HAINKE®
Filteranlagen

Operation manual

Electronic solenoid valve control

IFC 10

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Contents

1 Safety

The equipment may only be installed, connected, put into service and maintained by qualified and authorised skilled personnel in particular compliance with these operating instructions, the relevant standards and the legal regulations.

In addition, both the general and regional installation and safety regulations for work on power installations (e.g. VDE), and the regulations concerning proper use of tools and the use of personal protective equipment must also be complied with.

During the operation of electrical installations, certain parts of the installation are necessarily live with dangerous voltage.

Disregard of the warnings can cause serious physical injuries or material damage.

1.1 Standards

The solenoid valve controls comply with the following relevant provisions:

- 2014/30/EU
- 2014/35/EU
- 2014/34/EU

Applied standards:

- EN 55014-1:2012
- EN 60204-1:2012
- EN 60079-0:2014
- EN 60079-31:2014

The named standards and directives can be examined at HAINKE Filteranlagen GmbH .

1.2 Marking electrical equipment for potentially explosive atmospheres

Marking according to Directive 2014/34/EU:	**II 3D**
Marking	**Meaning**
II	Equipment group II
3	Category 3
D	For explosive mixtures of air and combustible dust

Standard-specific addition to EN 60079-0	**Ex tc IIIB T80 °C Dc X IP65 Ta: -5 °C...+40 °C**
Ex	Ex-protection to European standard
tc	Type of protection: Protection by enclosure, use in category 3D
IIIB	Dust group: non-conductive dust
T80 °C	Maximum surface temperature
Dc	Equipment protection level (EPL)
X	Note on particular use conditions
IP 65	Degree of protection IP 65
Ta: -5 °C ... +40 °C	Range of the allowable ambient temperature

Areas of use	
Category	Explosive dust-air mixtures (D)
Category 1	Zone 20, 21 or 22
Category 2	Zone 21 or 22

Areas of use	
Category 3	Zone 22 non-conductive dust
Equipment group II Category 3D	Equipment designed to be capable of functioning in conformity with the operating parameters established by the manufacturer and ensuring a normal level of protection.
Electrical equipment for use in areas with combustible dust	Equipment in this category is intended for use in areas in which explosive atmospheres caused by air/dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

1.3 Operation of the control in the mounting enclosure

The control may only be operated in normal operation with a closed cover.

For the commissioning and during maintenance work with applied supply voltage, before opening the cover, it must be ensured that there is no potentially explosive atmosphere caused by dust/air mixtures present and none will occur.

Otherwise, the cover may not be opened while the installation is live. Degree of protection IP54 must be maintained as a minimum.

1.4 Notes on particular conditions for safe use in hazardous area Zone 22

✓ Allowable ambient temperature range Ta: -5 °C to +40 °C.

1. Attach the control within the visible area and ensure that it is protected from any mechanical damage.
2. Ensure that the control is protected against ultraviolet light (daylight or UV light emitted by lights) or mount the control in a protected place.
3. Avoid dust deposits on the enclosure.
4. To prevent electrostatic discharges, clean the equipment with a damp cloth only. Avoid rubbing with non-conductive materials.

2 Intended use

The control can cause hazards if used improperly. The control has been developed for the cyclical cleaning of dust filter elements with compressed air pulses. Up to 10 solenoid valves can be actuated cyclically with settable pulse and pause time. A 24 VDC remote control input is available for the external start. The status message to a higher-level system is sent by means of a potential-free relay contact. Do not operate the control outside the electrical, thermal and mechanical characteristics.

3 Technical data

Supply voltage (see rating plate)	230 VAC 50/60 Hz	115 VAC 50/60 Hz	24 VDC
allowable tolerance	+/- 5%		24-32 VDC
	switchable with mains selection switch		
Fusing	160 mA medium lag	315 mA medium lag	1.6 A medium lag
Quiescent current input	typically 40 mA	typically 80 mA	typically 60 mA

Type	IFC 10 E in the polycarbonate mounting enclosure	IFC 10 S in metal chassis
Output data	1 – 10 solenoid valve outputs 24 VDC, output fuse 1.6 A very fast acting manually activatable with a step switch Output power max. 24 W / 1 A Outputs are shielded by freewheeling diodes	
Pulse time	approx. 60 – 600 ms settable Display by RED LED	
Pause time	approx. 6 – 60 s settable Display by GREEN LED	
Signalling by light-emitting diodes	RED: Overload, wire break GREEN: Status message (active)	
Message output	Status message, GREEN LED, potential-free make contact (NO), contact load max.: I = 0.5 A, U = 230 VAC	
Control input	F: Remote control input 24 VDC, YELLOW LED,	
Supply voltage for external pickup	24 VDC, 50 mA max.	
Enclosure material	Polycarbonate, transparent cover	Metal, electroplated
Colour	RAL 7035 (light grey)	
Installation	Wall-mounted	can be snapped onto top-hat rail 35 mm
Degree of protection	IP65 to EN 60529	IP20 for control cabinet installation
Dimensions (L × W × H)	240 × 90 × 160 mm	196 × 61 × 150 mm
Weight	1.7 kg	1.65 kg
Cable entries	3 × M16, 2 × M20	-
Clamping areas of the cable entries	M16: 4.0 – 8.0 mm	-
Connection cross-section	0.2 –2.5 mm^2	
Maximum surface temperature *T* of the enclosure (category 3D) at 40 °C ambient temperature	80 °C	-
Allowable ambient temperature	Hazardous area Zone 22: - 5 °C ...+ 40 °C Outside the hazardous area: - 20 °C ..+ 40 °C	- 20 °C ... + 55 °C

Type	IFC 10 E in the polycarbonate mounting enclosure	IFC 10 S in metal chassis
Conformity	Low Voltage Directive 2014/35/EU (EN 60204-1) Directive 2014/30/EU Electro-magnetic Compatibility (EN 61000-6-1, EN 61000-6-2, EN 55014-1)	Low Voltage Directive 2014/35/EU (EN 60204-1) Directive 2014/30/EU Electro-magnetic Compatibility (EN 61000-6-1, EN 61000-6-2, EN 55014-1)
Equipment marking	II 3D Ex tc IIIB T80°C Dc X IP65 Ta: -5 °C ...+40 °C	-

4 Assembly and installation

NOTICE

Installation according to manufacturer's instructions

1. Install the control unit in accordance with the manufacturer's instructions and the respective national regulations and provisions as well as the relevant installer provisions.
2. The protective conductor must always be laid alongside and connected.

Target group

Unless assigned otherwise, the assembly and installation are carried out by skilled personnel of HAINKE Filteranlagen GmbH .

Work on the electrical installation is only carried out by electrically skilled personnel. Work on live parts is not planned.

Safety instructions

After assembly and connection of the control, it must be ensured that degree of protection IP65 to EN 60529 is achieved again for the enclosure.

⚠ WARNING

Control is not suitable for operation in this use case

According to its marking, the equipment must be suitable for the existing hazardous area, otherwise there is a risk of explosion.

– Compare the technical data and ambient conditions exactly

General

Mount the control in a vibration-free location.

Mounting enclosure

The control in the mounting enclosure is suitable for mounting in the installation.

The operation is permitted for:

- Hazardous area Zone 22
- non-conductive dust
- the potentially explosive medium does not occur or only rarely/for a short time due to air/dust mixtures
- outside potentially explosive atmospheres

Installation

1. Compare the equipment marking and case of application.
2. Remove the cover.
   ⇨ The fixing holes are accessible.
3. Mount the control in the visible area.
4. Protect from mechanical damage.
5. Close off cable entries properly.
6. After installation, screw on the cover with all the screws provided.
7. Explosion protection to EN 60079-14 must be established.

⇨ The control is mounted.

Outdoor installation

1. Take suitable measures to protect the enclosure from the weather, e.g. by a canopy or similar.

Installation in potentially explosive atmospheres

All cables must be routed properly through cable entries, which are approved for use in potentially explosive atmospheres.

The mounting must be done properly.

Cable entries that are not required must be fitted with plugs, which are approved for use in potentially explosive atmospheres.

The requirements of EN 60079-14 must be met.

Polycarbonate mounting enclosure

The polycarbonate housing is intended for mounting indoors.

If mounted outdoors, measures must be taken to protect the enclosure from the weather. Example: Canopy

If using in potentially explosive atmospheres, the notes required in these instructions must be complied with.

Metal chassis

The control in the metal chassis is suitable for mounting in the control cabinet. To this end, the metal chassis is snapped onto the top-hat rail 35 mm to EN 50022.

4.1 Electrical connection

NOTICE

Property damage due to wrong supply voltage

The connection of 115 VAC or 230 VAC to a control for 24 VDC supply voltage leads to irreparable damage to the whole control.

– Connect the control only to the supply voltage given on the rating plate.

General

1. Connect the control according to the connection plan.
2. Comply with the values given in the technical data.

Power supply

1. Connect the supply voltage to the terminal block.

Solenoid valves

1. The solenoid valves must be connected to terminals 1-10 of the terminal block.
2. Route the positive terminal of the solenoid valves, grouped together, to terminals 11 and 12.
3. Connect the protective conductor to the PE terminal of the terminal block.

The output of the connective valves may not exceed the maximum output power of the connected valves.

Status message output

The status message output is routed to a potential-free make contact (NO) and to terminals 21 and 22 of the terminal block.

Remote control input

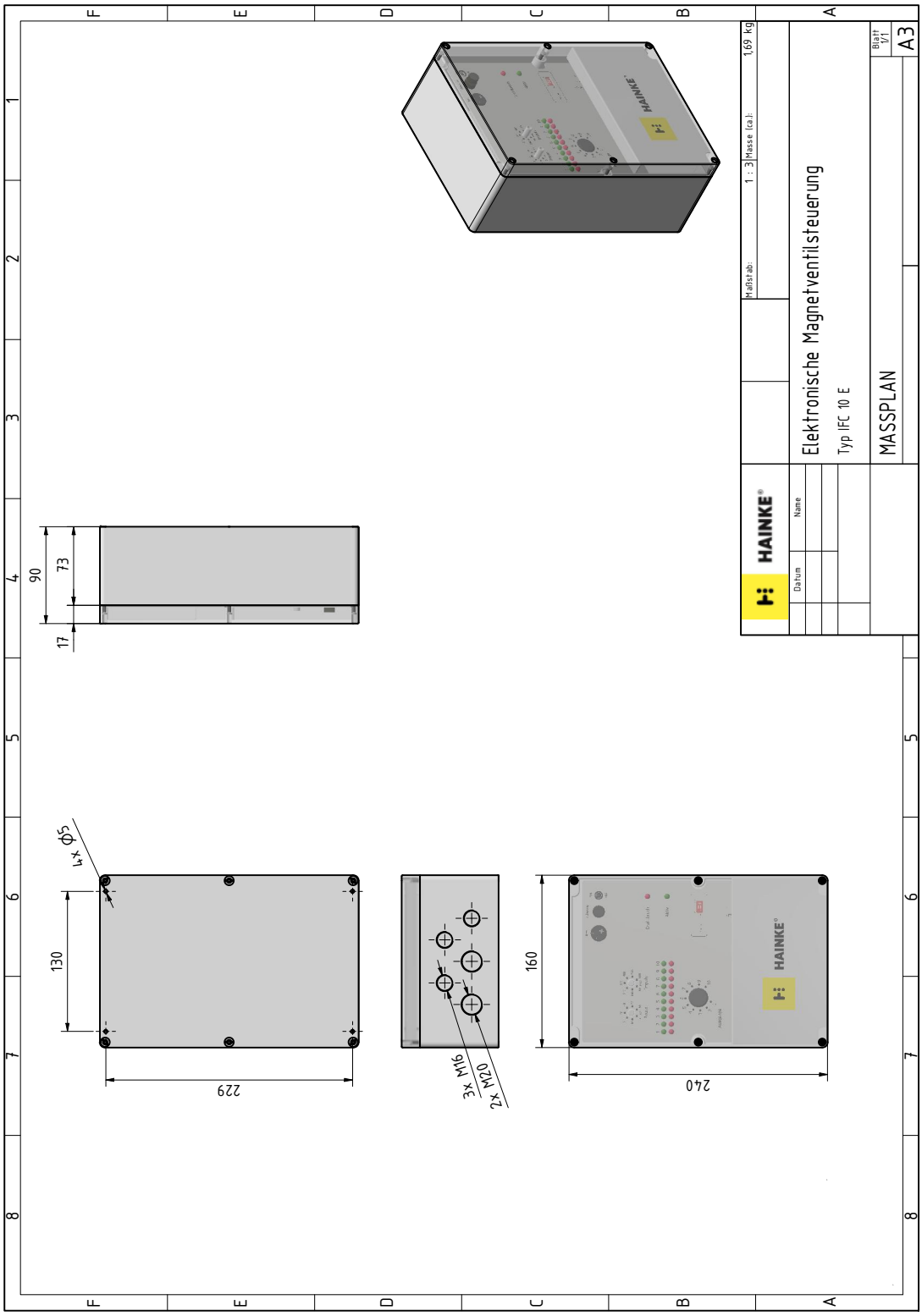
Terminal 24 of the terminal block is used to connect the remote control signal.

For supply of the pick-up, +24 VDC is available at terminal 25 and 0 V potential at terminal 26.

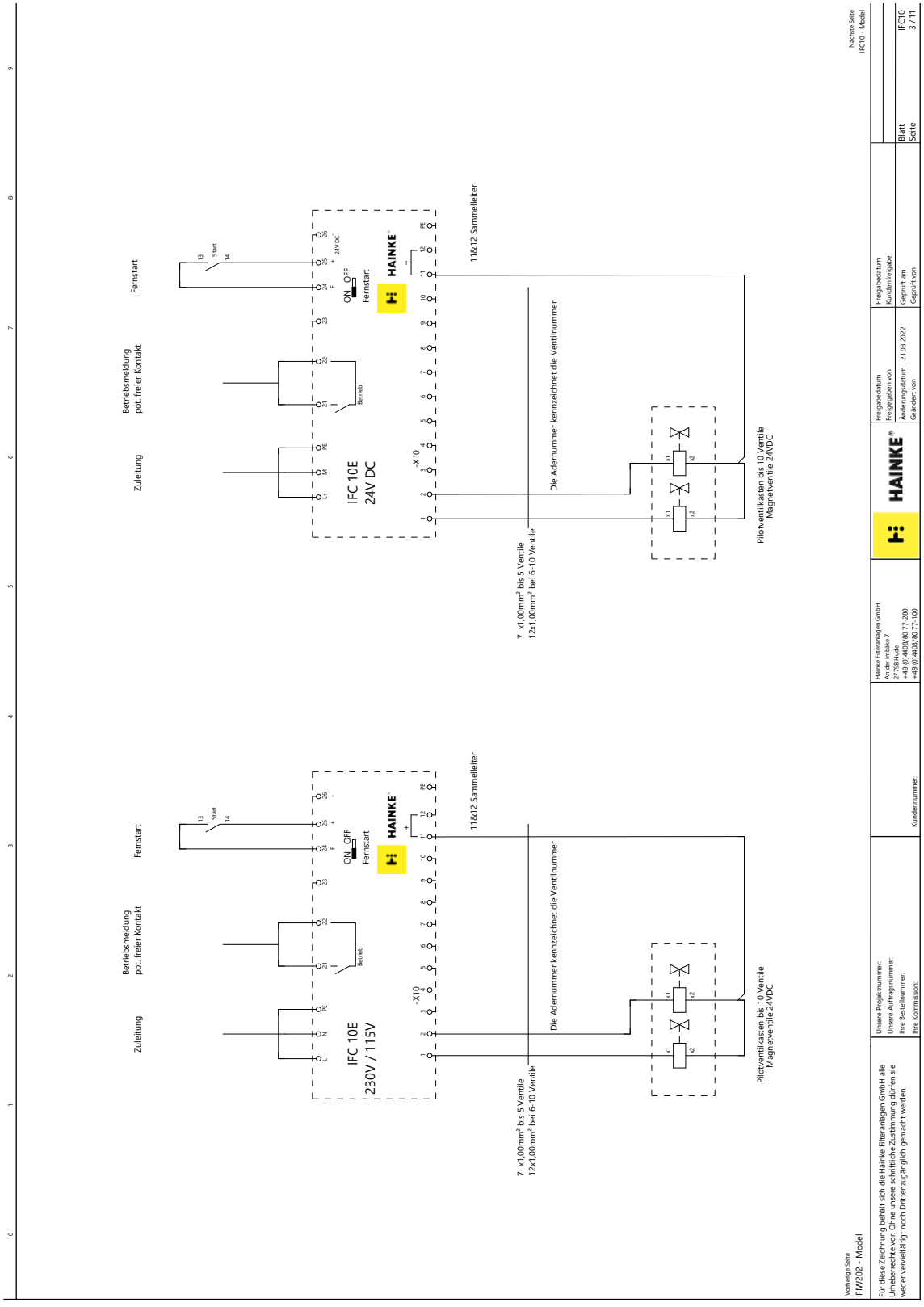
Pressure sensor input (P)

Not present.

4.2 Dimension plan IFC 10



4.3 Connection plan IFC10



5 Start-up

⚠ WARNING

Risk of injury due to the escape of a potentially explosive atmosphere consisting of dust/air mixtures

✓ Operation with the cover open is prohibited.

1. Before opening the cover, ensure that no potentially explosive atmosphere exists.
2. Do not operate the control outside the electrical, thermal and mechanical characteristics.

1. Switch the On/Off switch to the OFF position.
2. Use the rating plate to check the supply voltage for which this control is suitable.
3. For a supply voltage of 115 VAC or 230 VAC, set the voltage selector switch to the relevant voltage.
4. Check whether the correct microfuse is inserted.
5. Preselect the number of outputs to be actuated (solenoid valves) with the step switch.
6. Use the potentiometer to set the required pause and pulse time according to the filter manufacturer's data.
7. Use the DIP switches to select the operating mode and the required monitoring function.
8. Check that the control is connected correctly according to the connection plan.
9. Apply the supply voltage and switch on the On/Off switch.

DIP switch overview

DIP switch ON	Start the control via remote control or differential pressure switch
DIP switch OFF	Direct start of the control on connecting the supply voltage

Signalling	After switching on the control, the following LEDs light up:	
	Active (GREEN)	if the remote control function is active, start via 1 signal at input F
	Next output (GREEN)	
	Status message (GREEN)	only if control is ACTIVE
	Signal F (YELLOW) remote control input	depending on the switch state of the connected sensor (signal generator)
Start via remote start	After 1-signal is applied at input F, the connected valves are actuated with the set pulse-pause ratio. If 0-signal at input F, actuation of the valves stops. On restarting, the cleaning is continued.	
Remote start disabled	After connecting the supply valve, the connected valves are actuated with the set pulse-pause ratio.	
	1. Check for correct actuation of the valves. In the event of error-free actuation, the status message contact remains operated for the entire run. Light-emitting diode is lit without interruption. 2. Following completion of the commissioning, screw the cover back on, check the cable entries. Cable entries that are not required must be sealed with a plug. (Only relevant for control in the mounting enclosure.)	

6 Control and message functions

6.1 Remote control input F

The control can be remote controlled via input F and the terminal block. The following switch types can be used at input F:

- Potential free contact (switch or relay)
- Switch with electronic output PNP
- Direct voltages 12 to 30 V, to 0 V

The input is protected against reverse polarity.

The remote control function is enabled by the DIP switch in the ON position and is disabled in the OFF position. The switch may also be changed over while the control is in operation.

	Remote start (F) not enabled
	Remote start (F) enabled

If the remote control function is enabled, the cleaning process starts as soon as 1 signal is applied at input F. The LED is lit.

If the remote control function is not active, the cleaning process starts immediately after the supply voltage is applied.

Input F must also be used to connect a differential pressure switch. The differential pressure switch initiates the cleaning process depending on the filter resistance.

If, in addition to the remote start, a differential pressure switch is to be connected to input F, the remote start signal must be connected in series with the contact of the differential pressure switch.

6.2 Status message

A potential-free make contact (NO) is available on the terminal block for reporting the operating status. The operating relay does not operate until the control is switched to ACTIVE. If a fault occurs, e.g. low air or wire break, the operating relay releases. The control continues working without interruption, despite the error. As soon as an error is no longer detected the relay operates again automatically. The GREEN LED above the terminal block lights up.

7 Fault messages

The display of the “Wire break” fault is assigned to the next interrupted output. It goes out with the next fault-free pulse.

Example

The wire break message occurs after the 5th output has been actuated and the 5th pulse light-emitting diode goes out. The wire break light-emitting diode goes out again after the 6th output is actuated.

From this, it follows that the wire break fault was caused by the 5th valve.

7.1 Fault cause and remedy

Message	Display	Cause of error	Remedy
Wire break	RED light-emitting diode	no output load during the actuation pulse or short-circuit at the valve output	• Check the setting of the step switch. The number of connected valves

Message	Display	Cause of error	Remedy
	The display goes out with the next fault-free pulse.		must match the setting of the step switch. • Check the output fuse • Check the connection and correct actuation of the valves

Notes

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