1 Browser: Internet Explorer 5 or greater.
- Spare key for manual/automatic mode switch -
parts no. 41294-KEY01

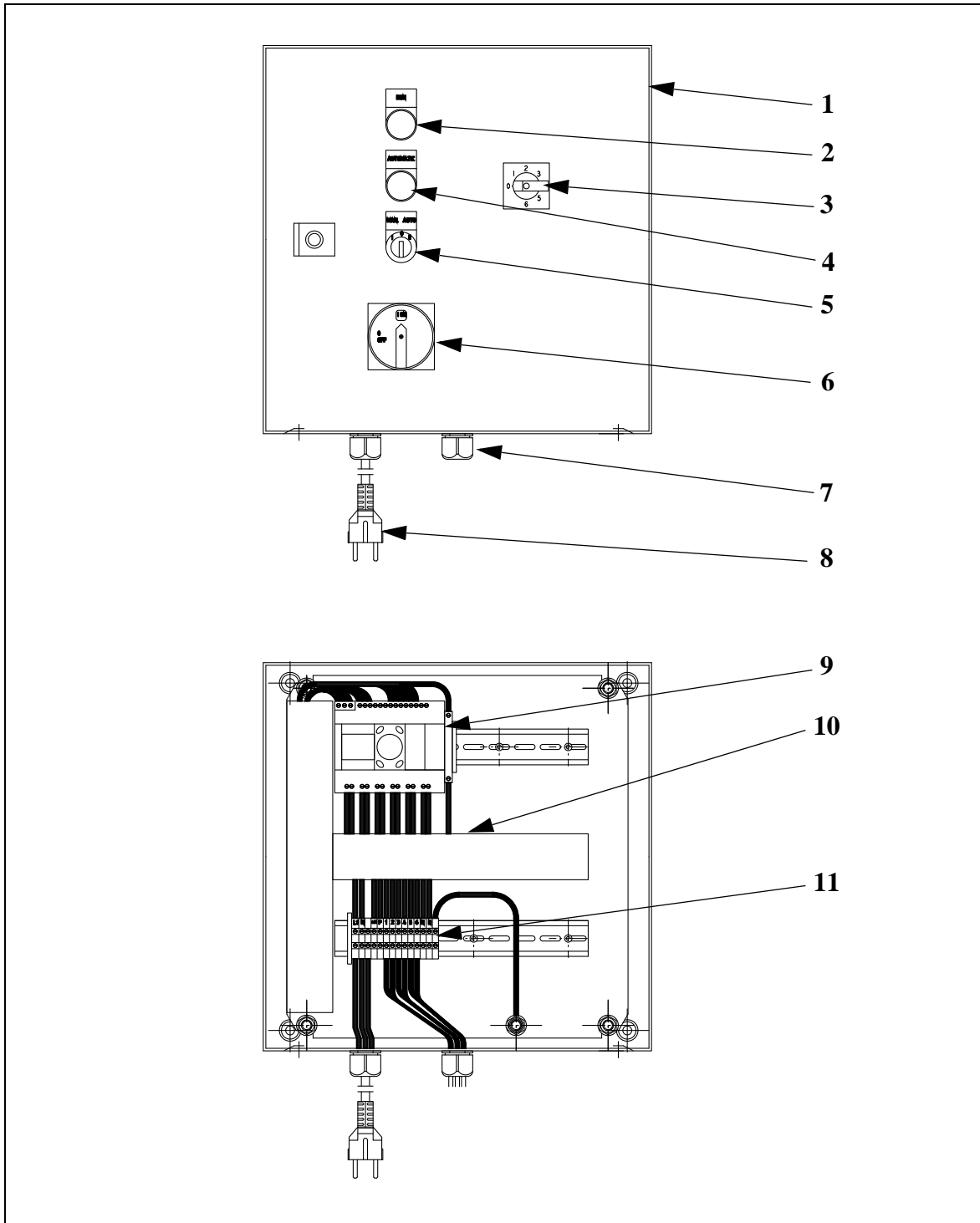


Figure 7: MARTIN® Air Cannon Controller - parts no. 41294-XXXX

- Number of control ports _____
- W- selector switch _____
- D - pressure switch _____
- 0 – special design _____
- 1 – standard design _____

Item	Qty.	Description
1	1	System cabinet
2	1	Indicator light white complete
3	1	Contact selector switch
4	1	Indicator light green complete
5	1	Key-operated switch Auto/manual
6	1	Main switch
7	2	Cable connection
8	1	Connector plug with 2 metres of cable
9	1	Control unit
10	2	Cable duct
11	14	Terminal block

Table 1: MARTIN® Air Cannon Controller - parts no. 41294-XXXX



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 **MARTIN
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MARTIN ENGINEERING GMBH

Headquarter Europe
In der Rehbach 14
D-65396 Walluf, Deutschland
Phone: (+49) 6123 - 97 82 0
Fax: (+49) 6123 - 7 55 33
E-Mail: info@martin-eng.de
www.martin-eng.de

