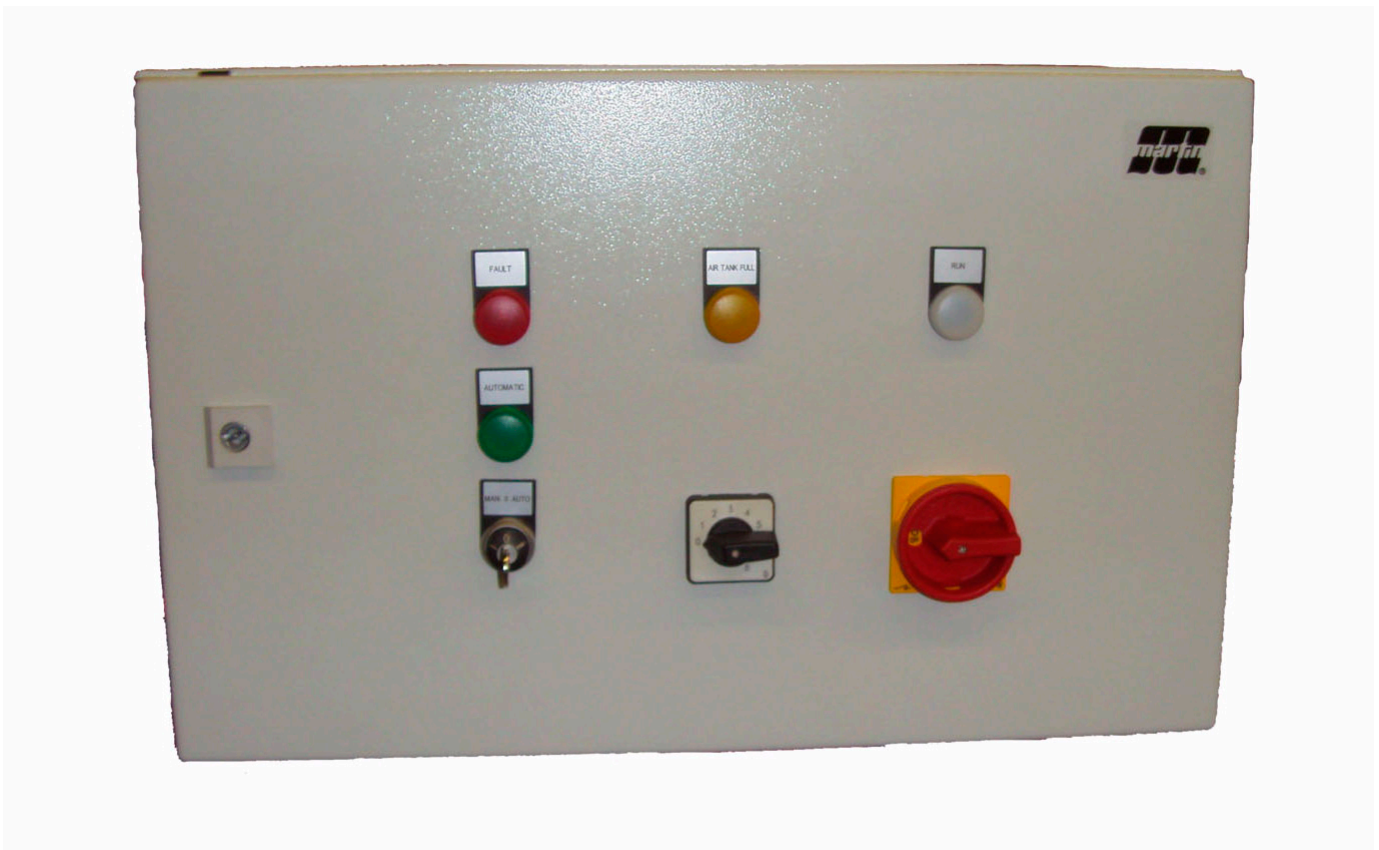


# ***MARTIN***® ***MultiPort*** ***Controller***



***Operators Manual***

***M3776UK***

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# 1 Introduction

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## 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® MultiPort controllers. They are directed at the persons who assemble the 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® MultiPort Controller control systems are used for controlling one MARTIN® MultiPort air cannon with a maximum of 8 output points and one pressure reservoir.

Every other use of the MARTIN® Air Cannon Controller is not regarded as intended. If you wish to use the MultiPort 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

### **Proper disposal**

Assemblies or parts of the MARTIN® MultiPort Controller must be disposed appropriately after use, as follows.

- Complete assemblies must be disposed separately according to material type.

All national and international disposal regulations must be followed for proper disposal.

### 1.1.6

#### **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.

### 1.1.7

#### **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 MARTIN® MultiPort 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. The installation must be carried out completely before putting into service. Check that all steps have been car-

1.3

ried out properly before putting the plant into operation. Please observe all instructions for installing and putting into service the product.

**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 (2006/42/EC)
- EU-Machinery Directive (89/336/EEC)
- EU-Machinery Directive (73/23/EEC)
- ISO/IEC Guide 37 „Instructions for use of products of customer interest“, Issue 1995
- DIN/EN ISO 14121-1 „Safety of machinery - Principles for risk assessment“, Issue 2007-12
- 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
- MOELLER operating instructions „easy800“ control relay - AWB2528-1423D - 06/03

## 2 Description of the product

### 2.1 General description

The MARTIN® MultiPort Air Cannon Controller, hereinafter referred to as controller, serve to control a maximum of one MARTIN® MultiPort Air Cannon. The work cycle of the MARTIN® MultiPort Air Cannon can either be triggered by a programmable time control, an external impulse or manually.

### 2.2 Control and display elements

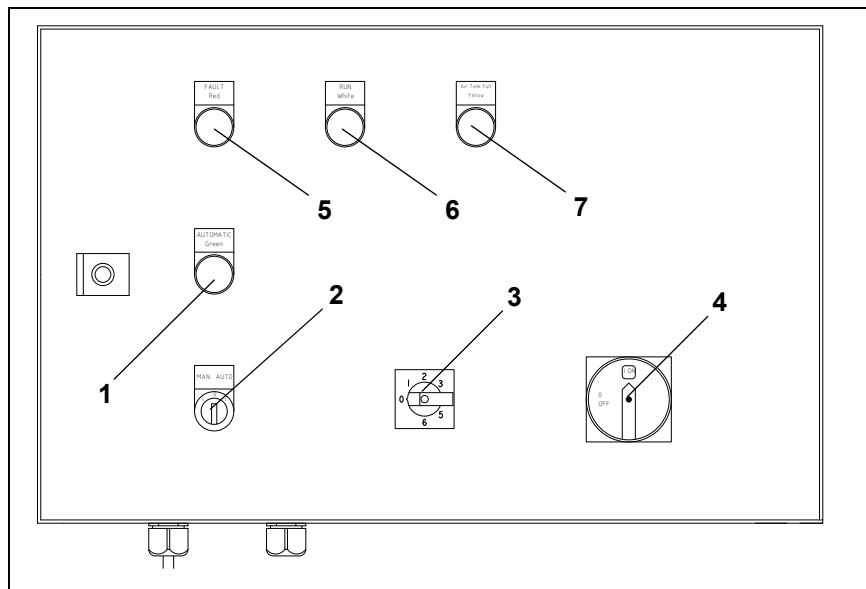


Figure 1: Control and display elements

1. The green signal lamp (1) indicates that the system is working in automatic mode.
2. The operation mode selector switch (2) is used to adjust the desired operation mode:
  - „MAN“ - semiautomatic mode. In semiautomatic mode, a port is selected with the slave selector switch (3) and it is triggered according to the programming of the selected port.
  - „0“ - MultiPort Controller is switched off. No air cannons are being triggered.
  - „AUTO“ - automatic mode. The ports are triggered in accordance with a programmed time sequence.
3. The port selector switch (3) serves to preselect the ports for semiautomatic operation.
4. The main switch (4) puts the controller into operation or switches it off and serves simultaneously as an emergency switch in the event of a malfunction.



5. The red signal lamp (5) indicates that the system has a malfunction.
6. The orange signal lamp (6) indicates that the pressure reservoir of the MARTIN® MultiPort air cannon has reached the set pressure and the system is „ready to shoot“.
7. The white signal lamp (7) indicates that the system is in readiness and the main switch (4) is set to „ON“.

## 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. 21313-MCG

## 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.

## 3 Before installation

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### 3.1 Before installation of the controller

#### 3.1.1 Needed materials and tools

Only standard hand tools are required for installation of the controller.

#### 3.1.2 Preliminaries

### **IMPORTANT**

**Perform the following inspections attentive and completely. The delivery service is responsible for damage occurring in transit. Martin Engineering does not accept any liability here. Contact your delivery service for more information.**

1. Inspect the delivery of the following points:
  - Is the package complete?
  - Are all delivery packages without damage? Are there damages which giving an matter of damages to the enclosed parts.
2. Report damages immediately to the carrier and complete his transport damage form. Keep any damaged goods subject to later examination.
3. Take the MARTIN® MultiPort Air Cannon Controller out of the transport packaging. This should contain:
  - MARTIN® MultiPort Air Cannon Controller
  - possibly additional parts according to the order.
4. 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.**

### **⚠ 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.**

## 4 Installing controller

### IMPORTANT

Read through these Operating Instructions in full before starting the installation. Otherwise you will miss important information for appropriate installation.

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

1. Assembly of the controller.
2. Connection of the controller.
3. Programming controller.
4. Trial run of the controller.

### 4.1 Assembly of the controller

The controller is completely assembled on delivery and is securely mounted to the MARTIN® MultiPort air cannon.

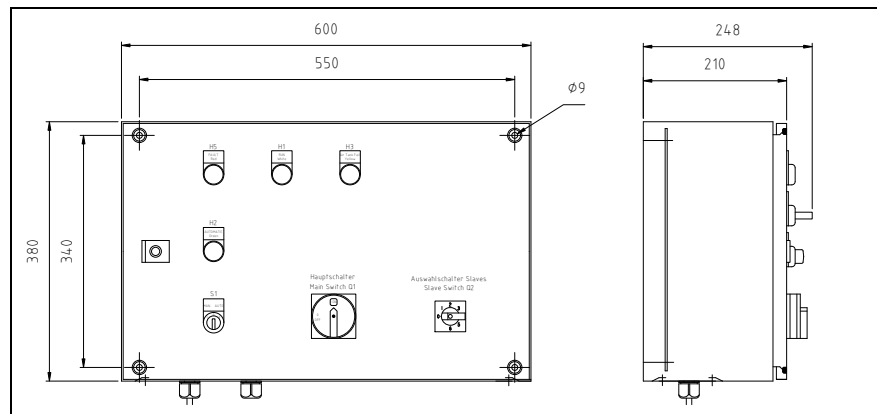


Figure 3: Dimensions of the controller

### NOTE

Mounting at a different location than directly to the MARTIN® MultiPort air cannon is not envisaged. If you want to install the control system at a different location, please observe the mass stated in fig. 3 and all valid standards and regulations with regard to the installation and use of electrical equipment.

### Connection of the controller

#### IMPORTANT

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

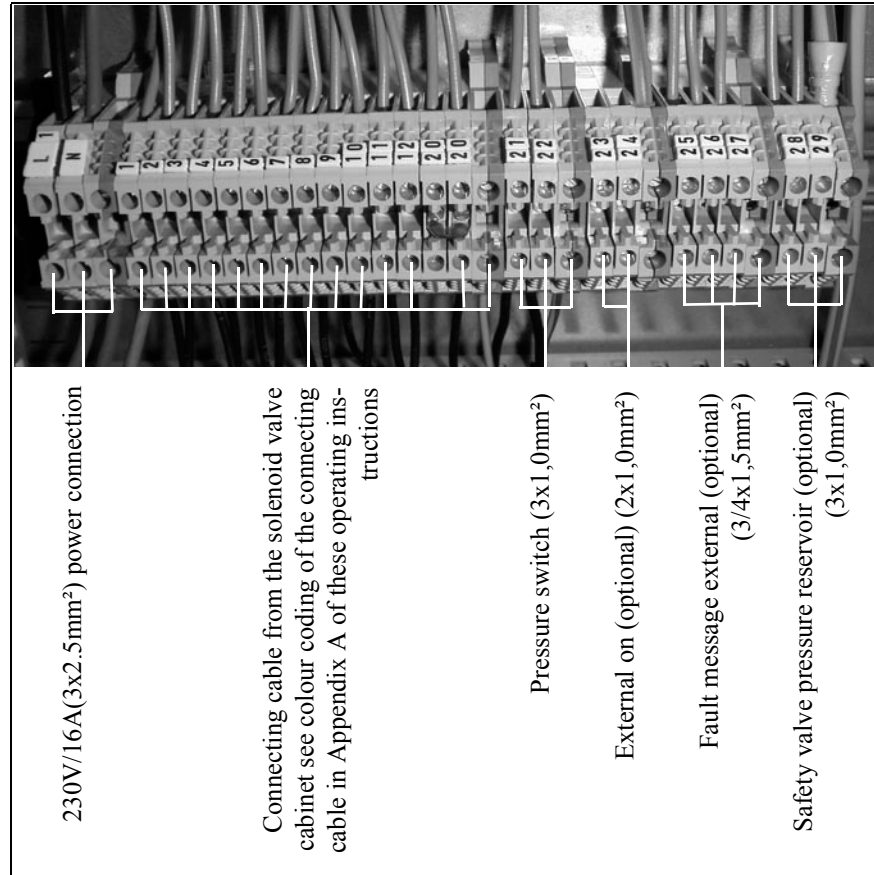


Figure 4: Connection diagram

1. Open the controller.
2. Make the connections as shown in the figure 4. Please also observe the circuit diagram supplied.

#### NOTE

In the case of complete systems supplied, the connecting cable from the solenoid valve cabinet has already been completely wired.

3. Lay all lines from and to the control system in such a way that a risk of stumbling is excluded and the lines are protected from damage.

### 4.3

## Programming controller

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 (Times shown in italics are optional):

- T01 Monitoring filling time container 1 - changeable
- T06 Delay time of next cycle - changeable
- T13 Delay time extending slave cylinder - changeable

The following chart emphasises the programme sequence with the programmable time variables:

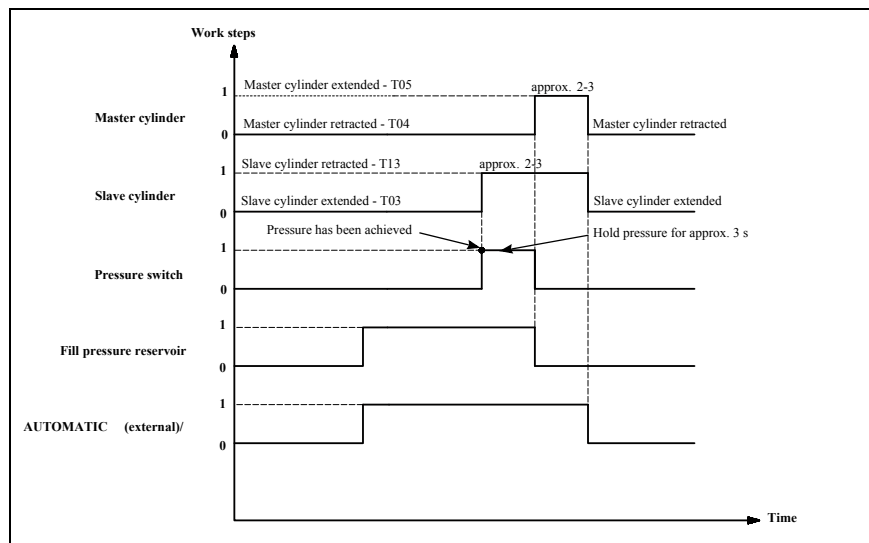


Figure 5: Programme sequence

## 4.3.1

## Changing parameters

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 controller.
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.



Figure 7: Selection of the parameter

4. Press (OK) to call up the parameter.
5. Mark the desired parameter using the down arrow key.

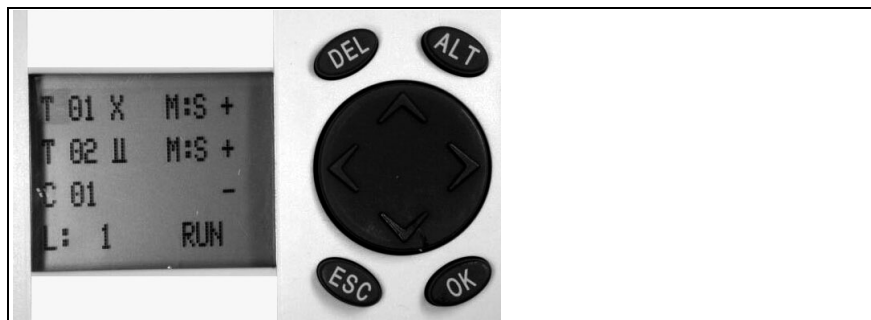


Figure 8: Changing parameter

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 EASY controller operating instructions for a detailed description of changing parameters.**

### NOTE

**The control system has a fixed programming for the number of ports and pressure reservoirs specified in the order. If fewer/more ports and/or pressure reservoirs are to be operated with it than planned, a new program must be installed. Programs can be installed from a special memory card through the easy interface.**

#### 4.3.2

#### 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 each individual area with a check mark by confirming with OK.
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. To restore the access, the complete control unit must be sent to the manufacturer, in the process all settings and the installed program are lost and the unit is returned to the condition on delivery.**

8. Press (OK) to change the password.
9. 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**

**The inputting of the password is restricted to numbers between 000001 and 999999 .**

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

## **NOTE**

**Please also observe the corresponding chapter of the operating instructions of the controller regarding further options and settings of the password.**



## 5 Operation of the controller

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### 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 of more ports:

- 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 ports**

Discharging the individual ports 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 ports are discharged both in automatic and in manual mode without prior warning after triggering on the controller. Make sure that the operating mode selector switch (2) and the port selector switch (3) are set at zero before putting the system into operation. Otherwise there is a possibility of an uncontrolled discharge of the MARTIN® MultiPort air cannon.**

**IMPORTANT**

**The operating mode „MAN“ makes it possible to freely select the port. From the plant engineering point of view this is semi-automatic operation whereby no more influence can be exerted on the prescribed sequence after the port has been selected and switchover to „MANUAL“.**

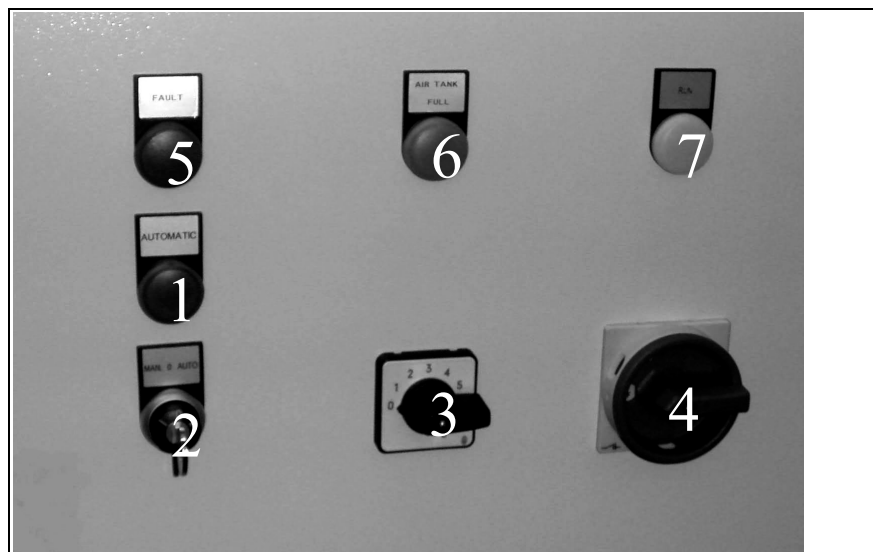


Figure 9: Operational controls cabinet

**IMPORTANT**

**It is absolutely essential that the operational sequences described in the following are complied with. Otherwise unexpected actions may be triggered on the MARTIN® MultiPort air cannon and the system switches to malfunction. To reset the system, all switches must be set to „0“ and the control system restarted.**

1. Set the main switch (4) to „ON“. In the starting position the master cylinder and the slave cylinder extend. Consequently the system is closed. The white signal lamp (7) „RUN“ comes on and indicates the operational readiness of the system.
2. Select the required port on the port selector switch (3).
3. Set the operating mode selector switch (2) to „MAN“.
4. The pressure reservoir is filled automatically up to the set pressure. After reaching the pressure, the orange signal lamp (6) „AIR TANK FULL“ comes on. The system is „ready to shoot“.
5. After a programmed period of time the master cylinder is retracted and firing takes place at the selected port.
6. After the firing has been carried out all cylinders return into the starting position again after a programmed period of time.

**NOTE**

**Provided that the operating mode selector switch (2) is still set to „MAN“ after completion of the described sequence, the tank is refilled automatically and the MARTIN® MultiPort air cannon discharges time and again in an endless loop into the selected port. To terminate the selected sequence, the operating mode selector switch (2) must be set to „0“.**

### 5.3.2

#### Automatic discharge

1. Set the main switch (4) to „ON“. In the starting position the master cylinder and the slave cylinder extend. Consequently the system is closed. Make sure that the port selector switch (3) is set to position 0 and no port has been selected. The white signal lamp (7) „RUN“ comes on and indicates the operational readiness of the system.
2. Set the operating mode selector switch (2) to „AUTO“. The green signal lamp (1) „AUTOMATIC“ comes on and indicates that the system is in automatic mode.
3. After expiry of a prescribed lead time, the programming runs independently in accordance with the following schedule:
  - a. Filling of the tank to the prescribed pressure. Filling times are governed by the air inflow and set pressure.
  - b. Once the pressure has been reached, the orange signal lamp (6) „AIR TANK FULL“ on the switch cabinet comes on, thus the system is „ready to shoot“.
  - c. A slave cylinder is retracted in accordance with the prescribed programming and order.
  - d. Once the slave cylinder has reached its final position, the master cylinder is retracted and the firing takes place. The green lamp (6) „AIR TANK FULL“ on the switch cabinet goes out.
  - e. After a one second waiting time, the master and the slave cylinder return into the starting position again.
  - f. After expiry of a prescribed time, the pressure reservoir is

refilled and the discharge sequence is executed according to the program.

**NOTE**

Provided that the operating mode selector switch (3) is still set to „AUTO“ after completion of the described sequence, the tank is refilled automatically and the programmed cycle starts from the beginning.

**IMPORTANT**

In the event of malfunctions, the red signal lamp (5) „FAULT“ comes on both in automatic and in manual mode and the entire system switches to malfunction.

## 6 Part numbers

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

### 6.1 MARTIN® MultiPort Air Cannon Controller

- MARTIN® MultiPort air cannon controller - parts no.: 41530-XXXX

### 6.2 Accessories

- USB-RS232 adaptor cable - parts no.: 41294-EAD01 - Adaptor cable for RS232 to USB.
- Memory card for EASY controller - parts no. 41468-MC-XXXX - Memory card with installed circuit diagram program to extend or reduce the number of ports and pressure reservoirs.
- Spare key for manual/automatic mode switch - parts no.: 41294-KEY01

6.3

Parts list

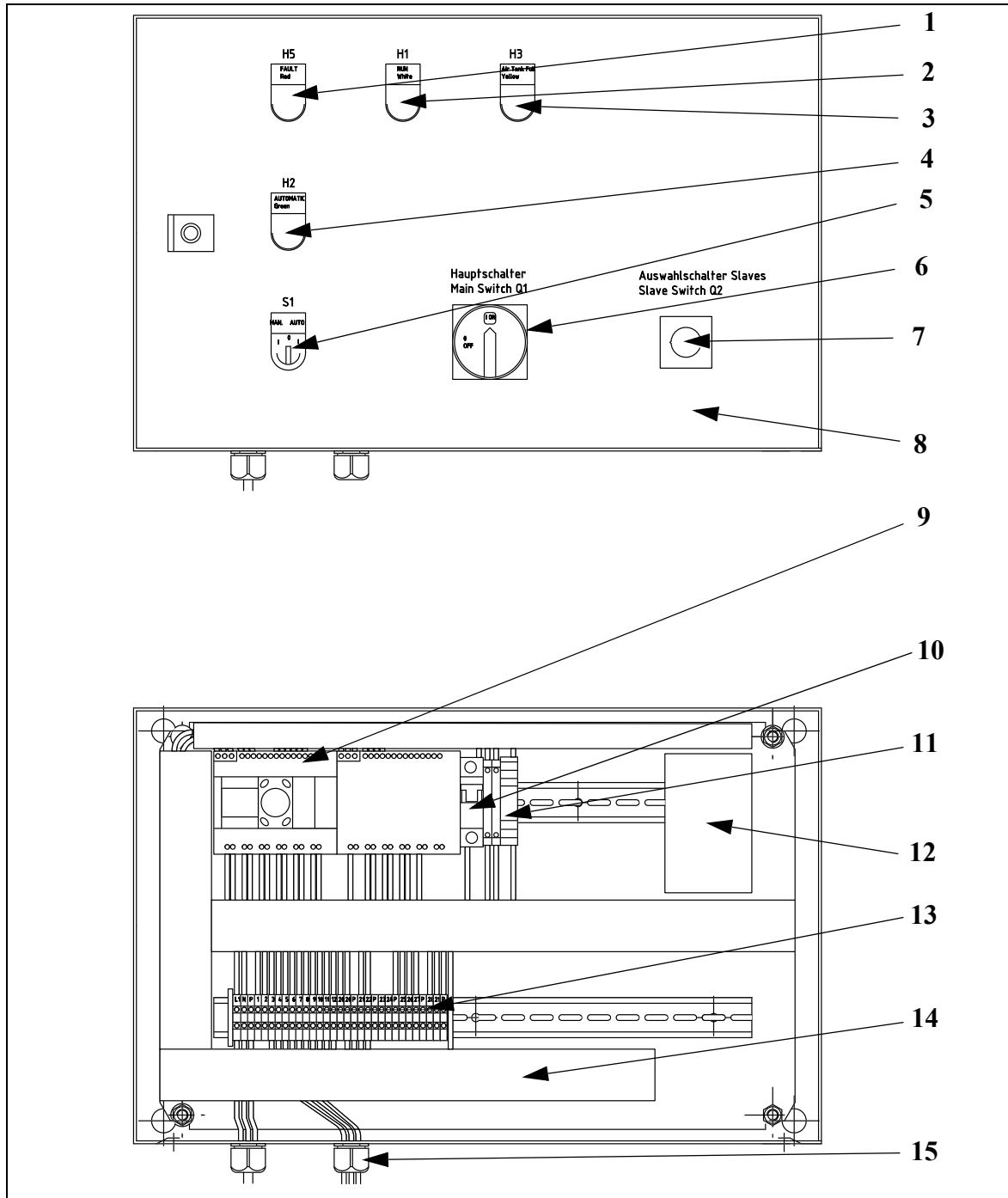


Figure 10: MARTIN® MultiPort air cannon controller

Item	Qty.	Description
1	1	Signal lamp red complete
2	1	Signal lamp green complete
3	1	Signal lamp white complete
4	1	Signal lamp green complete
5	1	Operation mode selector switch
6	1	Port selector switch 1-8
7	1	Main switch
8	1	System cabinet
9	1	Control unit
10	1	Fuse
11	1	All-or-nothing relay
12	1	Transformer
13	4	Cable duct
14	32	Terminal block
15	5	Cable connection

Table 1: MARTIN® MultiPort air cannon controller

#### 6.4

#### Part number explanation

MARTIN® MultiPort controller

Part No.: 41530 - X X

**Assembly part number** \_\_\_\_\_

**Options firing sequence** \_\_\_\_\_

Z = Chronological firing sequence

P = Programmable firing sequence

**Number of ports 1-8** \_\_\_\_\_

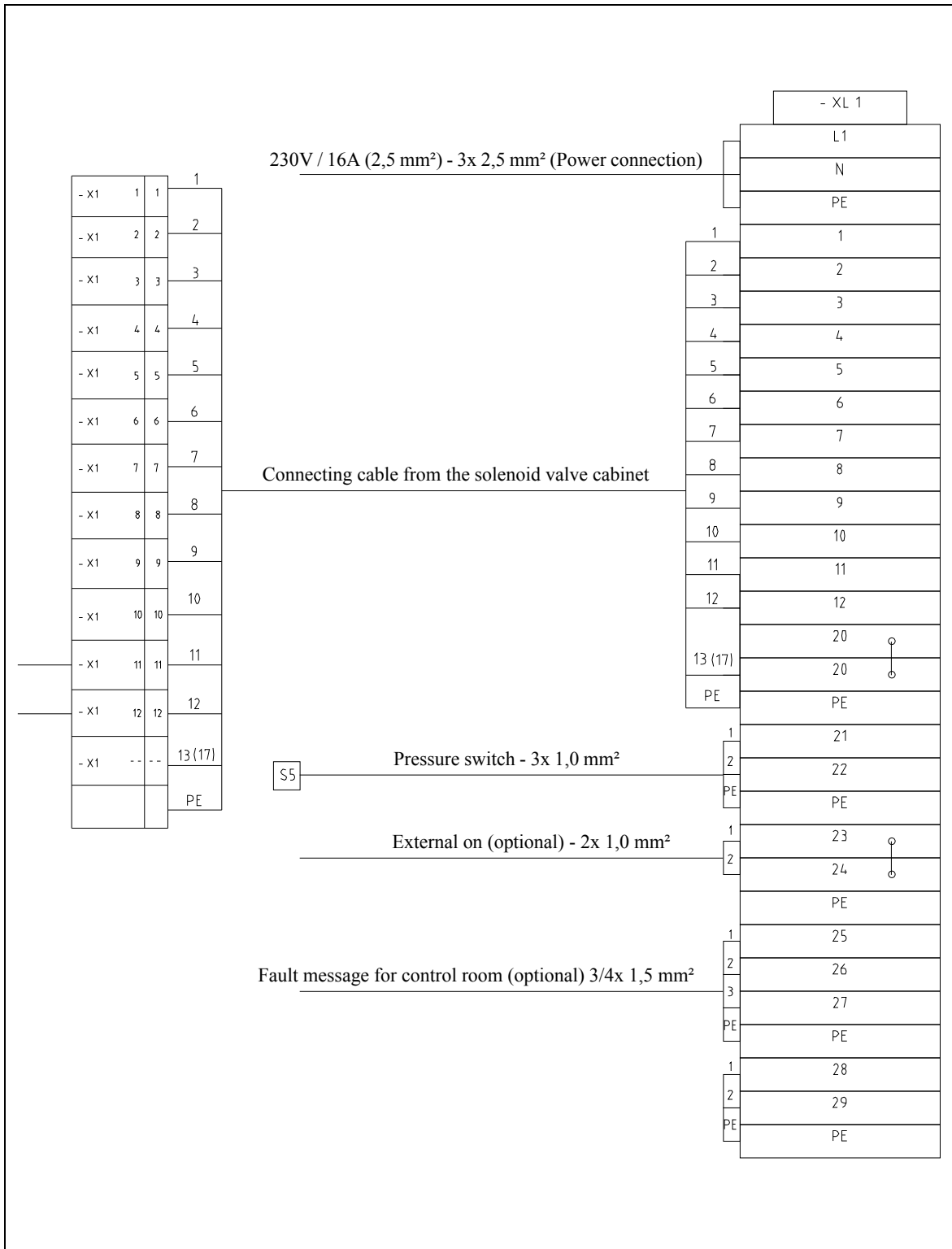


Figure 11: Terminal connections diagram





## **EU Manufacturer's declaration**

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The EU Manufacturer's Declaration or the CE Declaration of Conformity respectively for the MARTIN® MultiPort Air Cannon Controller follows below.



**EU manufacturer's declaration according to EU - Machinery Directive  
(2006/42/EC) Appendix II B for machine components**

We Martin Engineering GmbH  
In der Rehbach 14 phone +49 (0)6123-97820  
D-65396 Walluf fax +49 (0)6123-75533

hereby declare that the machine/partial machine/machine parts identified below  
designation of the machine/partial machine/machine parts:

**Air Cannon Controller**

make/ type:

**MARTIN® MultiPort Controller**

with the serial no.:

**not required**

comply with the following conditions:

**EG - Low Voltage Guideline 73/23/EEC**

**EU - EMC Directive 89/336 EEC**

Applied harmonised standards are in particular:

**DIN EN 50178 - Electronic equipment for use in power installations**

**DIN EN 60529 - Degrees of protection provided by enclosures (IP-Code)**

**DIN EN 60204-1 - Electrical equipment of machines (Industry)**

**DIN EN 60439-1 - Low-voltage switchgear and controlgear assemblies**

Notified body:

**not required**

The original version of the operating instructions and the technical documentation belonging to the machine are attached to the designated machine/partial machine/machine part.

The initial operation of these machine components is prohibited until it has been determined that the system into which they are to be installed, complies with the provisions of the EU Directive version (2006/42/EC).

Date: 05.01.2010

Manufacturer - Signature: Managing Director, Michael Hengl



***We Make Your Bulk Material  
Handling Cleaner, Safer  
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