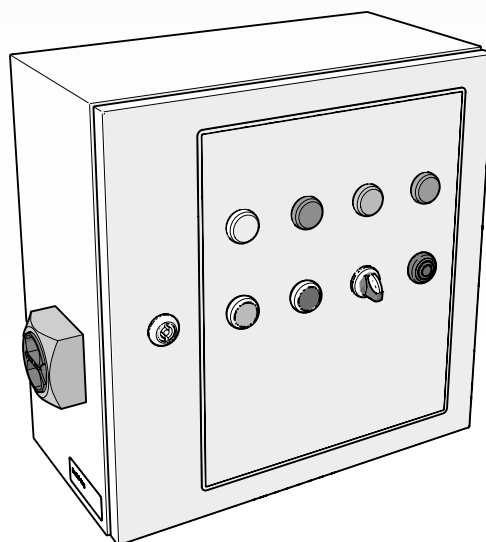
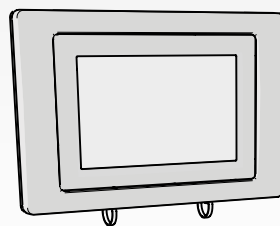


Control panel with separate HMI

CONTROLPRO



EN

Installation manual

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EN | ORIGINAL INSTRUCTION

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PREFACE

Using this manual

This manual is intended to be used as a work of reference for professional, well trained and authorised users to be able to safely install, use, maintain and repair the product mentioned on the cover of this document.

Pictograms and symbols

The following pictograms and symbols are used in this manual:

	TIP Suggestions and recommendations to simplify carrying out tasks and actions.
	ATTENTION A remark with additional information for the user. A remark brings possible problems to the user's attention.
	CAUTION Procedures, if not carried out with the necessary caution, could damage the product, the workshop or the environment.
	WARNING Procedures which, if not carried out with the necessary caution, may damage the product or cause serious personal injury.
	CAUTION Denotes risk of electric shock.

Text indicators

Listings indicated by "-" (hyphen) concern enumerations. Listings indicated by "•" (bullet point) describe steps to perform.

Product indications / Abbreviations

<u>Product type:</u>	<u>Equals to:</u>
- ControlPro/Panel	Panel
- ControlPro/HMI	HMI ¹
- Control/SlaveBoard	SlaveBoard
- MDB PRO	MDB
- SCS PRO	SCS
- MultiDust Bank	MDB

1 INTRODUCTION

1.1 Identification of the product

The identification plates contain, among other things, the following data:

- product name
- serial number
- supply voltage and frequency
- power consumption

1.2 General description

ControlPro of Plymovent is an intelligent control panel with separate HMI, that is supplied including the required connection cables. This system controls the fan and the compressed air valves of the connected filter system MDB or SCS.

1.2.1 ControlPro + MDB

Fig. 1.1

- A Filter system MDB²
- B SlaveBoard³

1. Human Machine Interface
2. Shown: rear of the filter system
3. Integrated on the rear of each filter module

- C Panel [control panel]
- D HMI
- E Fan control equipment (refer to paragraph 1.3)
- F Extraction fan (refer to paragraph 1.3)

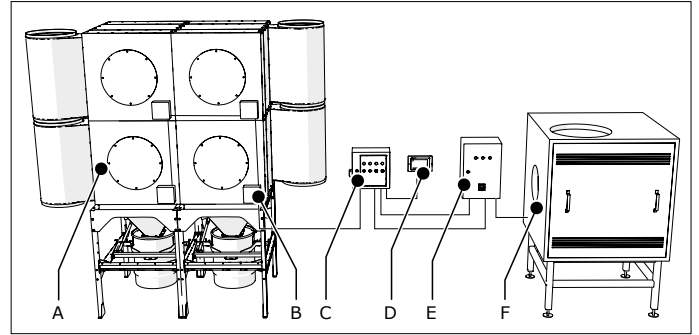


Fig. 1.1 ControlPro + MDB

1.2.2 ControlPro + SCS

Fig. 1.2

- A Filter system SCS
- B Panel [control panel]
- C HMI
- D Fan control equipment (refer to paragraph 1.3)
- E Extraction fan (refer to paragraph 1.3)

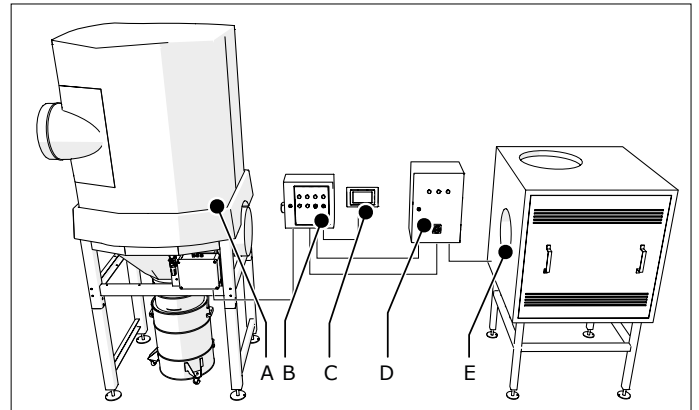


Fig. 1.2 ControlPro + SCS

1.3 Product combinations

1.3.1 Required products

To operate the system, selection of the following products is necessary:

Extraction fan	
- Plymovent SIF (Outdoor)	specific type and motor power depends on the configuration
Mounting frame	
- Plymovent FRAME SIF	specific type depends on the selected extraction fan and configuration
Fan control equipment	
<i>Preferred way:</i>	
- Plymovent VFD/Panel ⁴ (frequency inverter)	to have access to the extensive feature package of ControlPro; specific type depends on the selected extraction fan

<i>Other options:</i>	
- Other type of frequency inverter (third party)	fan start/stop with optional alarm feedback only; optional connection to internal fan pressure sensor
- Star-delta switch	fan start/stop with optional alarm feedback only
- Other type of motor starter	e.g. Direct online (DOL)

1.3.2 SHIELD fire safety solutions⁵

To enhance fire safety of the entire filter/extraction system, you can connect the following components to the Panel:

- ShieldControl | Fire detection panel
- Sliding valves | Pneumatic shut-off sliding valves in the extraction duct that close automatically in case of fire
- 3/2 solenoid valve | Release valve

1.4 Options and accessories

The following products can be obtained as an option and/or accessory:

- Panel → HMI cable 60 m/197 ft (instead of standard length 15 or 30 m)
- LightTower
- PT-1000 or PT-2500 | External pressure sensor
- Dustbin level indication⁶ (switch or sensor)

1.5 Technical specifications

1.5.1 ControlPro/Panel

Dimensions	refer to Fig. I on page 19
Weight	11 kg (24 lbs.)
Material of housing	sheet metal
Protection class	IP 65
Input voltage	100-240 VAC, 50-60Hz
Internal operating voltage	24 VDC
Power consumption	max. 60 W
Inputs	8x digital input (10 mA wetting current) 3x analogue input (4-20 mA)
Outputs	2x relay output (max. 30 VDC, 2,5 A) 2x output "low-side switch" (24 VDC, 2,5 A) 1x output "low-side switch" (24 VDC, 250 mA) 4x output "low-side switch" (24 VDC, 30 mA) 1x analogue output (4-20 mA)
Internal connectors	2x CAN + power (ControlPro/HMI & Control/SlaveBoard) 1x RS-485 (Modbus) to frequency inverter (19200,8N1) 1x USB 2.0 (host only, USB A receptacle) 1x ethernet (for service purposes) 1x RS-232 (for service purposes)
Internal pressure sensors	2x integrated pressure sensor Working range: 0-4000 Pa (0-16 in. WG)

4. Full integration of communication between the HMI and the Plymovent VFD/ Panel (frequency inverter) through an RS-485 cable. Including main switch to de-energize the entire filter system, thus complying with CE safety requirements.

5. Only in combination with the MDB; not suitable for the SCS. SHIELD is a safety system that consists of components for fire prevention, detection and suppression.

6. Future development

Guidelines & standards	EMC 2014/30 EU	LVD 2014/35 EU
	EN 61000-6-2	IEC 60204-1
	EN 61000-6-4	IEC 61131-2 IEC 61439-1
Approvals & certificates	CE cULus (UL 508A)	

1.5.2 ControlPro/HMI

Dimensions	255 x 165 x 125 mm (10.0 x 6.5 x 4.9 in.)	
Weight	900 g (2 lbs.)	
Material of housing	PC/ABS	
- flammability standard	- UL94 V-0	
Operating voltage	24 VDC (+/- 15%)	
Power consumption	- display off: nom. 4 W - display on: max. 5 W	
External connectors	- CAN + power (connection to Panel) [M12-5p shielded connector] - USB 2.0 (host only) [USB A receptacle, with dust cap] - ethernet 10/100 Mbit/s [RJ45, shielded, with dust cap]	
Display:		
- size	- 7"	
- type	- resistive touch screen	
- brightness	- 300 cd/m ²	
- colour	- 262K	
- resolution	- 800 x 480 pixels	
Guidelines & standards	EMC 2014/30 EU	LVD 2014/35 EU
	EN 61000-6-2	IEC 60204-1
	EN 61000-6-4	
Approvals & certificates	CE	

1.5.3 Control/SlaveBoard

Operating voltage	24 VDC (+/- 15%)	
Current	max. 2,5 A	
Internal connectors	2x CAN + power (max. 24 VDC, 2,5A)	
Guidelines & standards	EMC 2014/30 EU	LVD 2014/35 EU
	EN 61000-6-2	IEC 60204-1
	EN 61000-6-4	
Approvals & certificates	CE	

1.6 Ambient conditions



1.6.1 ControlPro/Panel

Ambient temperature:	Pressure sensors:		
	internal	external	
	- min.	0°C (32°F)	-20°C (-4°F)
	- nom.	+20°C (68°F)	+20°C (68°F)
- max.	+50°C (122°F)	+50°C (158°F)	
Max. relative humidity	80%		
Suitable for outdoor use	yes		

1.6.2 ControlPro/HMI

Ambient temperature:	0°C (32°F)
	+20°C (68°F)
	+50°C (122°F)
Max. relative humidity	80%
Suitable for outdoor use	no

1.6.3 Control/SlaveBoard

The ambient conditions of the MDB or SCS filter system apply.

2 PRODUCT DESCRIPTION

2.1 Components

The product consists of the following main components and elements:

2.1.1 ControlPro/Panel

Fig. 2.1

- A Housing
- B Control panel
- C Main switch
- D Power supply
- E PC board (master board)
- F Bottom plate with cable glands

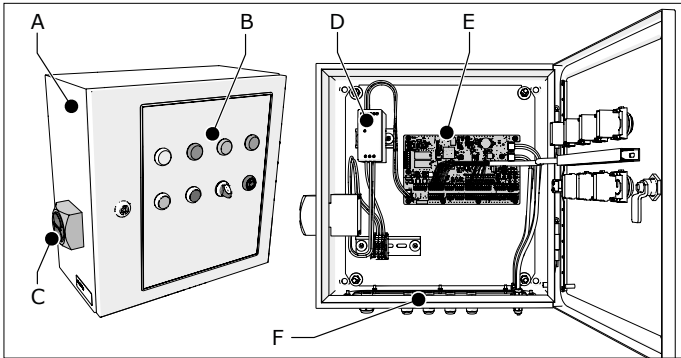


Fig. 2.1 Main components Panel

2.1.2 ControlPro/HMI

Fig. 2.2

- A Touch screen
- B Mounting bracket

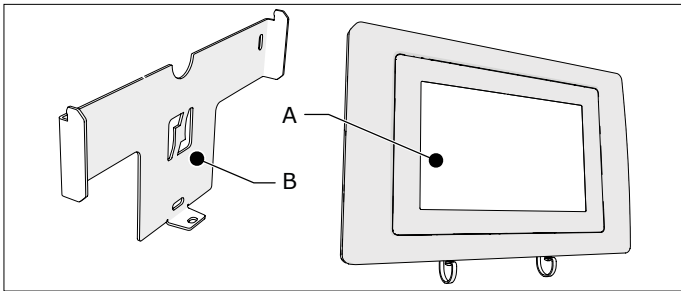


Fig. 2.2 Main components HMI

2.1.3 Control/SlaveBoard

Fig. 2.3

- A Box
- B PC board (slave board)

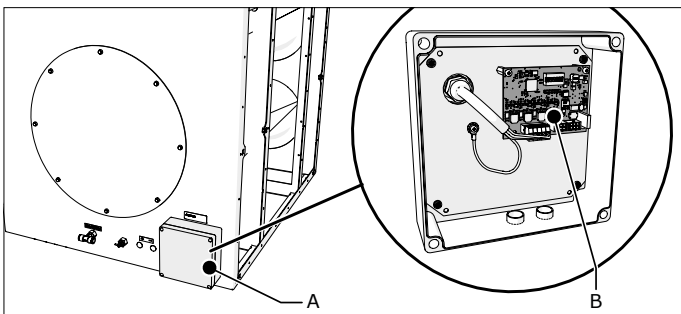


Fig. 2.3 Main components SlaveBoard

2.1.4 Connection cables

Set of cables to connect the Panel to the HMI and SlaveBoard(s).

2.2 Operation

ControlPro is an intelligent platform that controls a filter system MDB or SCS and the connected extraction fan. It contains an extensive feature package to monitor and arrange the RamAir™ pulse amplifier (filter cleaning system), the required airflow and the corresponding fan speed. By means of the user-friendly HMI you can program all desired parameters. The HMI gives a clear insight into the system status and performance at all times.

ControlPro allows for remote access via a network connection.

Fig. 1.1 and Fig. 1.2 show the connection of the components of ControlPro with the filter system and extraction fan.

3 SAFETY INSTRUCTIONS

General

The ControlPro is delivered as part of a filter system MDB or SCS of Plymovent. The safety instructions written in the related manuals apply to the ControlPro as well.



Intended use⁷

The product has been designed exclusively as control equipment for use with a filter system type MDB or SCS of Plymovent with the connected extraction fan. Using the product for other purposes is considered contrary to its intended use. The manufacturer accepts no liability for any damage or injury resulting from such use. The product has been built in accordance with state-of-the-art standards and recognised safety regulations. Only use this product when in technically perfect condition in accordance with its intended use and the instructions explained in the user manual.

4 INSTALLATION

4.1 Tools and requirements

You need the following tools to install the products:

- basic tools
- tools for electrical connections⁸



4.1.1 To be sourced locally

Mounting material⁹:

- to install the Panel to the wall (hardware max. Ø 10 mm)
- to install the HMI to the wall (head height of screws max. 6 mm, Ø max. 4 mm)



Connection cables¹⁰:

- refer to Table I on page 21 (#4 to 22) for the cable specifications

If necessary:

- additional cable glands M16

7. "Intended use" as explained in EN-ISO 12100-1 is the use for which the technical product is suited as specified by the manufacturer, inclusive of his directions in the sales brochure. In case of doubt it is the use which can be deduced from the construction, the model and the function of the technical product which is considered normal use. Operating the machine within the limits of its intended use also involves observing the instructions in the user manual.

8. E.g. heat gun, cable stripping tool

9. The type of mounting material depends on the wall type

10. Number and type of cables depend on the selected options and control equipment

Optional (for remote access to HMI via network):
 - ethernet cable, min. CAT 5E shielded

4.2 Unpacking

Make sure that the product is complete. The package contains:



4.2.1 ControlPro/Panel

- Panel (control panel)
- double-bit key
- mounting bracket (4), incl. mounting material
- pneumatic hoses, incl. mounting material:
 - 2x10 m (for filter pressure)
 - 10+1 m (for fan pressure)
- installation manual
- electrical diagram
- UL compliance sticker¹¹

4.2.2 ControlPro/HMI

- HMI, incl. bracket and locking screw
- ethernet field connector (IP 67)

4.2.3 Connection cables¹²

Fig. 4.1

- A Panel → HMI cable, incl. heat shrinking tubes
- B Panel → SlaveBoard cable¹³, incl. cable gland, termination plug and heat shrinking tubes
- C SlaveBoard → SlaveBoard cable¹², incl. cable glands

In case of a frequency inverter Plymovent VFD/Panel:

- D RS-485 cable¹⁴ (to be ordered separately)

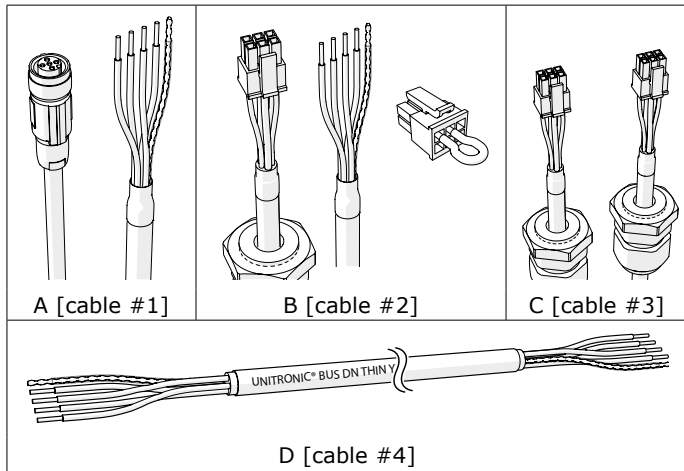


Fig. 4.1 Connection cables

4.3 Mounting



ATTENTION
Do not expose any component of ControlPro to vibrations or heat radiation.

You must install the Panel and HMI at a clearly visible and accessible position.

4.3.1 ControlPro/Panel

To install the Panel, do the following.

Fig. 4.2

- Attach the mounting brackets (A) to the Panel with the supplied mounting material (B).
- Install the Panel to the wall. Make sure that it is level.

ATTENTION
Before you install the Panel, make sure that the wall is strong enough. Refer to paragraph 1.5.1 for the weight.

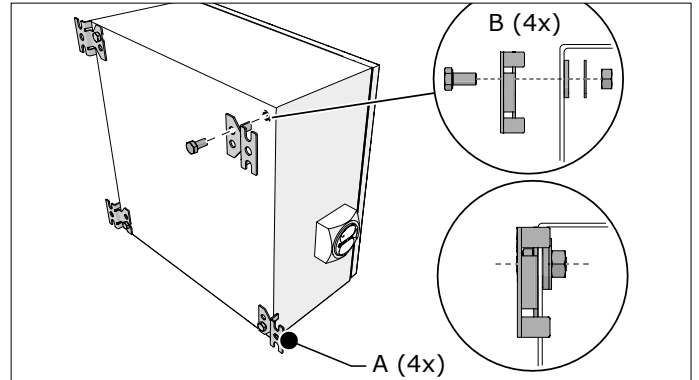


Fig. 4.2 Mounting of the Panel

Fig. 4.3

North America only:

- To comply with UL standard 508A, put the corresponding sticker on the Panel.

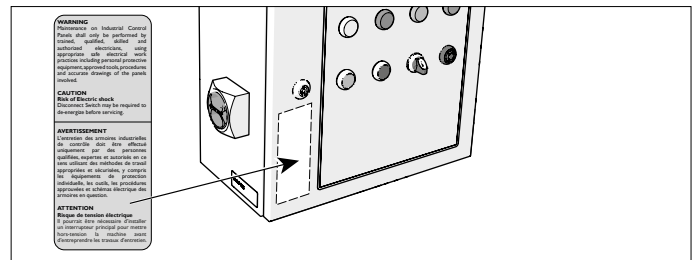


Fig. 4.3 UL compliance sticker

The bottom plate contains the following cable glands and connectors:

Fig. 4.4

- A metal cable gland M20 for the mains cord
- B universal cable glands M16 (8)
- C bulkhead connectors (4) for the pressure tubes¹⁵

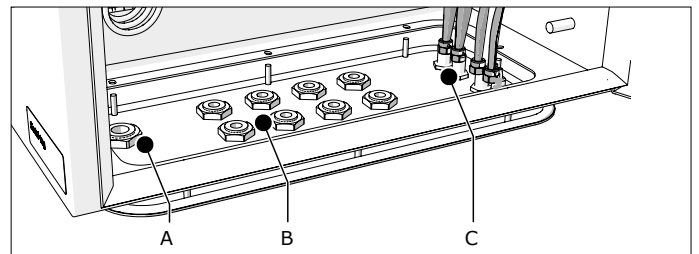


Fig. 4.4 Bottom plate

Table I on page 21 gives an overview of the necessary and optional cables that you need to install the system.

- Depending on the selected options and control equipment, determine the number and type of cables that you need.

11. For use in North America

12. The packages contain mounting material for the cables as well; refer to paragraph 4.4.4 and 4.4.5

13. MDB only

14. To be ordered separately (due to variable length)

15. Fan pressure + and - | Filter pressure + and -

If the number exceeds 8 cables (excluding the mains cord), you must install additional cable glands. In that case, do the following.

Fig. 4.5

- Loosen the pneumatic hoses (B) from the bulkhead connectors from the inside of the Panel.
- Loosen and remove the bottom plate (C+D).
- Open the necessary number of knock-out holes¹⁶ (A).
- Put additional cable glands M16 (E) in the bottom plate and tighten them.
- Install the bottom plate.
- Fasten the pneumatic hoses to the bulkhead connectors.

	WARNING You must remove the bottom plate to put additional cable glands to avoid damage to the interior parts of the Panel.
--	---

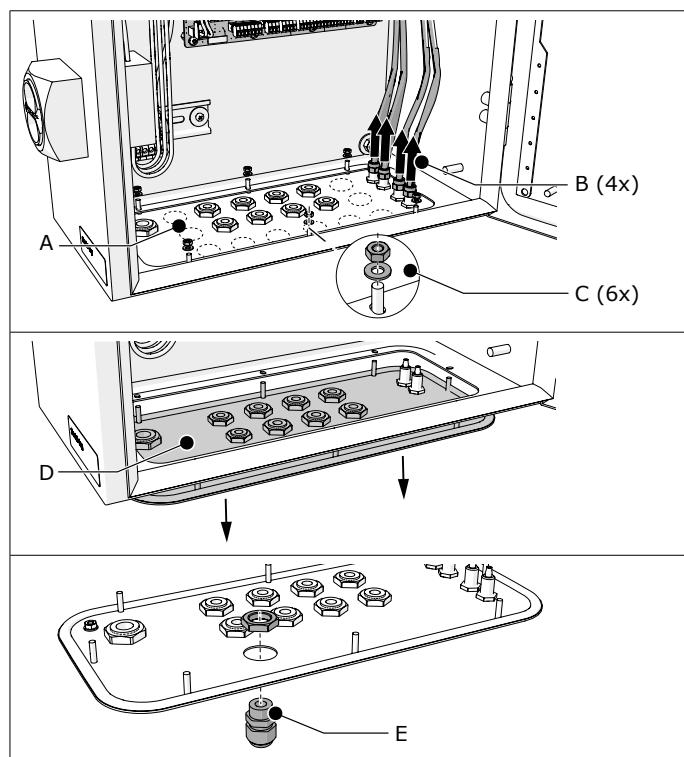


Fig. 4.5 Additional cable glands (optional)

4.3.2 ControlPro/HMI

To install the HMI, do the following.

Fig. 4.6

- Loosen the locking screw (C) and the HMI (B) from the bracket (A).
- Install the bracket to the wall. Use all 3 mounting points and make sure that it is level.
- Put the HMI on the bracket.

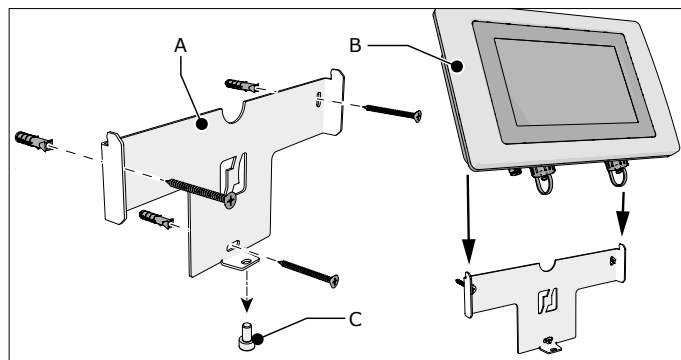


Fig. 4.6 Mounting of the HMI

Fig. 4.7

- Attach the HMI with the locking screw (A).
- Connect the HMI cable (C) to the CAN connector (B) and tighten it.

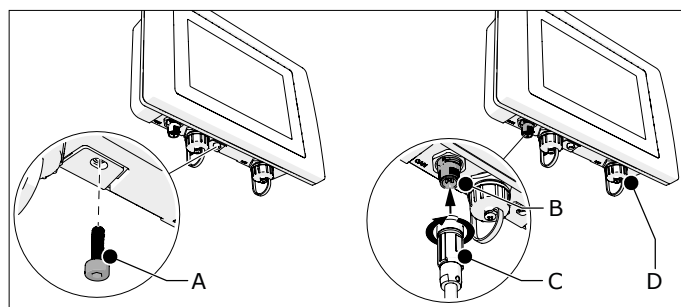


Fig. 4.7 Locking screw and HMI cable

Optional:

Fig. 4.8

- Connect the supplied ethernet field connector (B) to the ethernet cable (A).
- Remove the dust cap (refer to Fig. 4.7D) and put the ethernet cable in the corresponding LAN port.

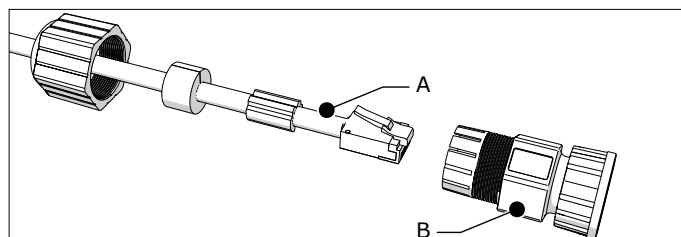


Fig. 4.8 Ethernet field connector

4.4 Electric connection

This chapter describes the electric connection of all necessary and optional components to the Panel.



Depending on the specific configuration of the filter system, some of the connections on the PC board inside the Panel remain unused. The PC board contains detachable screw terminal blocks ("connectors").


Table I on page 21 gives an overview of the necessary and optional cables¹⁷ that you need to install the system.

16. Max. 10

17. Recommended cable specifications; use cables with a max. wire diameter 1,5 mm² (AWG 16)

WARNING

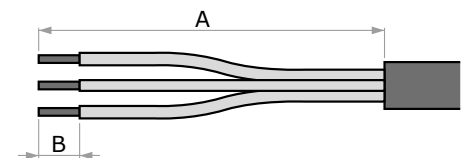
- Shorten excessive cable lengths. A coil or bundle of cables can cause electromagnetic interference.
- Make sure that you connect the wiring in the correct way. Wrong wiring may cause permanent damage to the PC board.
- Use cable glands to insert cables into the Panel.
- Keep the blanking plugs on the cable glands that are not in use to avoid pollution of the Panel.

 For all connections, also refer to the separately supplied electrical diagram.

- Refer to Table II on page 21 for a specification of the digital inputs (high/low).

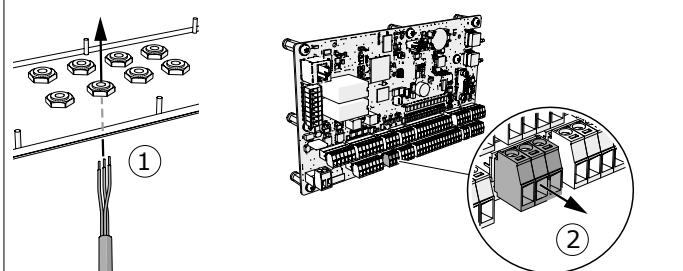
General instructions to connect a cable to a certain connector (unless otherwise stated)

Wire stripping:

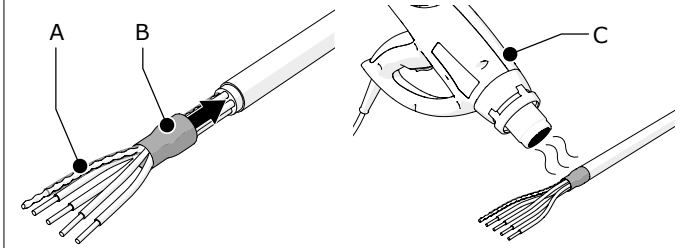


	mm	in.
A	50	2
B	6	¼

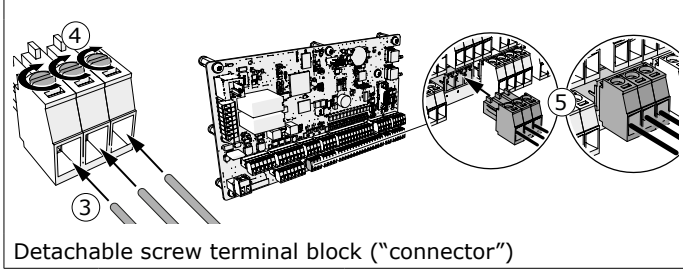
- (1) Put the cable through a cable gland M16 into the Panel.
- (2) Carefully remove the connector from the PC board. Pull the connector in a *horizontal* direction.
- Cut the cable to the correct length and strip the wires.



- Shielded cables only:
- Put a shrink tube on the drain wire (A) and the cable jacket (B).
 - Use a heat gun (C) to tighten the shrink tube.



- All cables:
- (3) Put the wires into the connector.
 - (4) Tighten the screws.
 - (5) Put the connector back on the PC board.
 - Tighten the cable gland.



4.4.1 Mains cord (cable #5)

To install the mains cord, do the following.

CAUTION
High voltage connection

Fig. 4.9

- Put the mains cord (B) through the metal cable gland¹⁸ (C) into the Panel.
- Connect the mains cable to the terminal block (A).
- Tighten the cable gland.

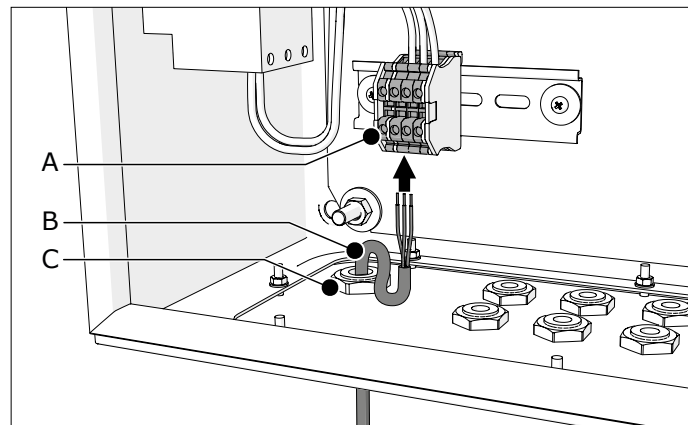
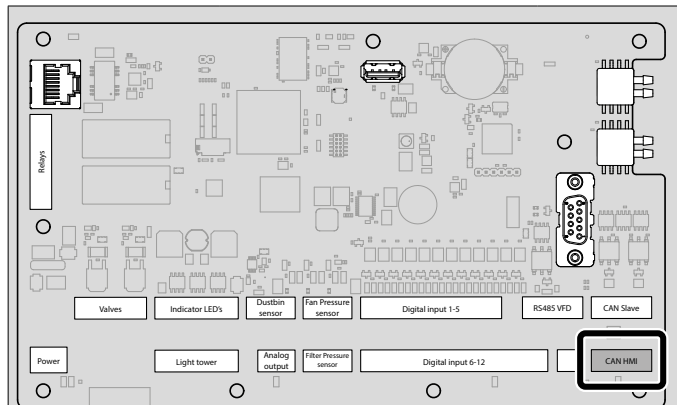


Fig. 4.9 Mains cord

4.4.2 Panel → HMI



Cable #1

CAN HMI				
1	2	3	4	5
+ 24V	CAN_H	CAN_L	GND	SHD

Wiring colours
 +24V red
 CAN_H white
 CAN_L blue
 GND black
 SHD drain wire (with shrink tube)


 [page 7]

Fig. 4.10 Connection Panel → HMI

4.4.3 Fan control

Depending on the selected fan control equipment, you can connect the fan in two different ways:

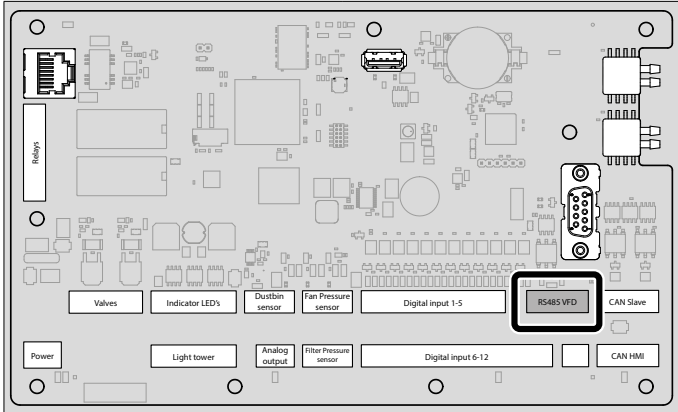
- Plymovent VFD/Panel (frequency inverter) by RS-485 cable
- direct fan start by conventional cables

Connect the selected fan control equipment in accordance with the instructions below.

18. Size M20

In case of:

Plymovent VFD/Panel (frequency inverter¹⁹)



Cable #4

(supplied with the VFD/Panel)

RS485 VFD				
1	2	3	4	5
A	B	GND	SHD	



[page 7]

Fig. 4.11 Connection of Plymovent VFD/Panel

- Connect the other end of the cable to the frequency inverter:
 - CAN-A to terminal 68
 - CAN-B to terminal 69
 - GND to terminal 61
- Make sure that switch S801 (BUS TER.) is set to 'on' to enable termination on the RS-485 port.



ATTENTION

To avoid earth loops, do **not** connect the shield of the RS-485 cable to the frequency inverter.



For more information about the Plymovent VFD/Panel, refer to the Danfoss documentation that is supplied with the product.

In case of:

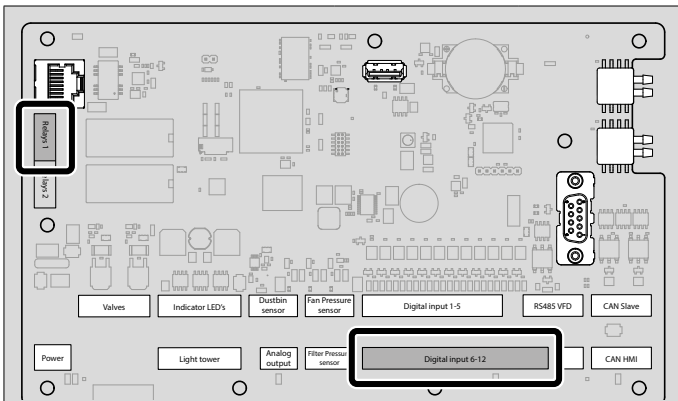
Direct fan start

Types of control equipment for direct fan start:

- other type of frequency inverter (third party)
- star-delta switch
- other type of motor starter, e.g. Direct online (DOL)

Connections/functionalities:

- relay output (potential-free contact) for start/stop signal²⁰
- alarm input; high input triggers the "Fan alarm"



19. Danfoss

20. Max. 30V, 2,5A

Cable #19

NO 1	1	Relay 1
NC 1	2	
COM 1	3	
	4	



[page 7]

Digital input 6-12															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
+24V	IN 6	+24V	IN 7	+24V	IN 8	+24V	IN 9	+24V	IN 10	+24V	IN 11	+24V	IN 12	COM2	GND

input IN 9

Fig. 4.12 Connection of direct fan start

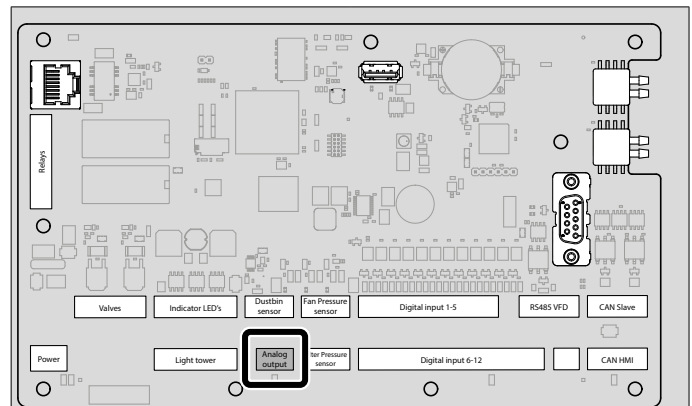
Additional functionality for frequency inverter:

- optional connection to the internal fan pressure sensor²¹



ATTENTION

Analogue output: 4-20 mA
Pressure range: 0-4000 Pa



Cable #15

Analog output		
1	2	3
OUT	GND	SHD



[page 7]

Fig. 4.13 Connection to internal fan pressure sensor



If you do not connect the frequency inverter to the internal fan pressure sensor, you must install and connect an external pressure sensor (e.g. PT-1000 or PT-2500); refer to paragraph 4.4.11.

4.4.4 Panel → SlaveBoard (MDB only)

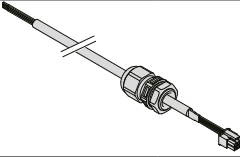
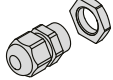
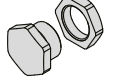


In case of an SCS:

- Proceed with paragraph 4.4.7

The SlaveBoard is integrated on the rear of each filter module MDB-BM/2 and MDB-BM/4 (refer to Fig. II on page 19).

Cable #2 is supplied with a cable gland for connection to the SlaveBoard box. You need the other parts in this kit to complete the installation (see text in italics for an explanation).

21. Instead of an external pressure sensor (e.g. PT-1000 or PT-2500)

Scope of supply	Cable #2
	Cable Panel → SlaveBoard, incl. cable gland
 3x	Cable gland M16 + nut For installation of the pneumatic hoses (filter pressure sensor); refer to par. 4.5
	Screw plug + nut M20 For installation on the last filter module
	Heat shrink tube 50 mm + 30 mm Refer to "Shielded cables only:" on page 7
	Termination plug Refer to Fig. 4.16B on page 10

Each SlaveBoard box contains two blind plugs and two disposable cover caps on the sides. The final position of the blind plugs depends on the connection sequence of the SlaveBoards.

- Connect the cable to the SlaveBoard first. Then cut the cable to the necessary length.
- Start to connect the filter module that is closest to the Panel.
- Refer to Fig. IV on page 19 for an example of the correct connection sequence.

Fig. 4.14

- Remove the lid (A) of the SlaveBoard box.
- Remove the two cover caps (E).
- If necessary, change the position of the blind plug(s).
- Loosen the cable gland (C) from the cable and remove the nut.
- Put the cable into the SlaveBoard and put the nut (B) back over the cable.
- Connect the cable to the CAN IN connector (D) on the PC board.
- Tighten the cable gland.

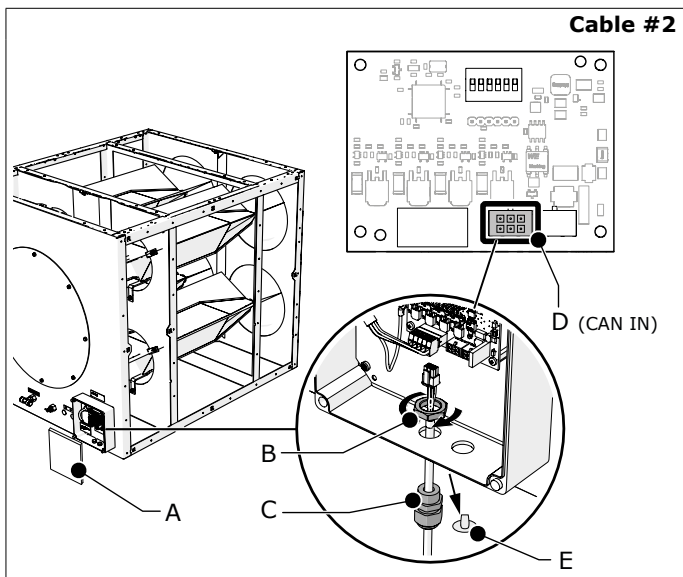


Fig. 4.14 Connection of SlaveBoard

Fig. 4.15

- Cut the cable to the necessary length for connection to the Panel.

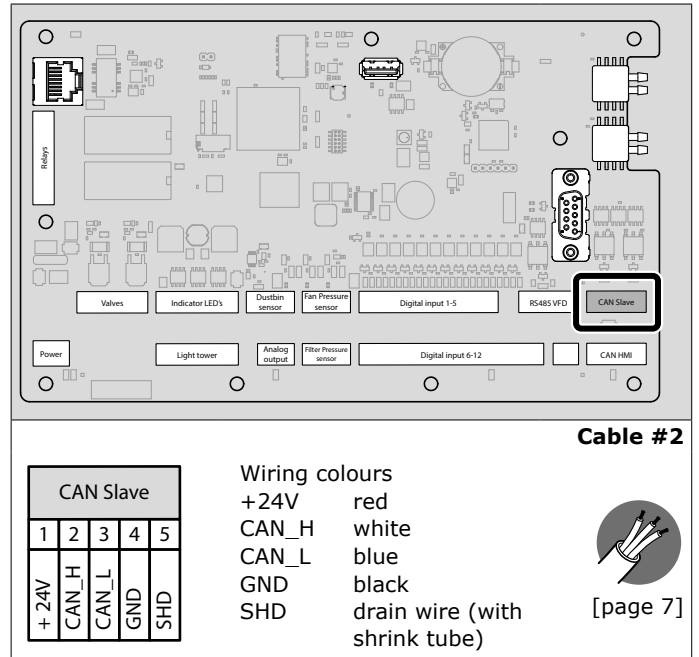


Fig. 4.15 Connection of SlaveBoard → Panel

In case of multiple filter modules

- Proceed with paragraph 4.4.5

In case of one (1) filter module

Fig. 4.16

- Put the termination plug²² (B) on the CAN OUT connector on the PC board.

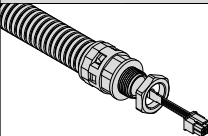

Fig. 4.17 + Fig. 4.18²³

- Make sure that the DIP switches are correctly set.
- Close the lid.

4.4.5 SlaveBoard → SlaveBoard


In case of multiple filter modules, you must make a serial connection of the cables.

The number of cables (cable #3) supplied is equal to the number of filter modules, minus 1 (one). Each filter module contains four screw holes for connection of the tube clamps.

Scope of supply	Cable #3
	Cable SlaveBoard → SlaveBoard, including: - conduit - conduit connectors M20 + nuts
 2x	Tube clamp + screw

22. Supplied with the Panel → SlaveBoard cable (#2)

23. Address configuration pos. 1-4: according to number 1

 - Due to the cable length, you can only make horizontal and vertical connections. It is *not* possible to make diagonal connections.

- Refer to Fig. IV on page 19 for an example of the correct connection sequence.

- In case of an installation with one or more MDB-BM/2 filter modules, you have one shorter cable.

- For the position of the CAN IN and CAN OUT connectors, refer to Fig. III on page 19.

Fig. 4.16

- Remove the lids of all SlaveBoards.
- Remove the cover caps²⁴ from the sides.
- If necessary, change the position of the blind plug(s).
- Install 2 tube clamps per cable in the screw holes (A) of each filter module²⁵. Fasten them with a screw.

To install the conduit – including cable – between two SlaveBoard boxes:

- Remove the nuts of the conduit connectors.
- Put the cable ends through the openings of the SlaveBoard boxes that you want to connect.
- Put the nuts over the cable ends and fasten them to the conduit connectors (C).
- Click the conduit in the tube clamps.
- Connect a cable to the CAN OUT connector of the first filter module.
- Connect the other end of the cable to the CAN IN connector of the next filter module.
- Continue the same way to connect all SlaveBoards.
- Put the termination plug²⁶ (A) on the CAN OUT connector of the last filter module.
- Put a screw plug in the opening of the last SlaveBoard box and tighten it with the nut M20²⁷.

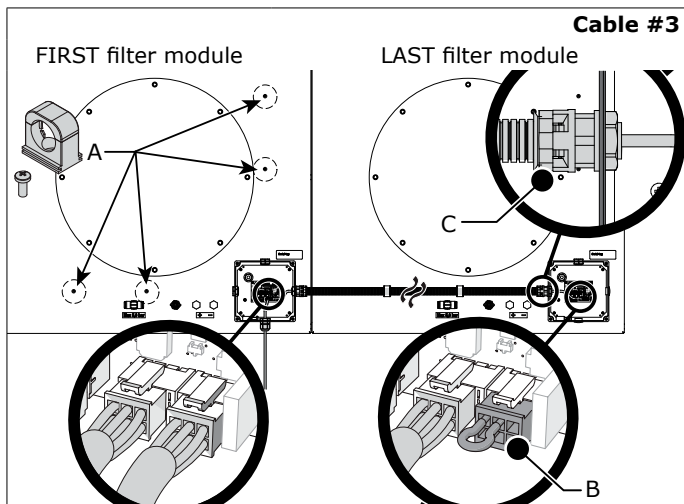


Fig. 4.16 SlaveBoard → SlaveBoard

Address SlaveBoards

To arrange the compressed air valves of the entire filter system to pulse in the most effective sequence, you must configure the DIP switches of each individual filter module.

24. 2 per SlaveBoard

25. 1 tube clamp in case of a filter module MDB-BM/2

26. Supplied with Panel → SlaveBoard cable (#2)

27. Both supplied with Panel → SlaveBoard cable (#1)

The DIP switch module²⁸ contains 6 DIP switches. Position 5+6 are pre-configured in the factory.

Fig. 4.17

- Make sure that DIP switches position 5+6 are correctly set.

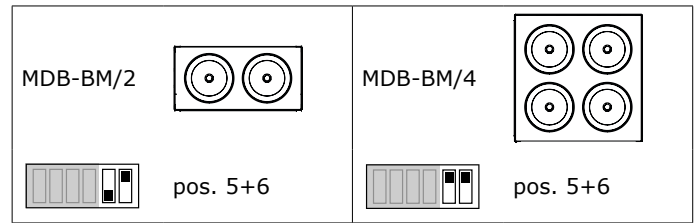



Fig. 4.17 DIP switches position 5+6

Fig. 4.18

- Set the DIP switches 1 to 4 as indicated. It shows the address configurations of max. 16 filter modules (=MDB-64).

 **ATTENTION**
Make sure that you address the filter modules in the correct sequence:

- start with the upper left filter module (1)
- address from left to right
- subsequently from top to bottom

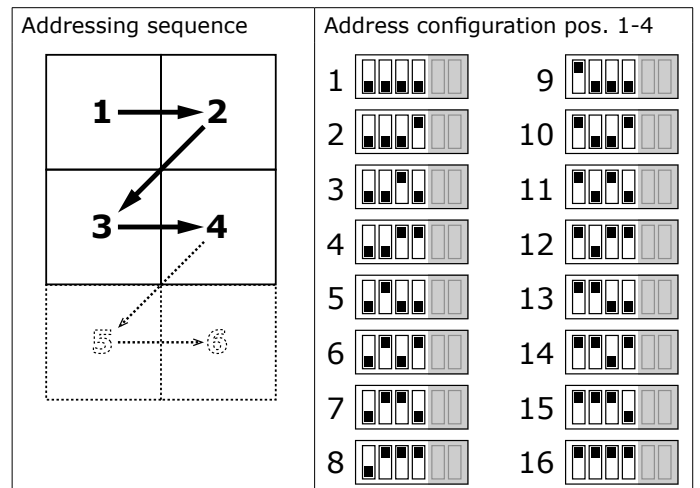


Fig. 4.18 Setting of DIP switches pos. 1 to 4

- Close all lids.

If there is a technical problem with a certain filter module, the HMI shows the specific number. The outside of the lid contains a sticker that helps you to identify each separate filter module.

Fig. 4.19

- Use a black marker to number the filter modules. Make sure that the sequence corresponds with the setting of the DIP switches.

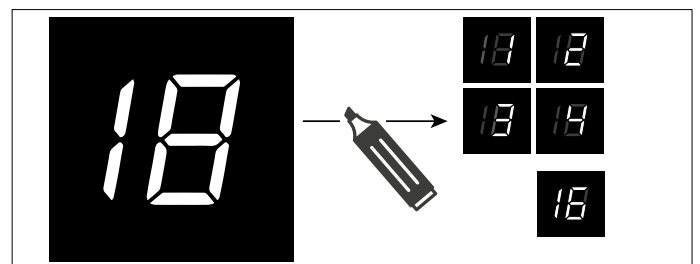


Fig. 4.19 Numbering of the filter modules

28. The red module on the PC board

4.4.6 Compressed air switch MDB

The compressed air switch monitors the availability of compressed air²⁹.

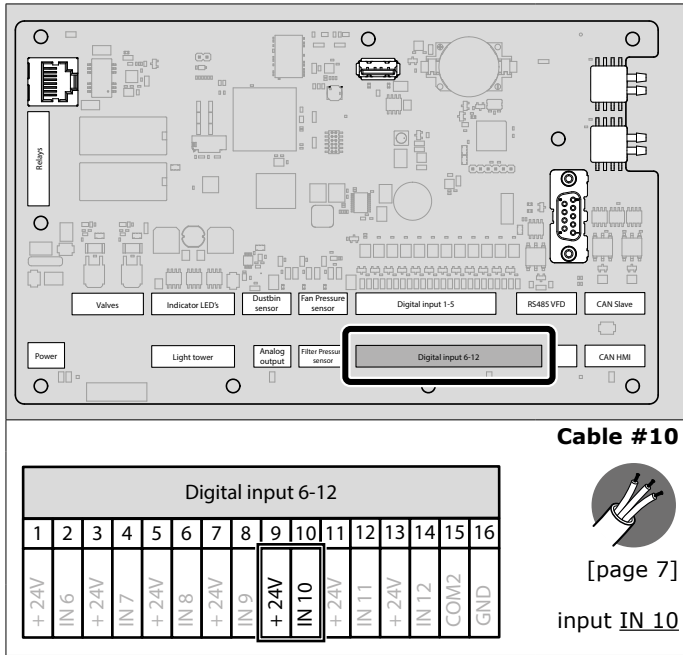


Fig. 4.20 Connection of compressed air switch

- Proceed with paragraph 4.4.8

4.4.7 Control cable

In case of one (1) SCS

Besides the compressed air switch, cable #20 connects the compressed air valve of the SCS as well.

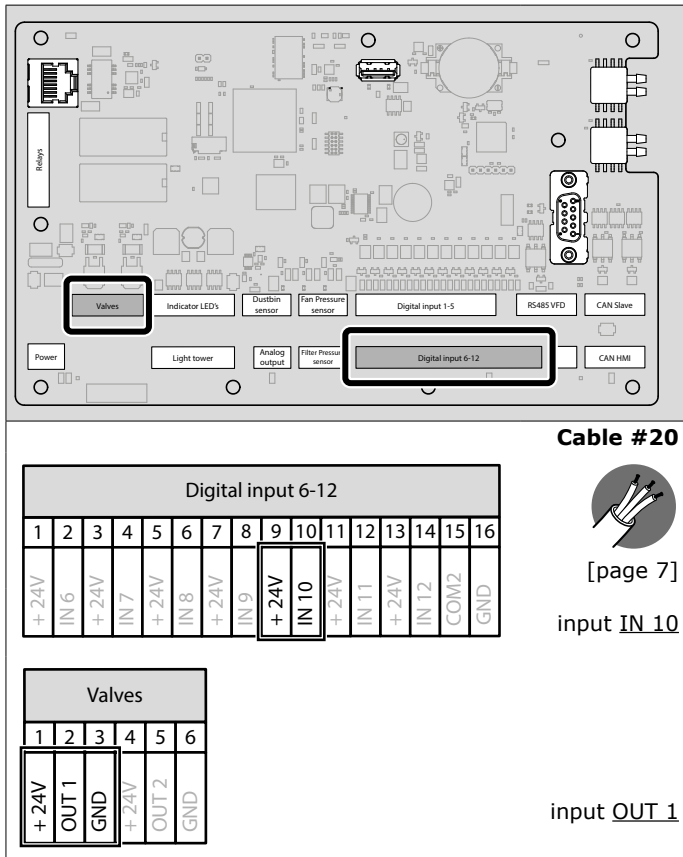


Fig. 4.21 Connection of the control cable

29. The system gives a warning signal when there is no compressed air available

In case of two (2) SCS

In case of two SCS systems, you must connect the second one as a "slave" to the first one ("master").

Fig. 4.21

- Connect the second SCS to output OUT 2.

4.4.8 Input signals (options)

If desired, you can connect the ControlPro to a start/stop signal and/or an alarm signal from an external device³⁰;

- start/stop signal: cable #6
- alarm signal: cable #7

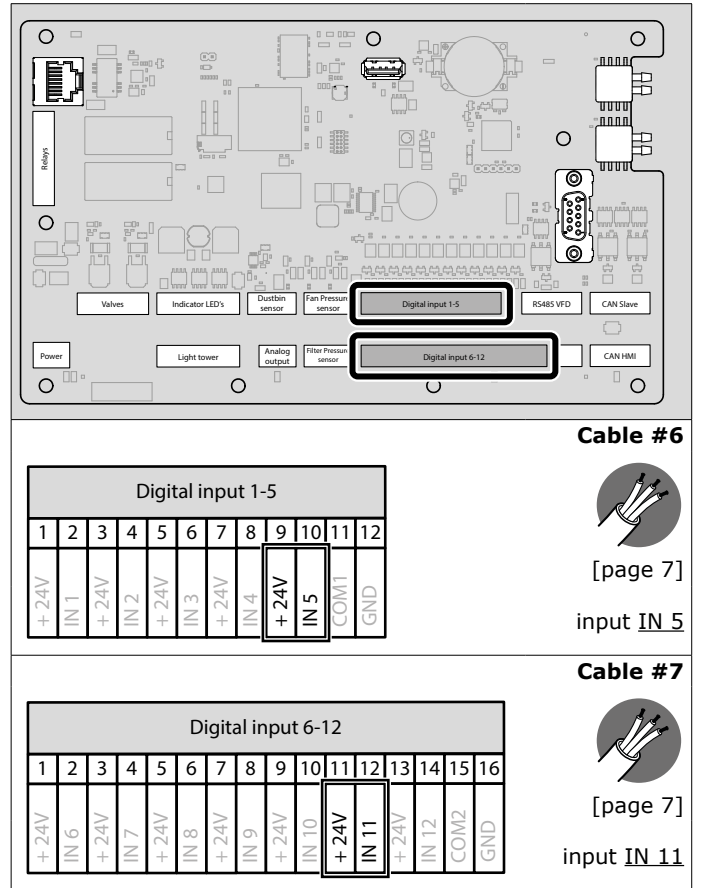


Fig. 4.22 Connection of external input signals

4.4.9 Relay outputs (cable #8 and #9) (options)

Both relay outputs are available for connection to an external device³¹. Possible events to activate the relays are:

- Start/stop fan
- Warning signals: filters clogged / no compressed air / dustbin full
- Alarm signals: motor / sliding valve / extra alarm input




ATTENTION

- If you have not selected a frequency inverter Plymovent VFD/Panel (refer to Fig. 4.12), Relay 1 is reserved for 'Start/stop fan'. In this case only Relay 2 is available.
- You can choose to connect the cables as NO (normally open) or NC (normally closed).
- Max. connection: 30 VDC / 2,5 A per relay.

30. E.g. a welding robot

31. E.g. a roof fan

- If desired, connect Relay 1 and/or Relay 2 to an external device.

 You must select the specific event that you want to activate the relay(s) on the HMI (refer to screen no. 1.4).

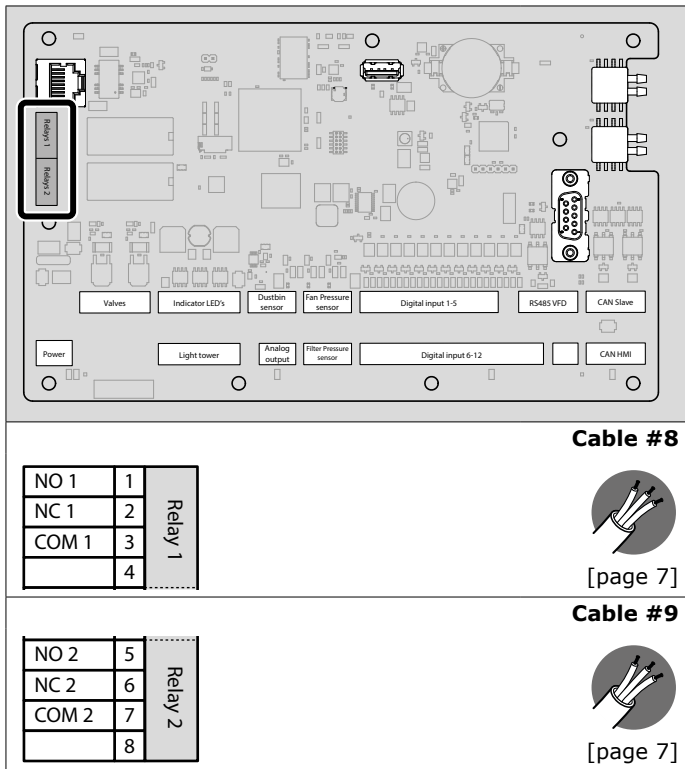


Fig. 4.23 Connection of relay outputs

4.4.10 LightTower (option)

The LightTower contains the same pilot lights as the Panel, including the buzzer.

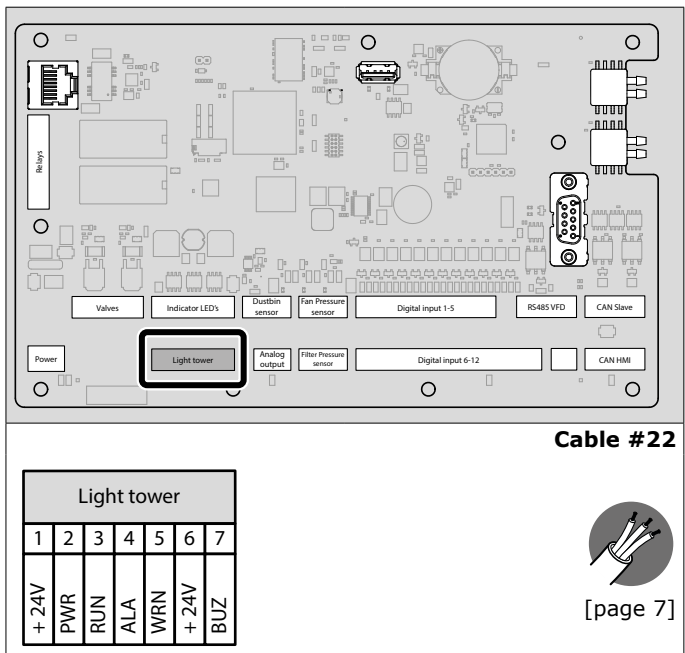



Fig. 4.24 Connection of LightTower

4.4.11 External pressure sensors (options)

The Panel contains two *internal* pressure sensors:

- filter pressure sensor
- fan pressure sensor³²

 For connection of the *internal* pressure sensors, refer to paragraph 4.5.

You must use *external* pressure sensors³³ instead of the internal ones when:

- the distance between the Panel and the filter system MDB or SCS is more than 10 m; and/or
- the Panel is installed outdoor and the temperature may drop below 0°C (32°F)

In all other cases the use of external pressure sensors is optional.

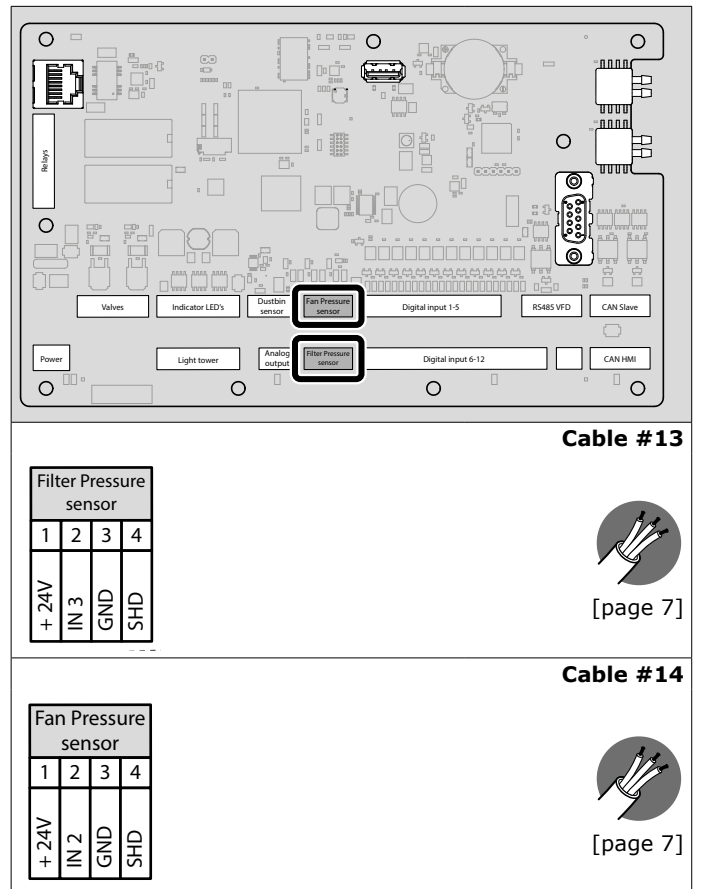


Fig. 4.25 Connection of external pressure sensor(s)

4.4.12 Dustbin level detection³⁴ (option)

There are two types of dustbin level indicators:

- dustbin level switch, that shows the dustbin to be full or empty
- dustbin level sensor, that shows the percentage of filling

In case of a dustbin level switch

Additional instruction:

- Connect the dustbin level switch as NO (normally open)³⁵.

32. In case of Plymovent VFD/Panel

33. Type PT-1000 or PT-2500

34. Future development

35. NO means that the dustbin is empty

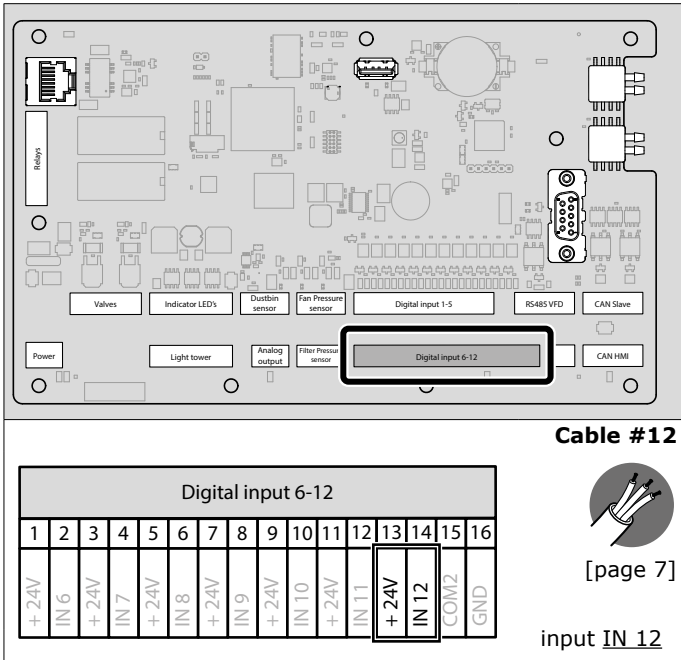


Fig. 4.26 Connection of dustbin level switch

In case of a dustbin level sensor

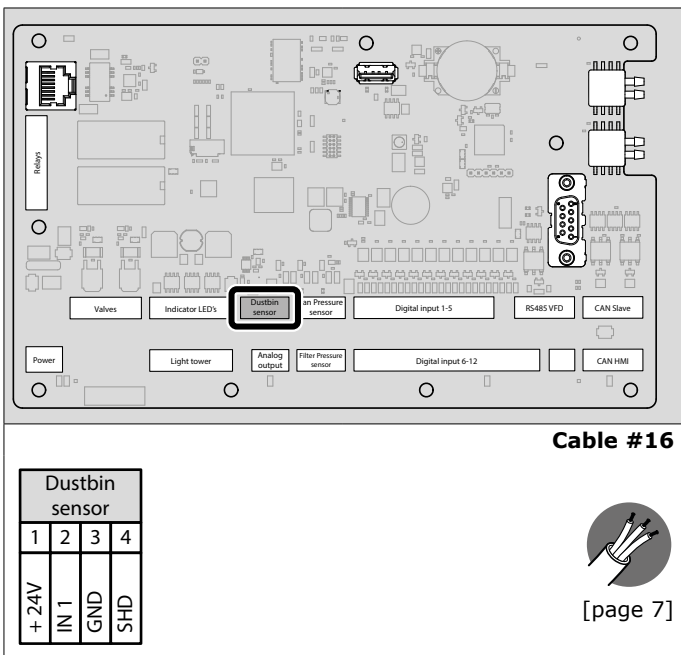


Fig. 4.27 Connection of dustbin level sensor

4.4.13 SHIELD fire safety solutions³⁶ (option)

ControlPro is SHIELD-ready. You must connect the following components to the Panel (refer to paragraph 1.3.2):

- ShieldControl fire detection panel
- sliding valves
- 3/2 solenoid valve

ShieldControl panel

ShieldControl is the fire detection panel of SHIELD fire safety solutions.

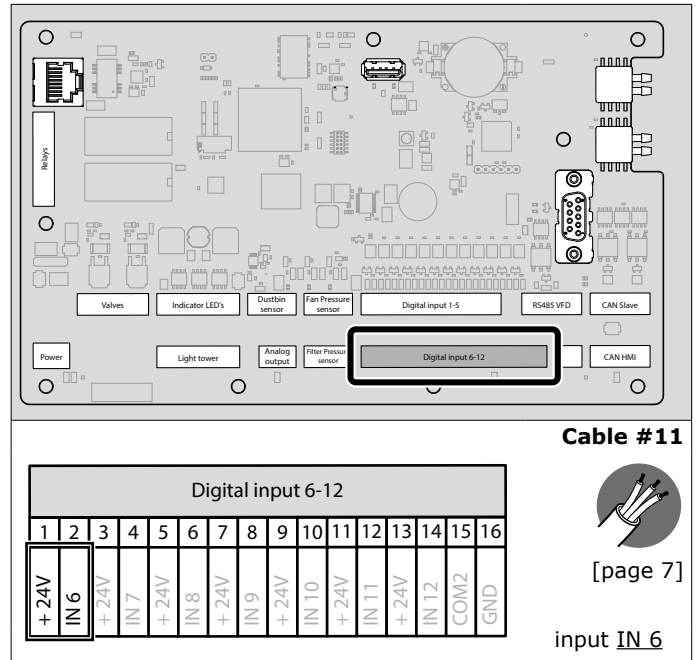
Connection/functionality:

- to send a fire alarm signal from the ShieldControl panel to the ControlPro

36. Only in combination with the MDB; not suitable for the SCS

Additional instruction:

- Remove the wire bridge from input **IN 6**.

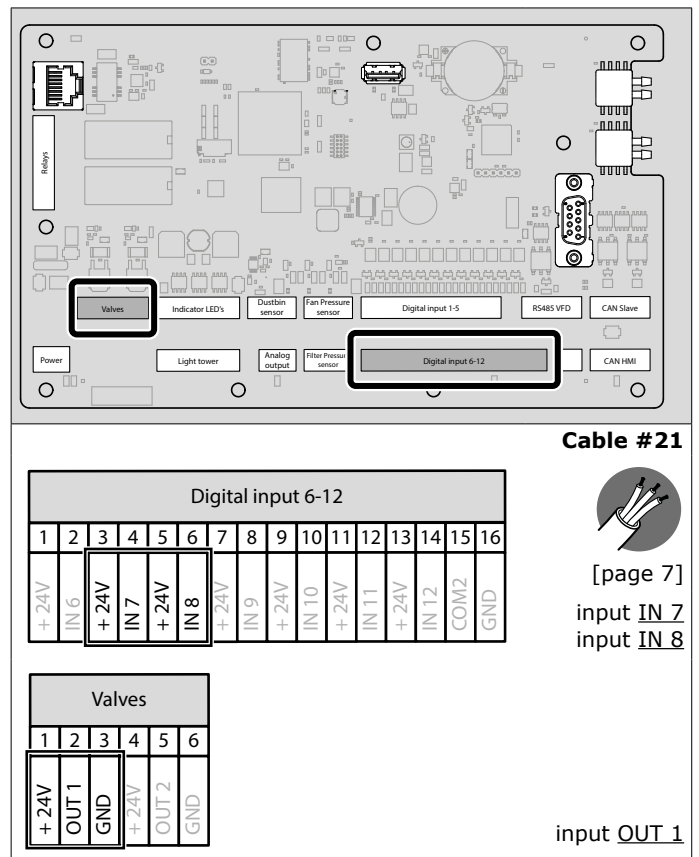


Sliding valves

A SHIELD system contains two sliding valves³⁷ in the connected duct system, that open and close at the same time.

Connections/functionalities:

- output signal to open/close the sliding valves
- feedback signal when the sliding valves are closed



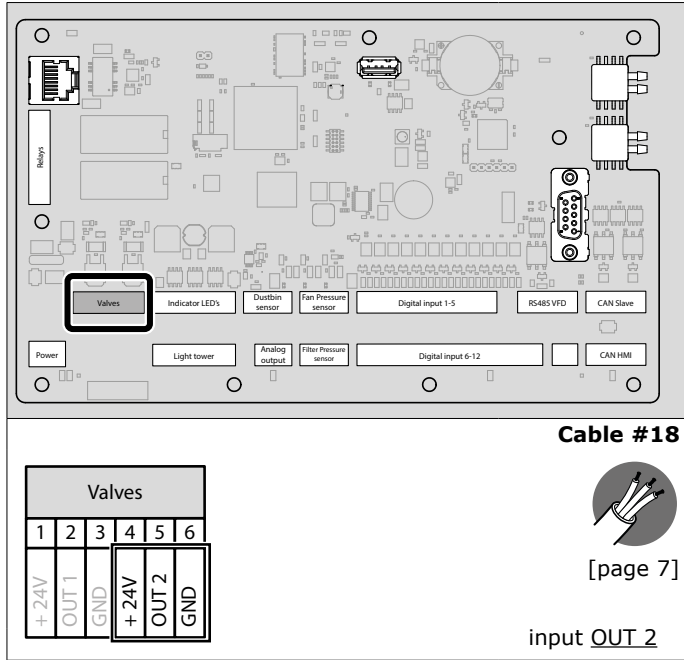
37. One before and one after the filter system

3/2 solenoid valve

Valve to shut off the compressed air supply in case of fire in the extraction/filter system. For enhanced safety it releases the air from the filter's compressed air tank at the same time.

Connection/functionality:

- output signal to shut off the compressed air supply and to release the compressed air tank



4.5 Pneumatic connection

Also refer to paragraph 4.4.11.

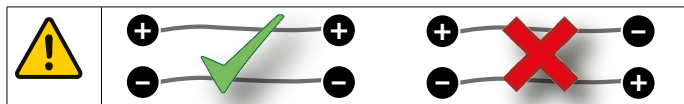
4.5.1 Filter pressure sensor

To monitor the filter pressure, you must connect pneumatic hoses to the internal filter pressure sensor (+ and -).

Fig. 4.32

- Connect the pneumatic hoses + and - to the corresponding bulkhead connectors (B).

You must install the other sides of the pneumatic hoses to the filter system (MDB or SCS). For connection of the hoses you need the cable glands + nuts supplied with the Panel → SlaveBoard cable (#1).



In case of an MDB system:

- Proceed with paragraph 4.5.2

In case of an SCS system:

- Proceed with paragraph 4.5.3

4.5.2 MDB

The filter pressure sensor measures the pressure difference between the filter compartment and the housing of the compressed air tank.

Fig. 4.28

- Remove the cover caps from the + and - (A+B) on the lower filter module.

- Install a cable gland in the + and - connection.

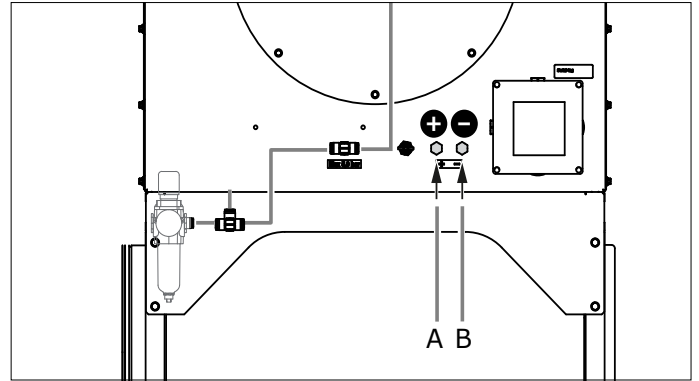


Fig. 4.28 + and - connection

Fig. 4.30

- Remove the filter cap and install another cable gland inside the filter module (+).
- (1) Put a pneumatic hose through the + connection.
- (2) Put the hose through the other cable gland into the filter compartment.
- (3) Put the other hose through the - connection.

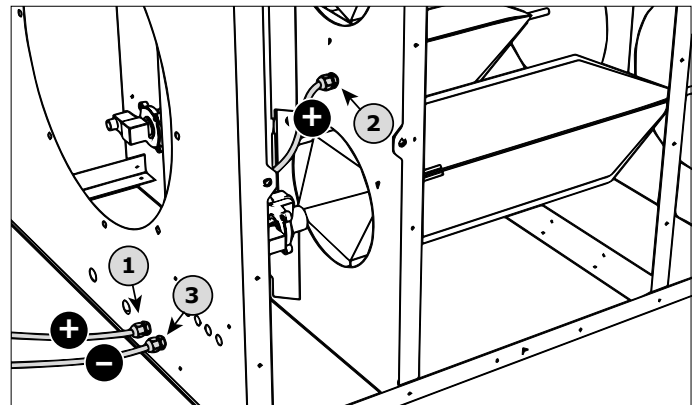


Fig. 4.29 Cable glands and pneumatic hoses

Fig. 4.30

- Make sure to have approx. 25 mm (1 in.) (A+B) hose end.
- Tighten all cable glands.

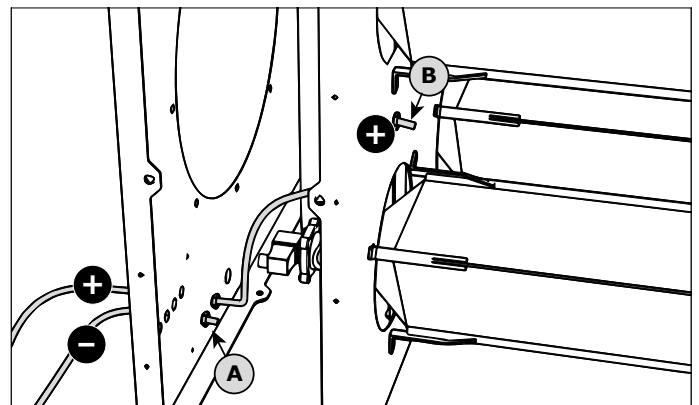


Fig. 4.30 Pneumatic hose ends

4.5.3 SCS

Fig. 4.31

- Connect the two pneumatic hoses to the corresponding + and - (A+B) on the junction box.

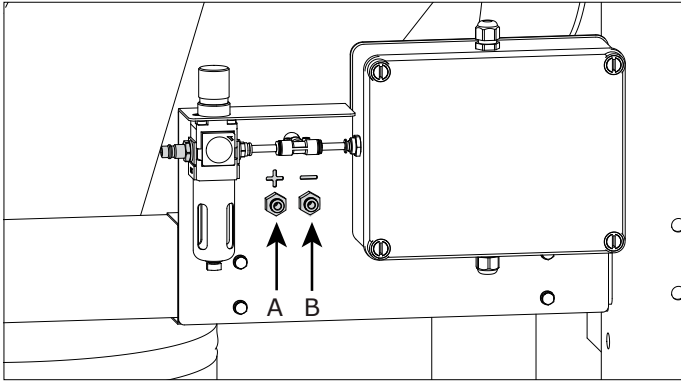


Fig. 4.31 Compressed air connection

4.5.4 Fan pressure sensor

To monitor the fan pressure³⁸, you must connect a pneumatic hose to the internal fan pressure sensor.

You can measure the fan pressure:

- before the filter system; or
- after the fan

This determines the connection of the hose.

Pressure measurement	Pressure	Connection
before the filter system	underpressure	- (minus)
after the fan	overpressure	+ (plus)

Fig. 4.32

- Determine the position of the pressure sensor in the extraction duct (before the filter system or after the fan).
- Connect the pneumatic hose to the corresponding bulkhead connector + or - (A).

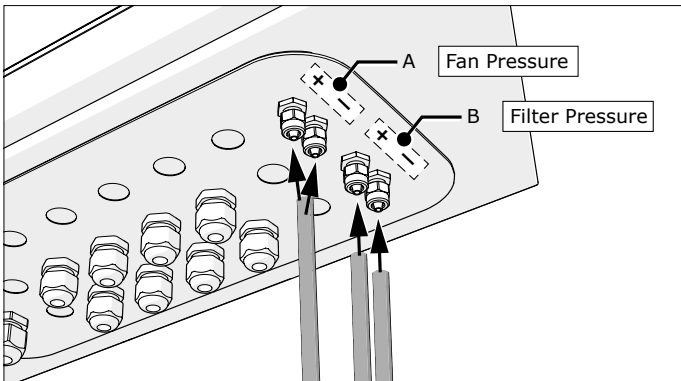


Fig. 4.32 Connection of pneumatic hoses to the Panel

Fig. 4.33

- Drill two holes \varnothing 10 mm (0.4 in.) in the extraction duct at the indicated positions (A+B).
- Connect the pneumatic hose (D) with T-connector (C) to the extraction duct with the supplied connection material.

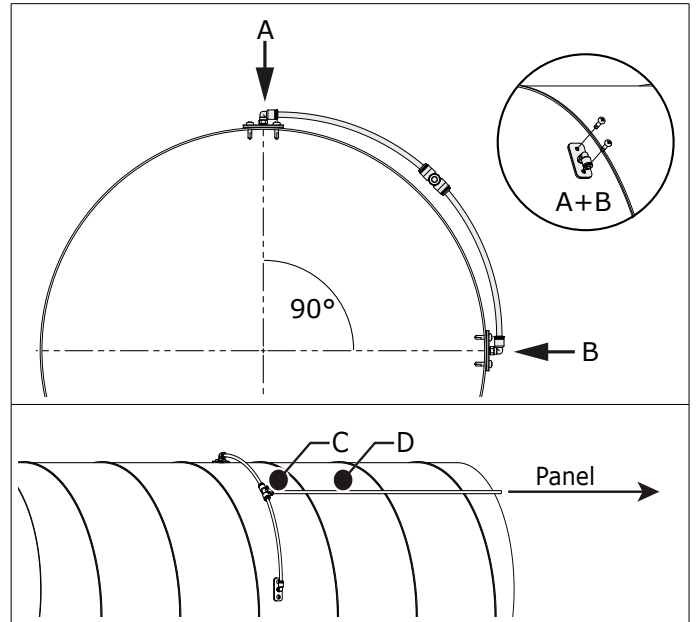


Fig. 4.33 Connection of the pneumatic hose to the extraction duct

5 COMMISSIONING

5.1 General

- Make sure that the Panel is connected to the mains.
- Turn the main switch (refer to Fig. 6.1E) to "on". The system will start up³⁹.
- The HMI starts the installation wizard.
- Complete the installation wizard.



Select the question mark on the touch screen for extensive explanation on all settings.



5.2 Functional tests

5.2.1 Extraction fan

- Push the START/STOP FAN button (refer to Fig. 6.1F) to start the fan.
- Push the button again to stop the fan.

If any problems or errors occur, refer to chapter 8 / Troubleshooting.

6 USE

6.1 Control panel

6.1.1 Panel

The control panel contains the following controls and indicators:

Fig. 6.1 (also refer to Fig. V on page 20)

- A White LED | POWER ON
 - LED off: system is off
 - LED blinking: system is starting up
 - LED on: system is ready

38. In case of Plymovent VFD/Panel or other type of frequency inverter

39. Indication: the white LED on the Panel is blinking

- B Green LED | FAN RUNNING
 - LED off: fan is off
 - LED blinking: fan is ramping down⁴⁰
 - LED on: fan is running
- C Yellow LED | WARNING
 - LED off: no problem
 - LED on⁴¹: refer to the HMI for the cause of the warning
- D Red LED | ALARM
 - LED off: no problem
 - LED on⁴²: refer to the HMI for the cause of the alarm
- E Main switch
- F Green button | START/STOP FAN
- G Black button | FILTER CLEANING
 - to activate an additional filter cleaning cycle
 - to suppress the buzzer (push and hold for 5 seconds)
- H Rotary switch 0-1 | SERVICE MODE
 - 0: normal mode
 - 1: to lock the touch screen of the HMI for service purposes
- I Buzzer | acoustic signal
 - together with the ALARM signal (D)
 - in some cases: together with the WARNING signal (C)

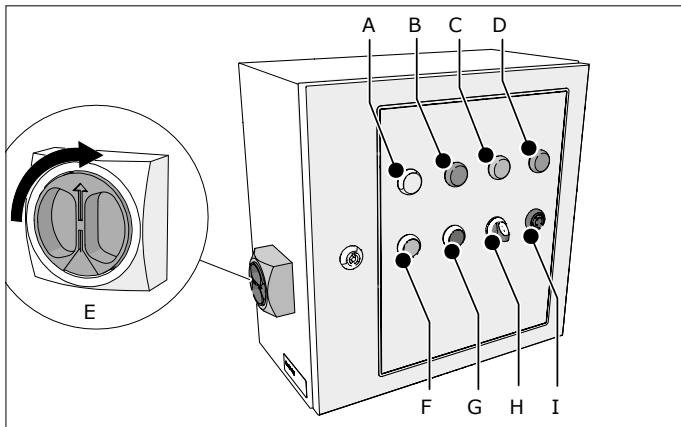


Fig. 6.1 Control panel

6.2 Use

6.2.1 Panel

Depending on the specific configuration and system settings on the HMI, you can activate the fan and cleaning system manually or have the entire system run fully automatically.

Manually activated functions:

Fig. 6.1

- green button START/STOP FAN (F)
- black button FILTER CLEANING (G)^{43 44}

You can activate START/STOP FAN and FILTER CLEANING on the HMI as well.

To suppress the buzzer (I) in case of a WARNING signal (C), push and hold the black button (G) for 5 seconds⁴⁵.

40. Ramp down time: 60 seconds

41. The system continues to run

42. The system stops running

43. You cannot stop/interrupt the filter cleaning cycle

44. You cannot activate this button during the first 40 running hours of the system and within 40 running hours after filter replacement, to maintain the protective layer of precoat material on the filter cartridges

45. You must still solve the cause of the warning

6.2.2 HMI

The HMI shows the actual system status at all times. If desired, you can activate the fan and the filter cleaning system manually.

Refer to the online user manual ControlPro for extensive explanation:
www.plymovent.com/manuals/controlpro

clean air at work

ControlPro/HMI

EN User manual
 NL Gebruikershandleiding
 DE Betriebsanleitung
 FR Manuel opérateur
 ES Instrucciones para el uso

www.plymovent.com/manuals/controlpro

000011273/0

7 MAINTENANCE

7.1 Periodic maintenance



The indicated maintenance intervals can vary depending on the specific working and ambient conditions. Therefore, we recommend to thoroughly inspect the complete system once every year beside the indicated periodic maintenance. For this purpose contact your supplier.



WARNING

If applicable, put the Panel in the Service Mode before you do the activities as stated below; refer to Fig. 6.1H.

Component	Action	Frequency: every X months	
		X=3	X=12
Panel	Clean the outside with a non-aggressive detergent	X	
	Make sure that the cable glands are correctly tightened	X	
	Make sure that all detachable screw terminal blocks on the PC board are connected	X	
HMI	Clean with a non-aggressive detergent	X	
	Make sure that the HMI cable is connected	X	
	Check for firmware updates; refer to the online user manual		X

For maintenance of the connected filter system, fan and other components, refer to the corresponding manuals.

8 TROUBLESHOOTING

If the system does not function (correctly), consult the checklist below to see if you can remedy the error yourself. Should this not be possible, contact your supplier.



WARNING

If applicable, put the Panel in the Service Mode before you do the activities as stated below; refer to Fig. 6.1H.

Symptom	Problem	Possible cause	Solution
Panel			
Yellow WARNING LED is on (with or without buzzer)	Refer to HMI	Refer to HMI; for more info, refer to the online user manual	Refer to HMI
Red ALARM LED is on + buzzer	Fan stops Filter cleaning stops		
HMI			
HMI screen is locked	No control on HMI possible	Panel is in service mode	Put the rotary switch on the Panel to 0 (refer to Fig. 6.1H)
Black screen	HMI does not function	Loose connection	Tighten the HMI cable to the CAN connector (refer to Fig. 4.7B+C)
		Loose or incorrectly connected cable	Connect the HMI cable to the CAN HMI connector (refer to Fig. 4.10)
No installation wizard at start up	Configuration of the system not possible	System configured in an earlier stage	Direct to screen 5.8 to restart the wizard manually If necessary: reset PIN (refer to online user manual)
System does not start (white LED is off)	System does not function	No mains voltage	Connect the mains voltage
		Main switch is off	Turn the main switch to on (refer to Fig. 6.1E)
White LED remains off	No indication	LED is defective	Replace the LED
Filter and/or fan pressure value = 0 when system is on	No pressure indication	Loose pneumatic hose(s)	Connect the hose(s)
Filter and/or fan pressure value ≠ 0 when system is off	Wrong pressure indication	Wrong pressure setting	Do a zero point calibration of the internal sensors (refer to screen 1.2)
Filter pressure value is negative or illogical	Wrong pressure indication	One pneumatic hose is loose	Connect the hose
		Inverted connection of the pneumatic hoses (+ vs. -)	Correct the connection (refer to par. 4.5.1)
		Wrong type of external pressure sensor configured (PT-1000 vs. PT-2500)	Set the correct type of pressure sensor (refer to screen 1.2)

Symptom	Problem	Possible cause	Solution
Malfunction of frequency inverter	Fan pressure value is negative	Wrong connection of the pneumatic hose (+ vs. -)	Correct the connection (refer to par. 4.5.4)
USB stick is not recognized	Firmware update not possible	USB-stick does not comply with USB 2.0 standard (too slow)	Use a USB 2.0 or USB 3.0 stick

Filter system

Filter cleaning sequence is incorrect or illogical	No optimum cleaning performance	Addressing sequence is not correct	Correct the setting of the DIP switches; refer to Fig. 4.18
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9 SPARE PARTS

The following spare parts are available for the product.



9.1 ControlPro/Panel

Refer to exploded view Fig. VI on page 20.

Article no.	Description
0000103139	Switch mode power supply 24V DC 2.5A
0000103141	Rotary switch 0-1
0000113558	Indicator light yellow 24V
0000113559	PCB main board ControlPro
0040900180	Main switch 25A
0324000300	Indicator light white 24V
0324000310	Indicator light green 24V
0324000320	Indicator light red 24V
0328050300	Push button green
0328050320	Push button black
0360000060	Buzzer

9.2 ControlPro/HMI

Refer to exploded view Fig. VII on page 20.

Article no.	Description
0000112777	ControlPro/HMI (complete)
0000113560	Dust cap for ControlPro/HMI

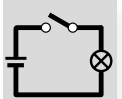
9.3 Control/SlaveBoard

Refer to exploded view Fig. VIII on page 20.

Article no.	Description
0000113561	PCB slave board

10 ELECTRICAL DIAGRAM

Refer to the separately supplied electrical diagram.



11 DISPOSAL

After life of the product, dispose it of in accordance with federal, state or local regulations.



CE DECLARATION

CE Declaration of Conformity for machinery



We, Plymovent Manufacturing B.V., Koraalstraat 9, 1812 RK Alkmaar, the Netherlands, herewith declare, on our own responsibility, that the product:

- ControlPro

which this declaration refers to, is in accordance with the conditions of the following:

Directives:

- EMC 2014/30 EU | EMC Directive
- LVD 2014/35 EU | Low Voltage Directive

Harmonised Standards:

- EN-IEC 60204-1:2006 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- EN-IEC 61439-1:2011 | Low-voltage switchgear and controlgear assemblies - Part 1: General rules
- EN-IEC 61131-2:2007 | Programmable controllers - Part 2: Equipment requirements and tests
- EN-IEC 61000-6-2:2005 | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN-IEC 61000-6-4:2007 | Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Alkmaar, Netherlands, 1 July 2020

Jeroen Crezee
Manager R&D

An **installation** is defined as a combination of several finished products or components that are assembled by an installer at a given place. The various parts of the installation are intended to operate together in a particular environment and to perform a specific task. The entire installation must comply with the relevant directives and standards. The assembly instructions given by the manufacturer, as well as the whole method of installation, must be in accordance with good engineering practices within the context of installations, as well as installation rules. Considering the above, the installer will be responsible for completing the installation and issuing the final CE Declaration of Conformity.

Fig. I Dimensions Panel

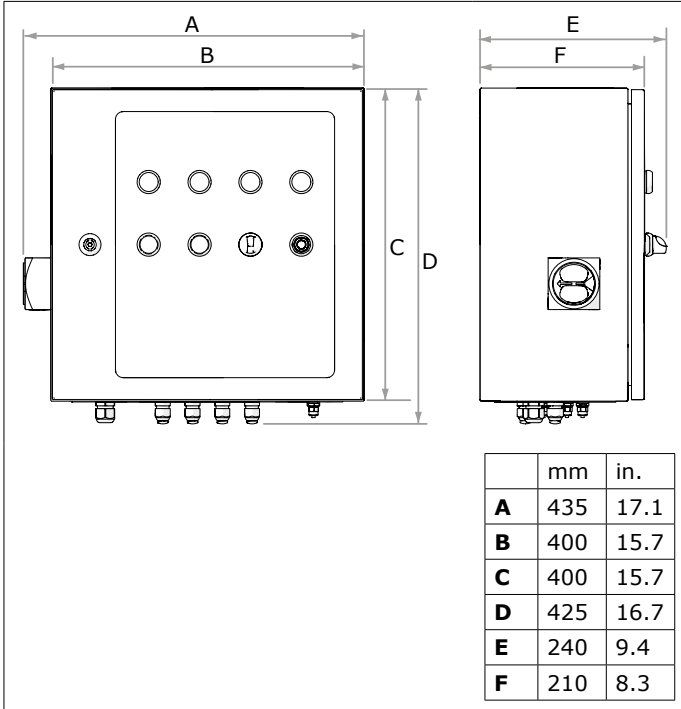


Fig. III SlaveBoard | PC board

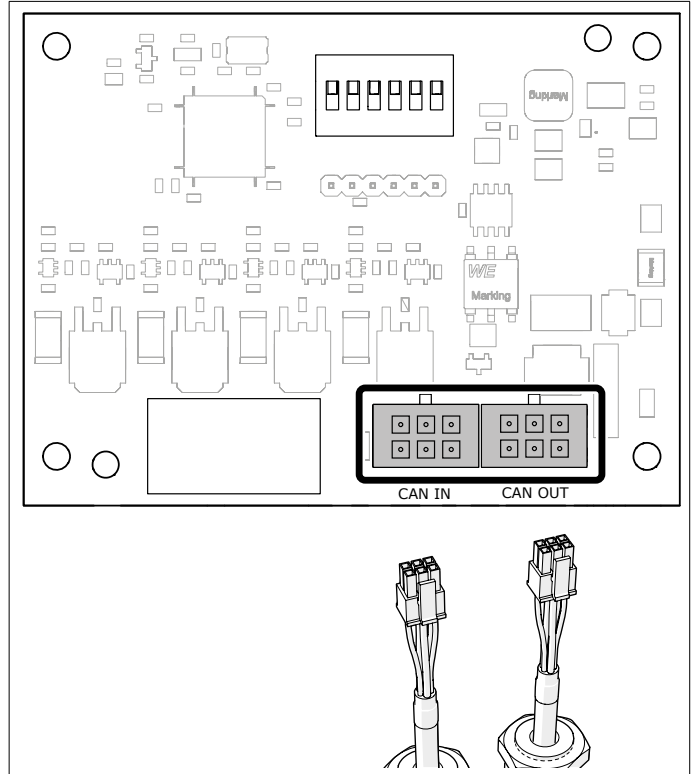


Fig. II SlaveBoards

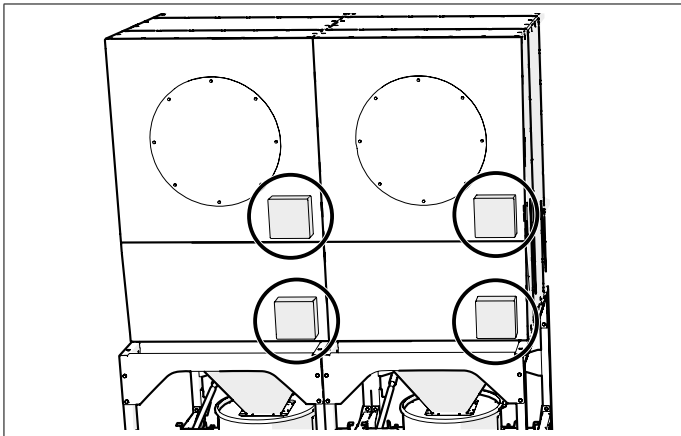


Fig. IV Connection sequence SlaveBoards

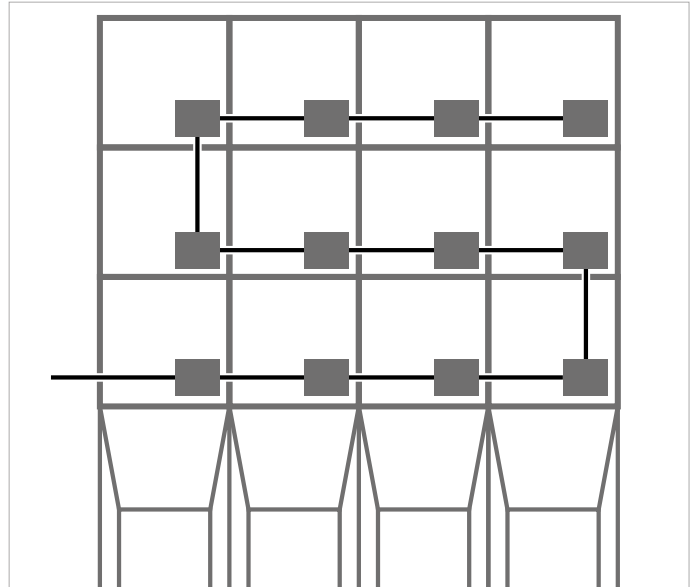


Fig. V Control panel



Fig. VI ControlPro/Panel

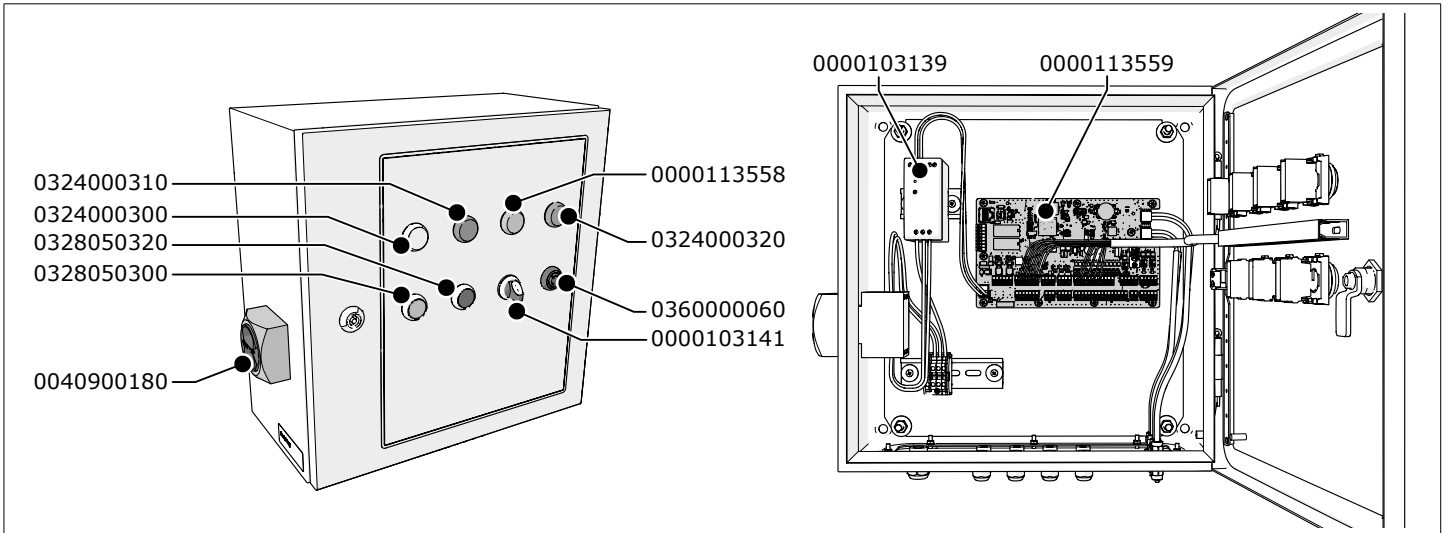


Fig. VII ControlPro/HMI

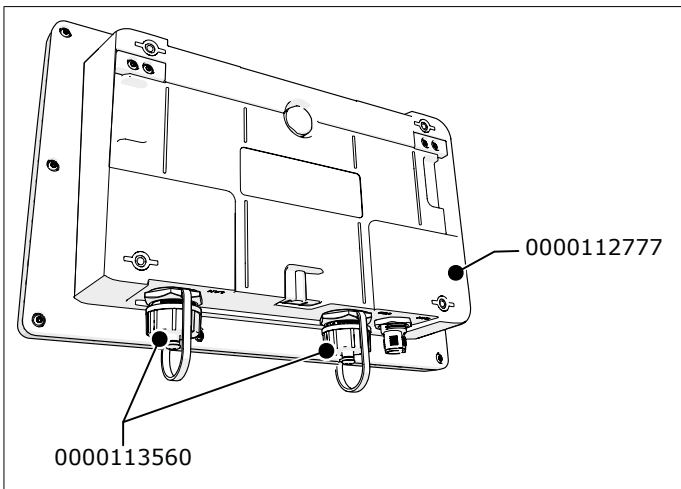


Fig. VIII Control/SlaveBoard

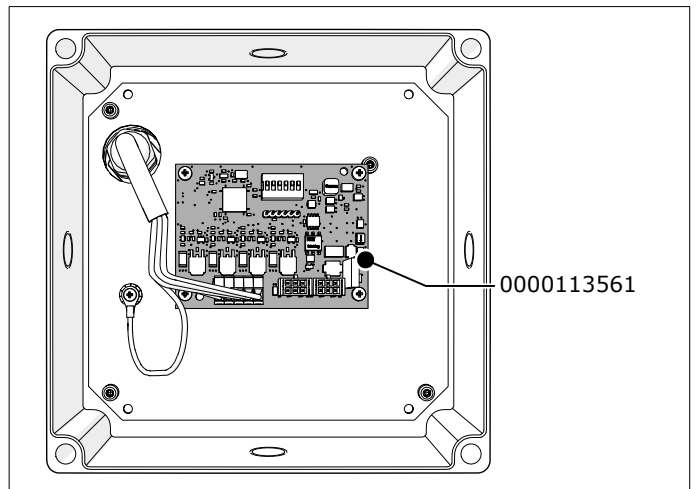


Table I Cable specifications

#	Connection	Recommended cable type	Included	Source locally	For use with		Option
					MDB	SCS	
1	Panel → HMI (shielded)		✓		✓	✓	
2	Panel → SlaveBoard (shielded)		✓		✓		
3	SlaveBoard → SlaveBoard		✓		✓		
4	RS-485 (shielded, for use with VFD)	UNITRONIC® BUS DN THIN Y	✓ *)		✓	✓	✓
5	Mains cord	H05VV-F 3G1		✓	✓	✓	
6	External start/stop	H05VV-F 2X0.75		✓	✓	✓	✓
7	External alert input			✓	✓	✓	✓
8	Relay output 1			✓	✓	✓	✓
9	Relay output 2			✓	✓	✓	✓
10	Compressed air switch		✓		✓		
11	Fire alarm (SHIELD)			✓			✓
12	Dustbin level switch			✓			✓
13	Filter pressure sensor (PT-1000/2500)	H05VV-F 3G0.5			✓	✓	✓
14	Fan pressure sensor (PT-1000/2500)				✓	✓	✓
15	Internal fan pressure sensor			✓	✓	✓	✓
16	Dustbin level sensor				✓		✓
17	SCS/Slave valve	H05VV-F 3G0.75		✓		✓	✓
18	3/2 solenoid valve (SHIELD)			✓	✓		✓
19	Fan control (direct online)	H05VV-F 4X0.5		✓	✓	✓	✓
20	Control cable (SCS valve + compressed air switch)	H05VV-F 5G0.75	✓			✓	
21	Sliding valve (SHIELD)	H05VV-F 6G0.75		✓	✓		✓
22	Light tower	H05VV-F 7X0.5		✓	✓	✓	✓

*) To be ordered separately due to variable length

Table II Digital inputs

Input		
	High	Low
IN 5	External signal fan start/stop	
	start	stop
IN 6	Fire alarm	
	normal	alarm
IN 7	Sliding valve 1	
	closed	open
IN 8	Sliding valve 2	
	closed	open
IN 9	Fan alarm	
	alarm	normal
IN 10	Compressed air switch	
	normal	alert
IN 11	External alarm signal	
	normal	alert
IN 12	Dustbin level switch	
	full	not full

