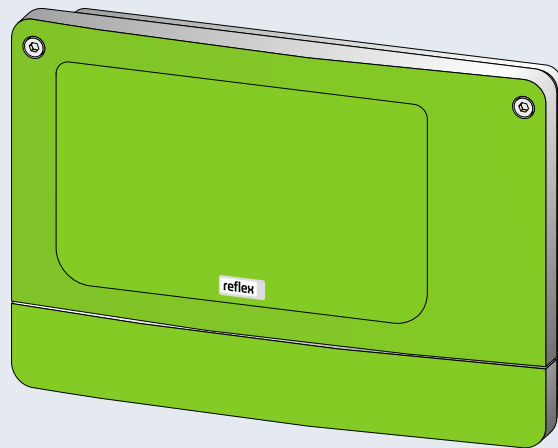


I/O module (Expansion module)

Variomat
Variomat Giga
Reflexomat
Servitec V2.00

GB Operating manual

Original operating manual



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1 Notes on the operating manual

The electric connections and the wiring of the device must be executed by a specialist in accordance with all applicable national and local regulations.



Note!

Every person installing this equipment or performing any other work at the equipment is required to carefully read this operating manual prior to commencing work and to comply with its instructions. The manual is to be provided to the device operator and must be stored near the device for access at any time.

2 Models

The I/O modules are used to expand the inputs and outputs of the controllers for pressure-maintaining and degassing stations.

The following device groups with control units are suitable for an expansion with I/O modules:

- Reflexomat
- Variomat
- Servitec

The I/O modules support the following controllers:

- Control Basic
- Control Touch

The I/O modules are fitted with two isolating amplifiers for analogue signals:

- Pressure measurement
- Level sensor

Six digital inputs and six digital outputs are used to process messages and alarms:

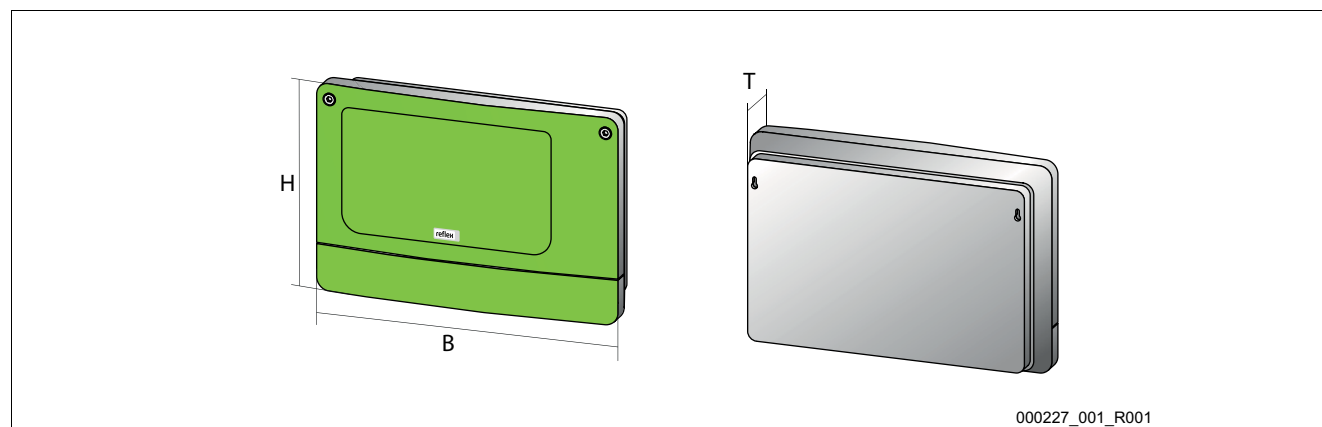
- Inputs:
 - 3 inputs, N.C. with 24 V self potential for standard settings.
 - External temperature monitoring
 - Minimum pressure signal
 - Manual make-up with water.
 - 3 inputs, N.O. with 230 V self potential for standard settings.
 - Emergency-Off
 - Manual operation (of pump or compressor, for example)
 - Manual operation of the overflow valve
- Outputs:
 - Potential-free as changeover contacts. Standard settings for messages:
 - Make-up fault
 - Below minimum pressure
 - Above maximum pressure
 - Manual or Stop operation



Note!

- The I/O module is connected to the control unit by the user.
- For the standard settings of the I/O modules, see chapter 5.4 "Standard setting of the I/O module" on page 20 .
- All digital inputs and outputs can be set freely as option. Settings to be made by the Reflex Customer Service, see chapter 7.1 "Reflex Customer Service" on page 26 .

3 Technical data



Housing	Plastic housing
Width (W)	340 mm
Height (H)	233.6 mm
Depth (D)	77 mm
Weight	2.0 kg
Permissible operating temperature	-5° C – 55° C
Permissible storage temperature	-40° C – 70° C
Degree of protection IP	IP 64
Voltage supply	230 V AC, 50 – 60 Hz (IEC 38)
Fusing • primary	0.16 A time-lag
Inputs, outputs	<ul style="list-style-type: none"> • 6 floating relay outputs (changeover) • 3 digital inputs 230 V AC • 3 digital inputs 24V AC • 2 analogue outputs, to be set with jumper <ul style="list-style-type: none"> – 0V – 1 V or 2V – 10V – 0mA – 20mA or 4mA – 20mA
Interface to the controller	<ul style="list-style-type: none"> • RS – 485 • 19.2 kbit/s • Floating • connection with plug or screw terminals • RSI-specific protocol

4 Connection



Danger – electric shock!

- Risk of serious injury or death due to electric shock.
 - Ensure that the system is voltage-free before installing the device.
 - Ensure that the system is secured and cannot be reactivated by other persons.
 - Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.



Danger – electric shock!

- Risk of serious injury or death due to electric shock. Some parts of the main board may still carry 230 V voltage even with the device physically isolated from the 230 V power supply.
 - Before you remove the covers, completely isolate the device controller from the power supply.
 - Verify that the main circuit board is voltage-free.

4.1 Electrical connection

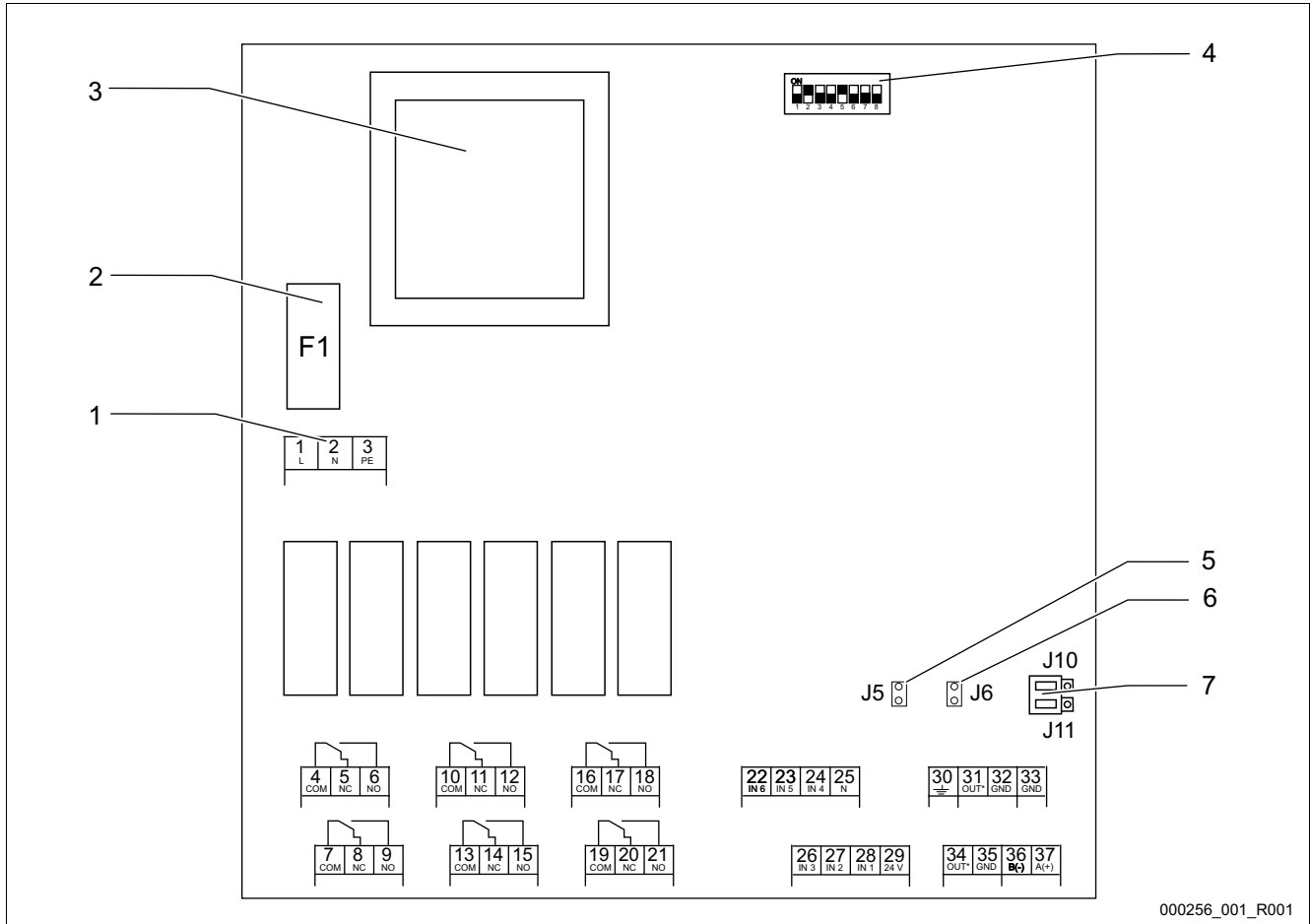
The I/O modules are shipped with a power cable including earthed plug. If required, you may use a different power cable.

Proceed as follows:

1. Pull the mains plugs of the I/O module.
2. Open the housing cover.

The terminals are located on the main circuit board of the I/O module in the open housing.

I/O module main circuit board.



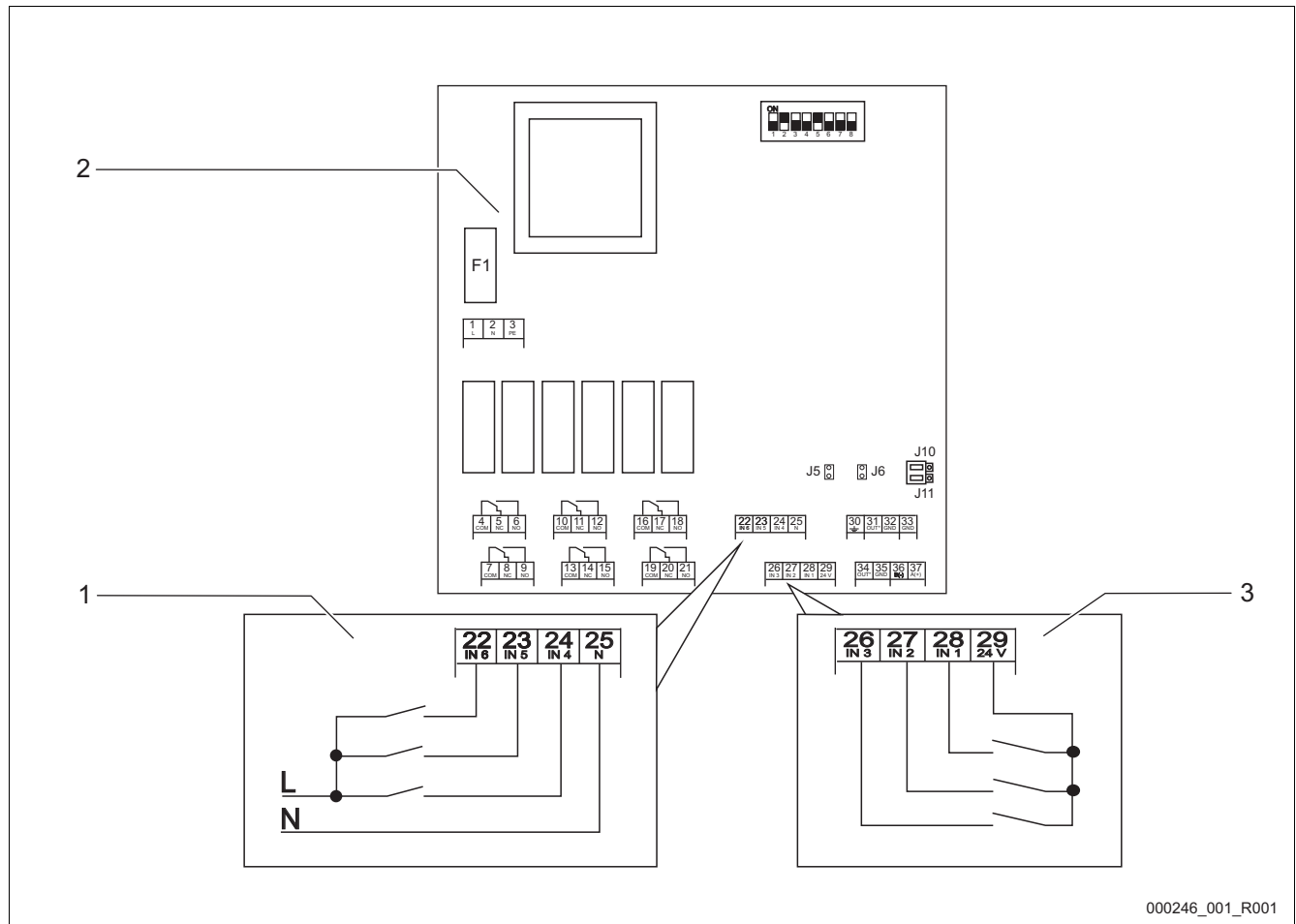
000256_001_R001

1	Terminals for main connection
2	Feeble current fuse 250 V / 016 A time-lag
3	Transformer
4	DIP switch for setting the module address

5	Jumper for setting the analogue signal 1
6	Jumper for setting the analogue signal 2
7	Jumper for activating the terminators

Terminal number	Signal	Function
1	L	Mains supply
2	N	
3	PE	
4	COM	Relay output 1
5	N.C.	
6	N.O.	
7	COM	Relay output 2
8	N.C.	
9	N.O.	
10	COM	Relay output 3
11	N.C.	
12	N.O.	
13	COM	Relay output 4
14	N.C.	
15	N.O.	
16	COM	Relay output 5
17	N.C.	
18	N.O.	
19	COM	Relay output 6
20	N.C.	
21	N.O.	
22	Digital input 6	Digital inputs 230V AC
23	Digital input 5	
24	Digital input 4	
25	Common neutral conductor for inputs 4 to 6	
26	Digital input 3	Digital inputs 24V DC
27	Digital input 2	
28	Digital input 1	
29	24V DC supply voltage for inputs 1 to 3	
30	Function earthing	Cable screening for analogue outputs and RS-485 interface
31	Analogue output 2	Analogue output 2 <ul style="list-style-type: none"> • For pressure measurement <ul style="list-style-type: none"> – No connection in Servitec with "Levelcontrol" operating mode
32	Connection to earth for analogue output 2	
33	RS-485 earth	RS-485 interface
34	Analogue output 1	Analogue output 1 <ul style="list-style-type: none"> • For level measurement <ul style="list-style-type: none"> – No connection for Servitec
35	Connection to earth for analogue output 1	
36	RS-485 signal B (-)	RS-485 interface
37	RS-485 signal A (+)	

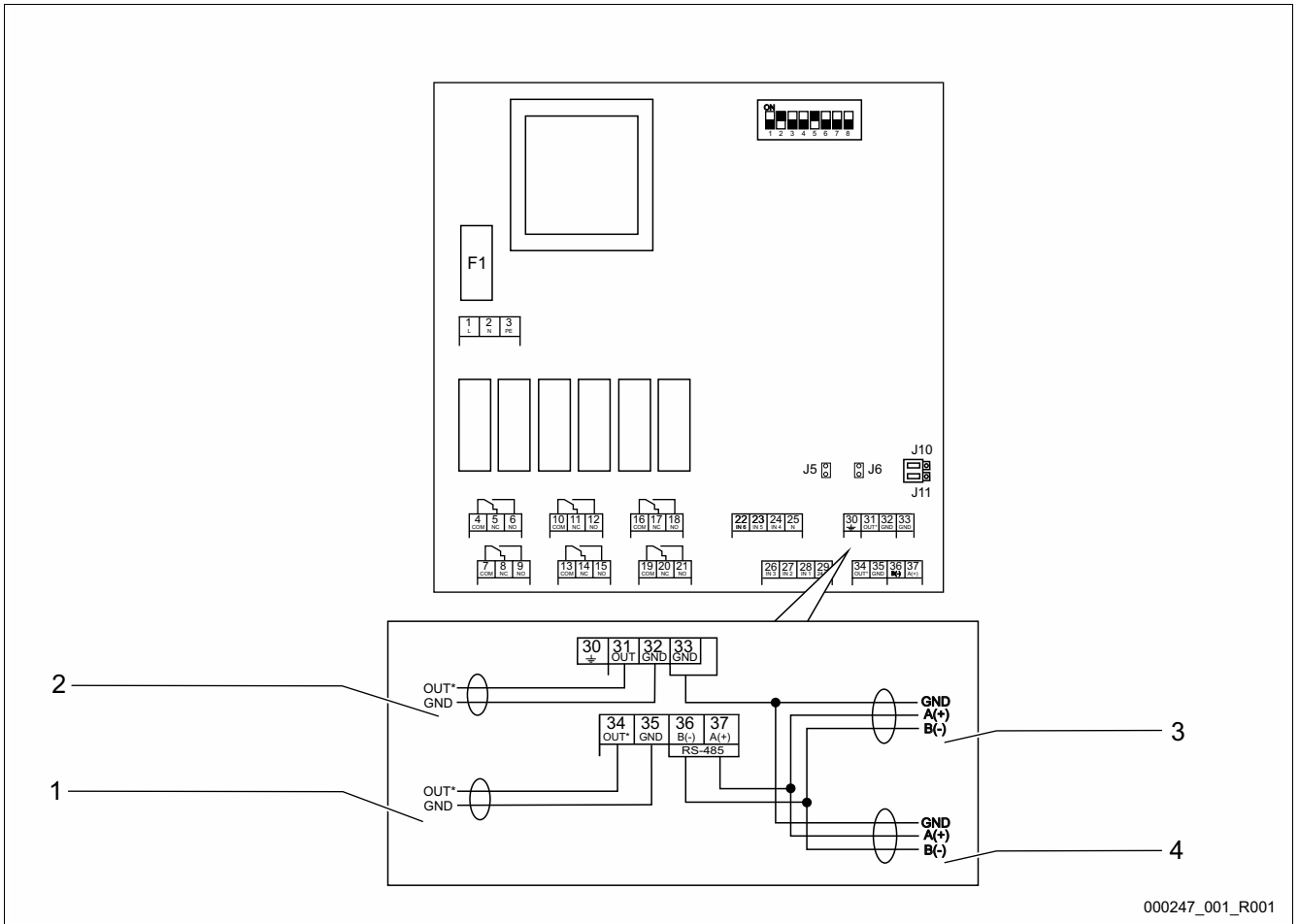
Schematic connections of the digital inputs of the I/O module.



1	External connection with 230 V AC
2	I/O module main circuit board

3	Internal connection with 24 V AC
---	----------------------------------

Schematic connections of the analogue signals and the RS-485 interfaces.



1	Analogue output 1
2	Analogue output 2

3	RS-485-conductor from the controller <ul style="list-style-type: none"> • Control Basic • Control Touch
4	RS-485 conductor for an additional I/O module

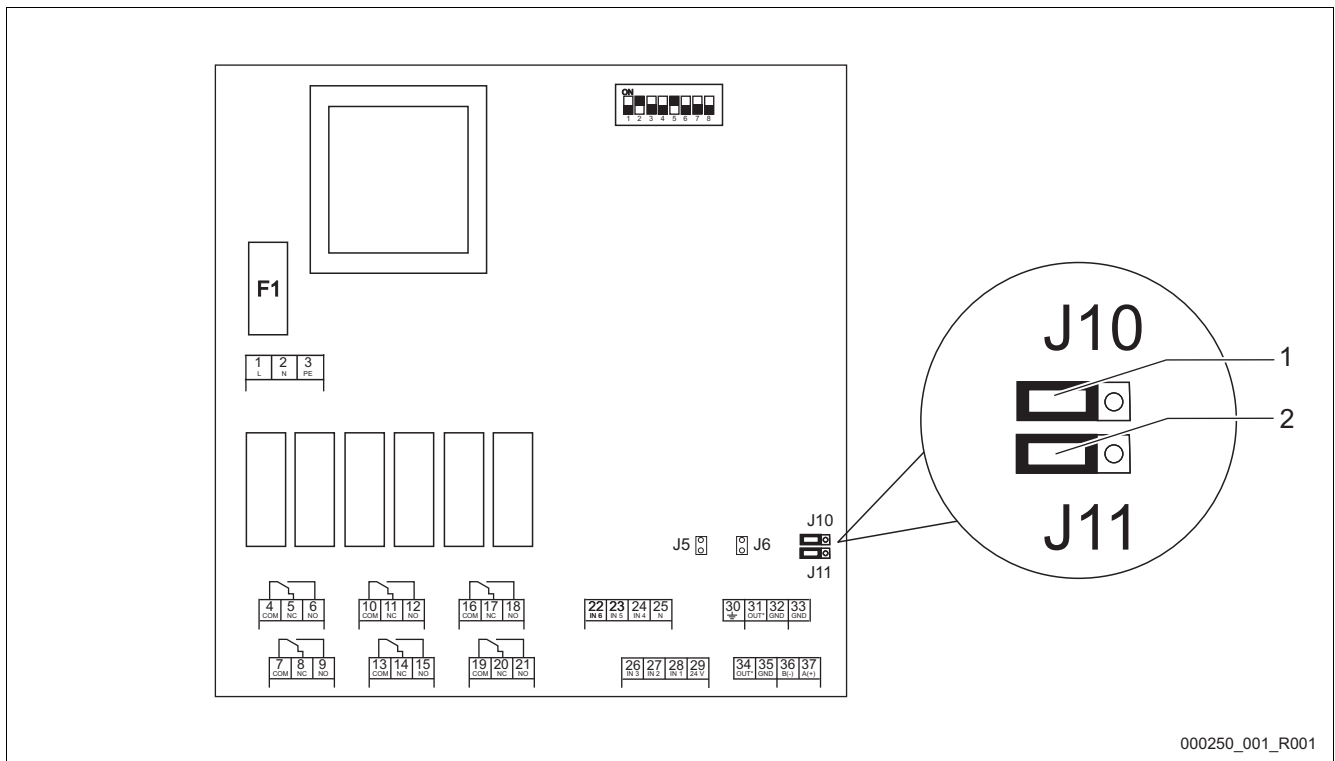


Note!

- Cable screens of the conductors must be connected separately.
- For each RS-485 conductor, the cable screen must be connected at one side.

4.2 Connecting the RS-485 with the I/O module

I/O module main circuit board.



000250_001_R001

1	Jumper 10 in active position <ul style="list-style-type: none"> • Terminator is active 	2	Jumper 11 in active position <ul style="list-style-type: none"> • Terminator is active
---	--	---	--

Proceed as follows:

1. Open the housing cover of the I/O module.
2. Use a screened cable to connect the RS-485 interface on the main circuit board.
 - Use a three-wire connector. The connection is floating.
 - Connection at the terminals 33, 36, 37 of the main circuit board.
3. Connect the cable screen at one side.
 - Use terminal 30 of the I/O module.
 - Optionally use terminal 22 of Control Basic.
4. Activate the terminators on the main circuit board.
 - Use jumpers J 10 and J 11.

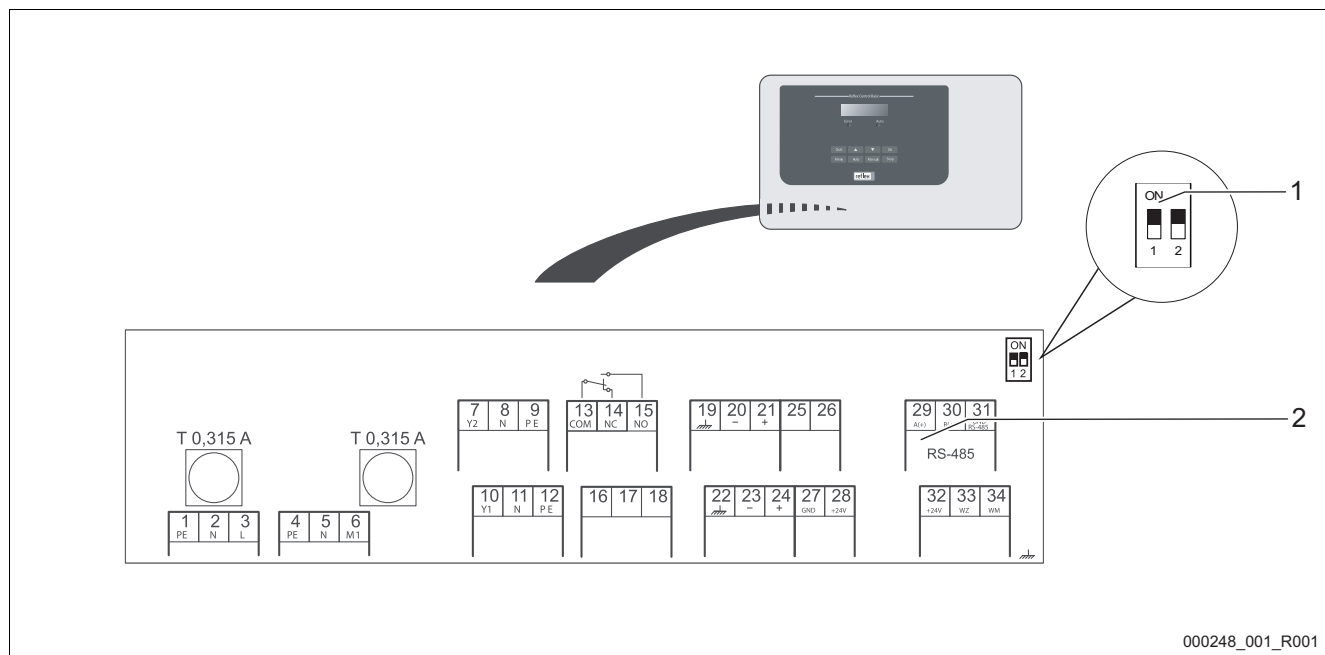


Note!

- Activate the terminators when the I/O module is at the beginning or the end of an RS-485 network.
- Connect the cable screen at one side only. Either in the I/O module or in the controller.

4.3 Connecting the RS-485 with the Control Basic controller

Main circuit board of the Control Basic controller.



000248_001_R001

1	DIP switches 1 and 2 in active position <ul style="list-style-type: none"> The terminator is activated 		2	Connection terminals for RS-485 connection
---	---	--	---	--

Proceed as follows:

1. Open the housing cover of the Control Basic controller.
2. Use the screened cable fro, I/O module to connect the RS-485 with the main circuit board.
 - Connection at the terminals 29, 30, 31.
3. Connect the cable screen at one side.
 - Use terminal 30 of the I/O module.
 - Optionally use terminal 22 of Control Basic.
4. On the main circuit board of the Control Basic controller, activate the terminators.
 - Use the DP switches 1 and 2.
 - Optionally, you may use the jumpers J3, 1 – 2 and 3 – 4.

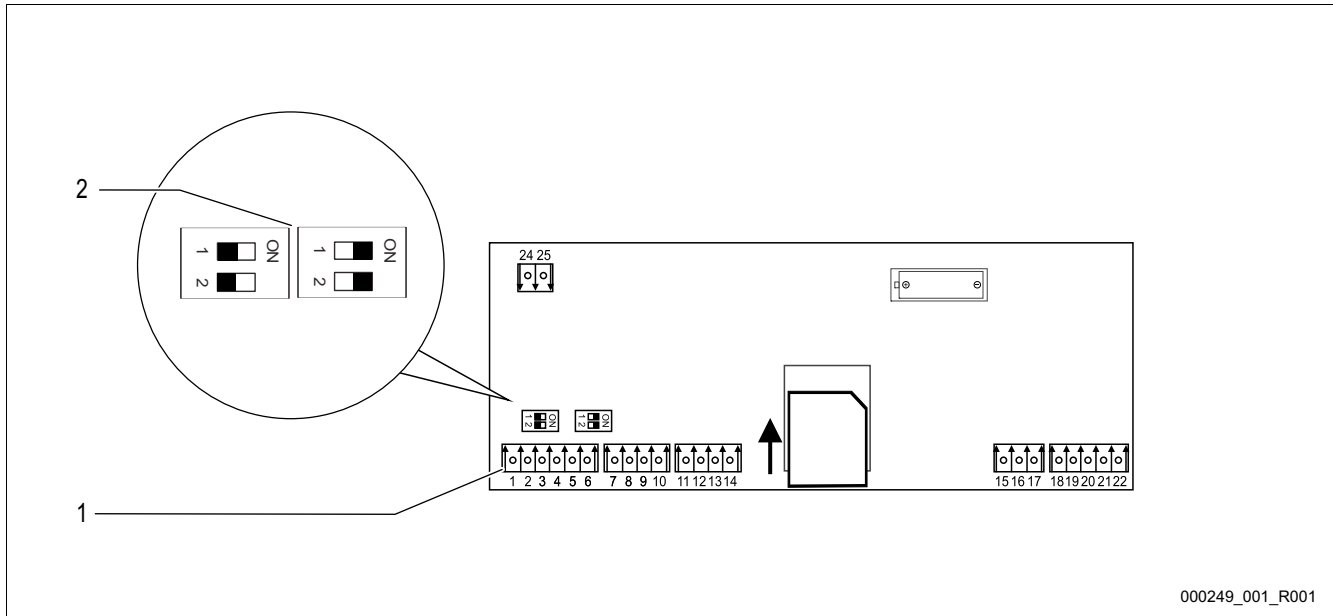


Note!

- Activate the terminators when the device is at the beginning or the end of an RS-485 network.
- The main circuit board of the controller provides either the DIP switches 1 and 2 or the jumper J3.
- Connect the cable screen at one side only. Either in the I/O module or in the controller.

4.4 Connecting the RS-485 with the Control Touch controller

Main circuit board of the Control Touch controller.



1	Connection terminals for RS-485 connection
---	--

2	DIP switches 1 and 2 in active position – The terminators are activated.
---	---

Proceed as follows:

1. Use a screened cable to connect the RS-485 interface on the main circuit board.
 - Connection at the terminals 4, 5, 6.
2. Connect the cable screen at one side.
 - Use terminal 30 of the I/O module's main circuit board.
3. Activate the terminators on the main circuit board of the Control Touch controller.
 - Use the DP switches 1 and 2.



Note!

Activate the terminators when the device is at the beginning or the end of an RS-485 network.

5 Settings



Danger – electric shock!

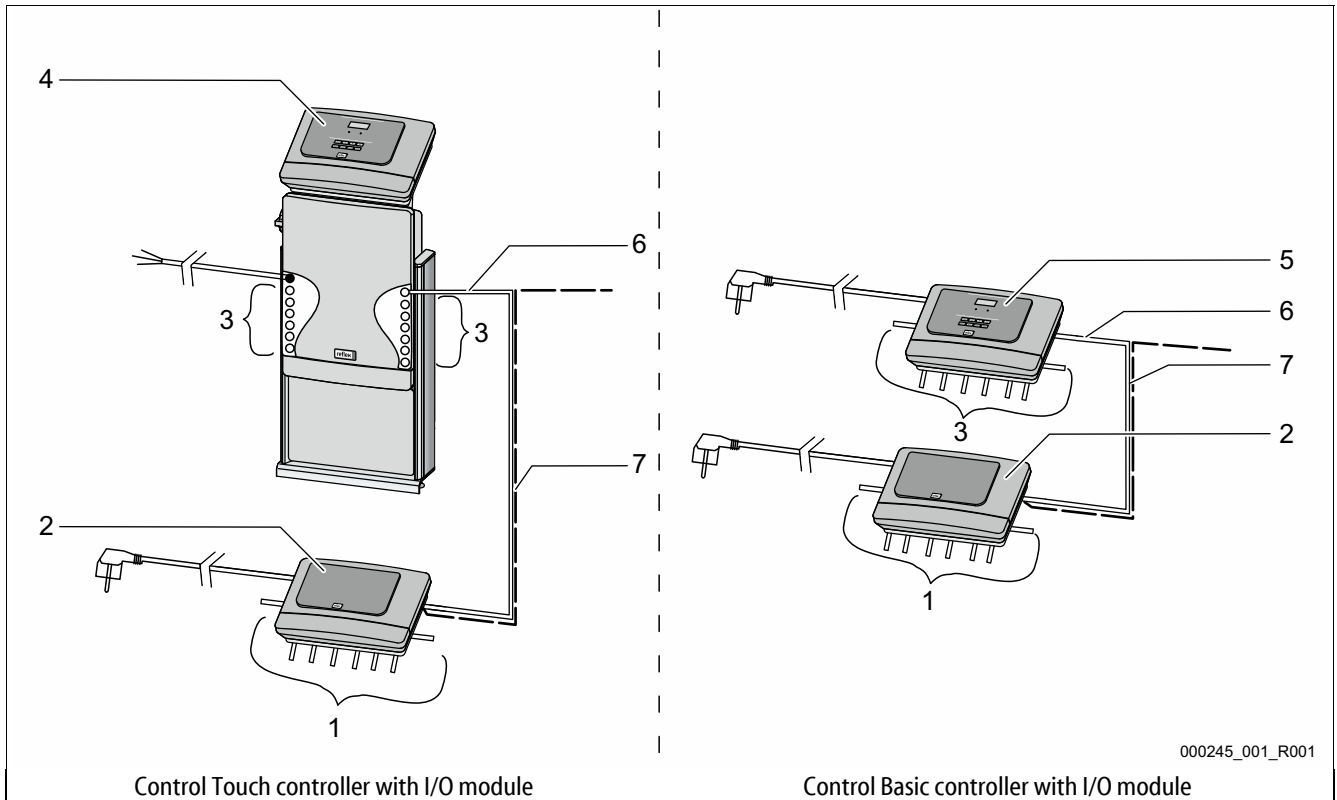
- Risk of serious injury or death due to electric shock. Some parts of the main board may still carry 230 V voltage even with the device physically isolated from the 230 V power supply.
 - Before you remove the covers, completely isolate the device controller from the power supply.
 - Verify that the main circuit board is voltage-free.

5.1 Setting the terminators in RS-485 networks

Examples for the activation and deactivation of terminators in RS-485 networks.

- The main circuit board of the Control Basic provides either the DIP switches 1 and 2 or the jumper J3.
- Maximum length for an RS-485 connection is 1000 metres

Device controllers with I/O module.

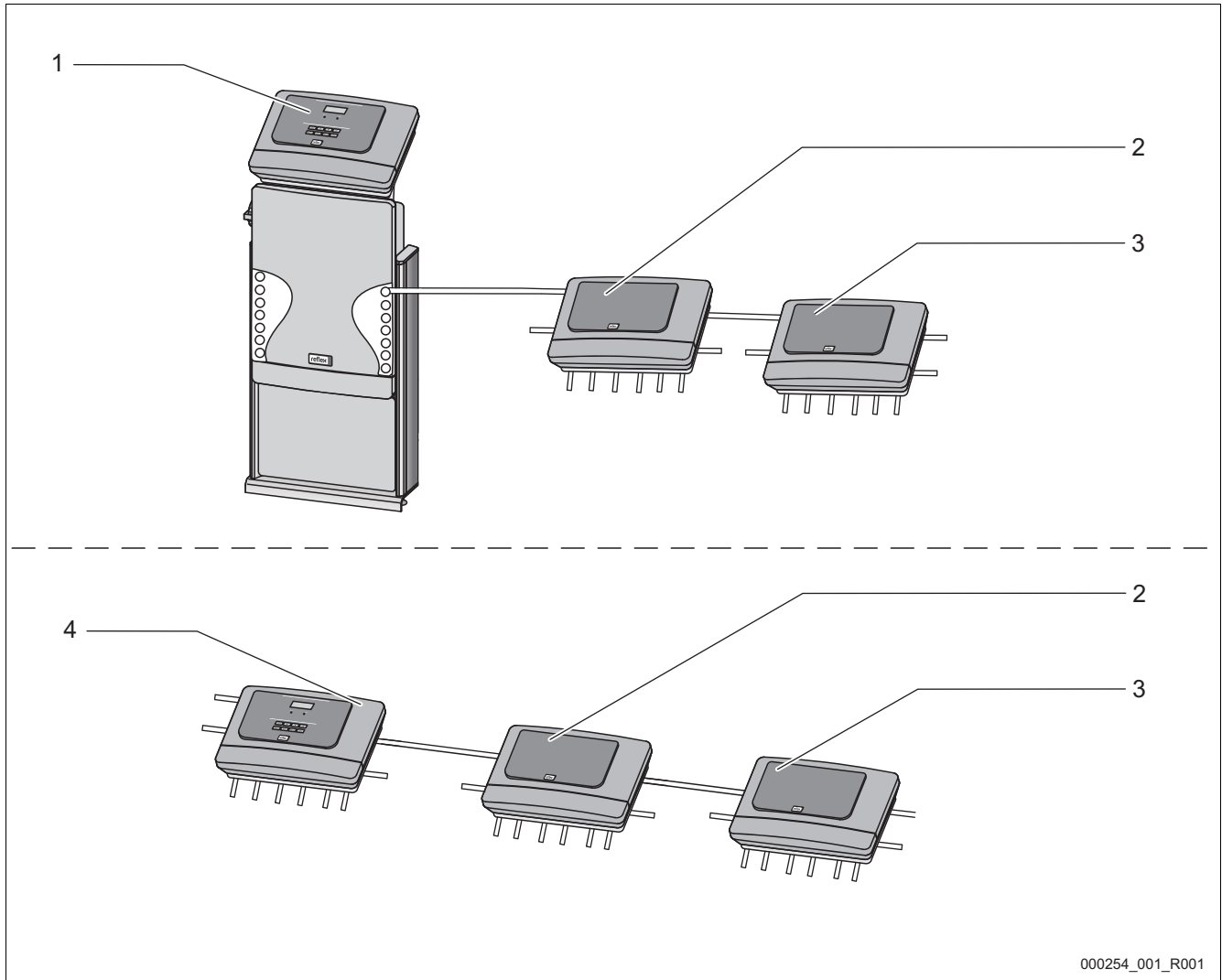


1	Relay outputs of the I/O module <ul style="list-style-type: none"> • 6 digital outputs • 2 analogue outputs
2	I/O module
3	Connections of the I/O conductors
4	"Control Touch" controller

5	"Control Basic" controller
6	RS-485 connection
7	Optional RS-485 connection <ul style="list-style-type: none"> • Master – Slave • Fieldbus

Terminator settings						
Jumper / Switch	Jumpers J10 and J11		DIP switches 1 and 2		Jumper J3 1 and 2 and 3 and 4	
	Activated	Deactivated	Activated	Deactivated	Activated	Deactivated
I/O module	X					
Contol Touch			X			
Control Basic			X		X	

Device controllers with I/O module and bus module.



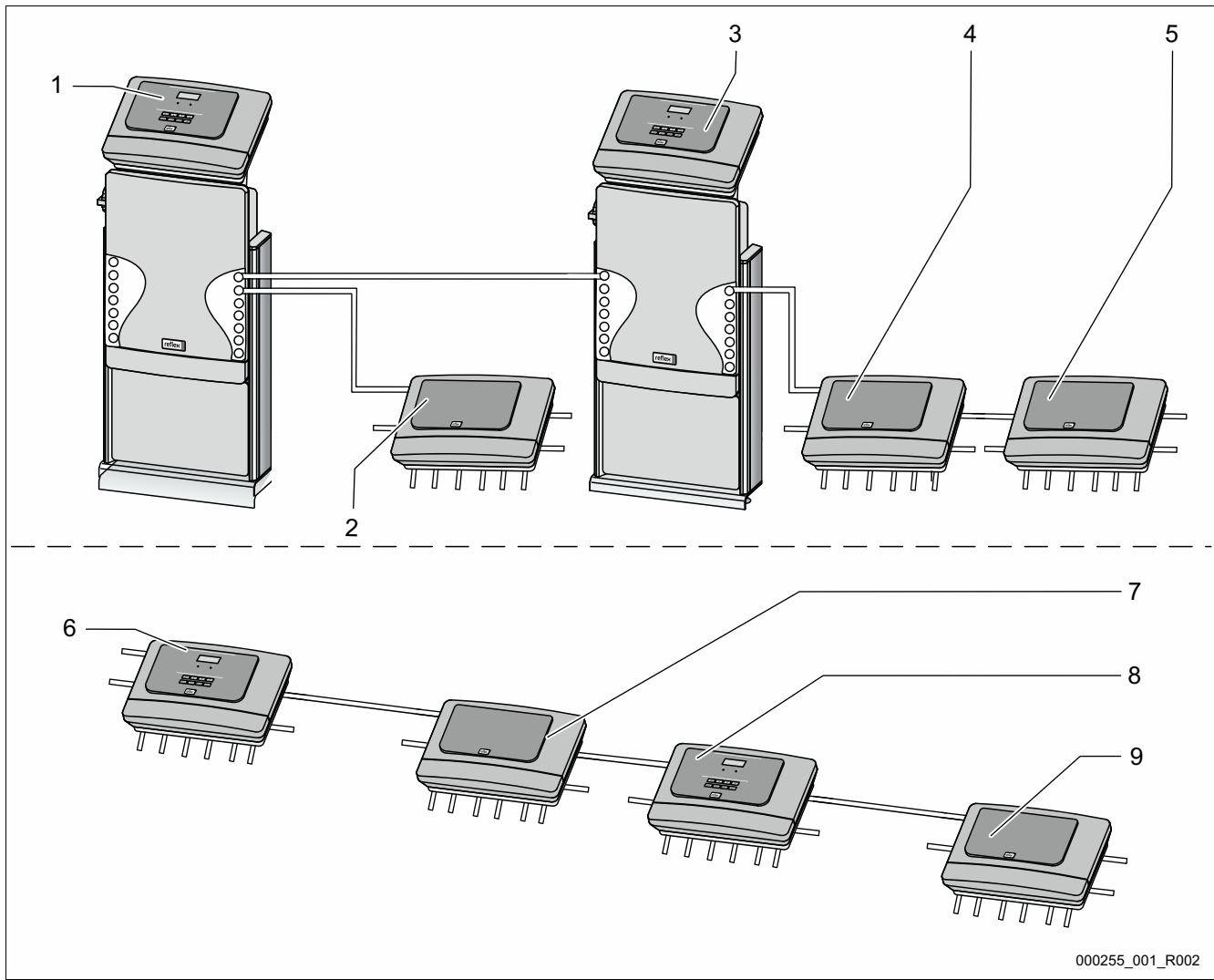
000254_001_R001

1	"Control Touch" controller
2	I/O module

3	Bus module
4	"Control Basic" controller

Terminator settings						
Jumper / Switch	Jumpers J10 and J11		DIP switches 1 and 2		Jumper J3 1 and 2 and 3 and 4	
	Activated	Deactivated	Activated	Deactivated	Activated	Deactivated
I/O module		X				
Contol Touch			X			
Control Basic			X		X	
Bus module					X	
• Lon Works						
• Profibus DP						
• Ethernet						

Device controllers and I/O modules in Master – Slave functions.



000255_001_R002

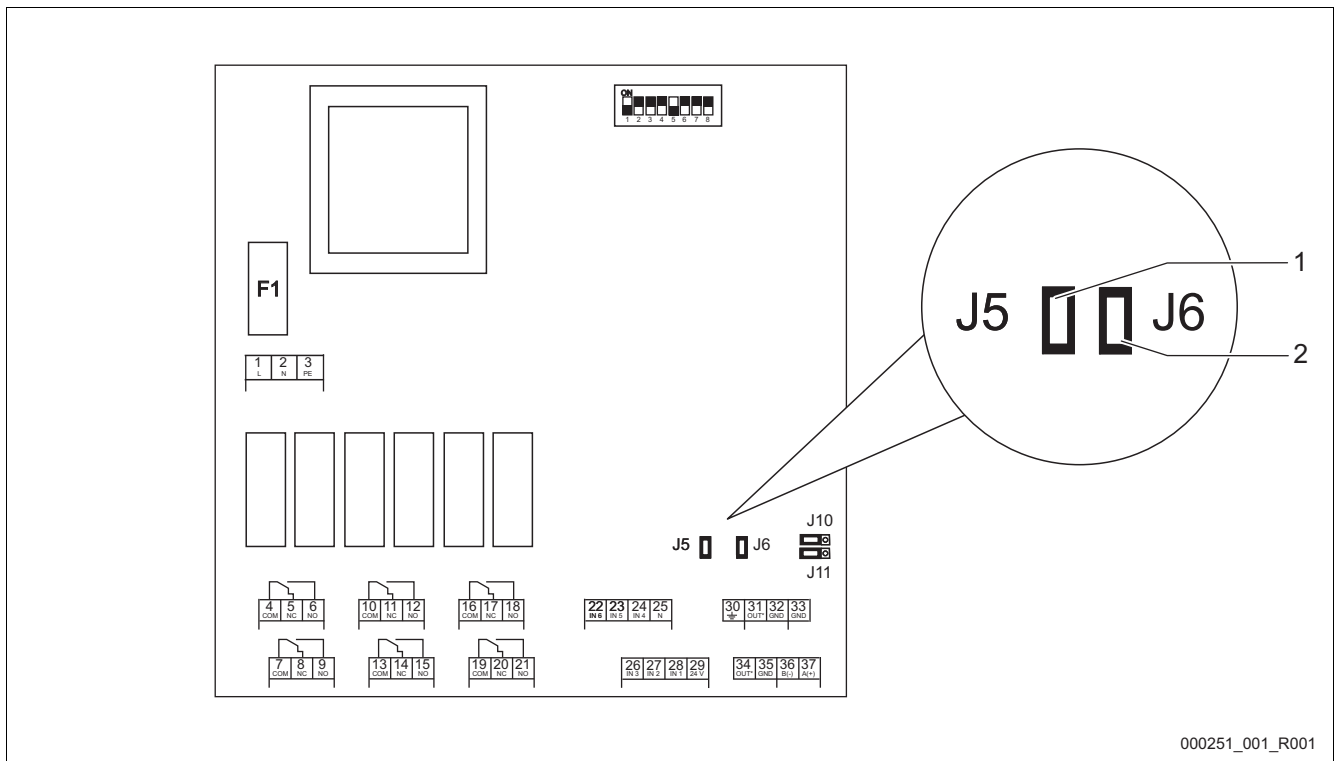
1	Control Touch controller in Master function
2	I/O module for the Master function
3	Control Touch controller in Slave function
4	I/O module for the Slave function
5	I/O module for expansion

6	Control Basic controller in Master function
7	I/O module for the Master function
8	Control Basic controller in Slave function
9	I/O module for the Slave function

Terminator settings						
Jumper / Switch	Jumpers J10 and J11		DIP switches 1 and 2		Jumper J3 1 and 2 and 3 and 4	
	Activated	Deactivated	Activated	Deactivated	Activated	Deactivated
Master function:						
I/O module	X					
Control Touch			X			
Control Basic			X		X	
Slave function:						
I/O module		X				
I/O module for expansion	X					
Control Touch			X			
Control Basic			X		X	

5.2 Setting the analogue outputs

Set the analogue outputs on the I/O module's main circuit board.



000251_001_R001

1 Jumper J5

2 Jumper J6

Use the jumpers J5 and J6 to set both analogue outputs as current or as voltage outputs.

Proceed as follows:

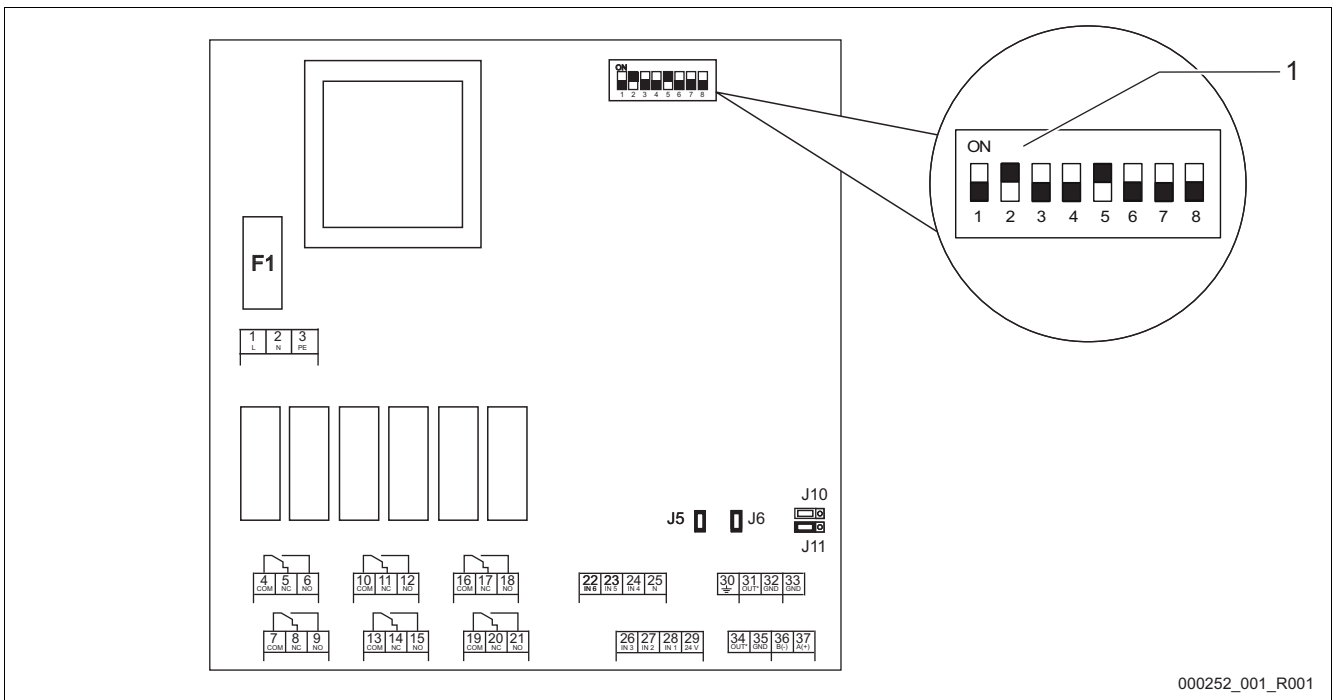
1. Pull the mains plugs of the I/O module.
2. Open the housing cover.
3. Plug the jumpers in the required position.

Analogue outputs	Setting the jumpers	Current output* 0 – 20 mA or 4 – 20 mA	Voltage output* 0 – 10 V or 2 – 10 V
Analogue output 1	J5 is plugged		X
	J5 is not plugged	X	
Analogue output 2	J6 is plugged		X
	J6 is not plugged	X	

* Depending on the relevant setting in the device controllers

5.3 Setting the module address

Set the module address on the I/O module's main circuit board.



000252_001_R001

1	DIP switch
---	------------

DIP switch position:

- DIP switch 1 – 4
 - For setting the module address
 - Variable setting ON or OFF
- DIP switch 5
 - Permanently on position ON.
- DIP switch 6 – 8
 - For internal testing.
 - On position OFF during operation.

Use DIP switches 1 – 4 to set the module address.

Proceed as follows:

1. Pull the mains plugs of the I/O module.
2. Open the housing cover.
3. Set the DIP switches 1 – 4 to position ON or OFF.

Module address	DIP switch								Used for the modules
	1	2	3	4	5	6	7	8	
1	1	0	0	0	1	0	0	0	1
2	0	1	0	0	1	0	0	0	2
3	1	1	0	0	1	0	0	0	3
4	0	0	1	0	1	0	0	0	4
5	1	0	1	0	1	0	0	0	5
6	0	1	1	0	1	0	0	0	6
7	1	1	1	0	1	0	0	0	7
8	0	0	0	1	1	0	0	0	8
9	1	0	0	1	1	0	0	0	9
10	0	1	0	1	1	0	0	0	10

5.4 Standard setting of the I/O module

The inputs and outputs of the I/O modules are given a default setting for every device group.

- Variomat
- Variomat Giga
- Reflexomat
- Servitec

These default settings can be changed, if required, and adjusted to local conditions.

Responses by the inputs 1 - 6 of the I/O module are recorded and displayed in the corresponding device controller's fault memory.



Note!

- Default settings apply to software version V1.10 and higher.
- All digital inputs and outputs can be set freely as option. Settings to be made by the Reflex Customer Service, see chapter 7.1 "Reflex Customer Service" on page 26 .

Default setting of the Variomat I/O module

Location	Signal evaluation	Message text	Fault memory entry	Priority	Signal on the input triggers the following action
Inputs					
1	N.C.	External temperature monitoring	Yes	Yes	<ul style="list-style-type: none"> Solenoid valves are closed. <ul style="list-style-type: none"> Solenoid valve (2) in overflow line (1) Solenoid valve (3) in overflow line (2) Output relay (1) is switched.
2	N.C.	External signal, Minimum pressure	Yes	No	<ul style="list-style-type: none"> Solenoid valves are closed. <ul style="list-style-type: none"> Solenoid valve (2) in overflow line (1) Solenoid valve (3) in overflow line (2) Output relay (2) is switched.
3	N.C.	Manual make-up	Yes	Yes	<ul style="list-style-type: none"> Solenoid valve (1) in make-up line is manually opened. Output relay (5) is switched.
4	N.O.	Emergency-Off	Yes	Yes	<ul style="list-style-type: none"> Pumps (1) and (2) are switched off. Solenoid valves (2) and (3) in the overflow lines are closed. Solenoid valve (1) in the make-up line is closed. Switches "Group alarm" in the device controller.
5	N.O.	Manual pump 1	Yes	Yes	<ul style="list-style-type: none"> Pump (1) is manually switched on. Output relay (5) is switched.
6	N.O.	Manual OF-1	Yes	Yes	Solenoid valve (1) is opened.
Outputs					
1	Changeover contact	---	---	---	See Input 1
2	Changeover contact	---	---	---	See Input 2
3	Changeover contact	---	---	---	<ul style="list-style-type: none"> Below minimum pressure. Switches "ER 01" message in the device controller.
4	Changeover contact	---	---	---	<ul style="list-style-type: none"> Maximum pressure exceeded. "ER 10" message in the device controller.
5	Changeover contact	---	---	---	<ul style="list-style-type: none"> Switches at manual mode Switches at manual mode Switches the active inputs 3, 5, 6.
6	Changeover contact	Make-up fault	---	---	<ul style="list-style-type: none"> Make-up setting values exceeded Switches the following messages in the device controller. <ul style="list-style-type: none"> "ER 06", Make-up time "ER 07", Make-up cycles "ER 11", Make-up quantity "ER 15", Make-up valve "ER 20", Maximum make-up quantity

Default setting of the Variomat Giga I/O module.

Location	Signal evaluation	Message text	Fault memory entry	Priority	Signal on the input triggers the following action
Inputs					
1	N.C.	External temperature monitoring	Yes	Yes	<ul style="list-style-type: none"> The solenoid valves in the overflow lines are closed. <ul style="list-style-type: none"> Solenoid valve (2) in overflow line (1) Solenoid valve (3) in overflow line (2) Switches "Group alarm" in the device controller.
2	N.C.	Emergency-Off	Yes	Yes	<ul style="list-style-type: none"> Pumps (1) and (2) are switched off. Overflow solenoid valves (2) and (3) are closed. Solenoid valve (1) in the make-up line is closed. Switches "Group alarm" in the device controller.
3	N.C.	Manual make-up	Yes	Yes	<ul style="list-style-type: none"> Solenoid valve (1) in make-up line is manually opened. Output relay (5) is switched.
4	N.O.	External signal, Minimum pressure	Yes	Yes	<ul style="list-style-type: none"> The solenoid valves in the overflow lines are closed. <ul style="list-style-type: none"> Solenoid valve (2) in overflow line (1) Solenoid valve (3) in overflow line (2) Output relay (4) is switched. Switches "Group alarm" in the device controller.
5	N.O.	Manual pump 1	Yes	Yes	<ul style="list-style-type: none"> Pump (1) is manually switched on. Output relay (5) is switched.
6	N.O.	Manual OF-1	Yes	Yes	<ul style="list-style-type: none"> Solenoid valve (2) in overflow line (1) is opened. Output relay (5) is switched.
Outputs					
1	Changeover contact	---	---	---	Switches at message ER 04
2	Changeover contact	---	---	---	Switches at opened solenoid valves in the overflow lines. <ul style="list-style-type: none"> Solenoid valves (2) Solenoid valves (3)
3	Changeover contact	---	---	---	Switches at opened solenoid valve (1) in the make-up line
4	Changeover contact	---	---	---	Switches at the messages: <ul style="list-style-type: none"> "ER 01", Minimum pressure "ER 10", Maximum pressure
5	Changeover contact	---	---	---	<ul style="list-style-type: none"> Switches at manual mode Switches at manual mode Switches the active inputs 3, 5, 6.
6	Changeover contact	Make-up fault	---	---	<ul style="list-style-type: none"> Make-up setting values exceeded Switches the following messages in the device controller. <ul style="list-style-type: none"> "ER 06", Make-up time "ER 07", Make-up cycles "ER 11", Make-up quantity "ER 15", Make-up valve "ER 20", Maximum make-up quantity

Default setting of the Reflexomat I/O module

Lo cat ion	Signal evaluation	Message text	Fault memory entry	Priority	Signal on the input triggers the following action
Inputs					
1	N.C.	External temperature monitoring	Yes	Yes	Switches "Group alarm" in the device controller.
2	N.C.	External signal, Minimum pressure	Yes	Yes	Switches "Group alarm" in the device controller.
3	N.C.	Manual make-up	Yes	Yes	Solenoid valve (1) in make-up line is manually opened.
4	N.O.	Emergency-Off	Yes	Yes	<ul style="list-style-type: none"> • Compressor (1) switched off. • Compressor (2) switched off. • Solenoid valve (1) in the make-up line is closed. • Solenoid valve (2) in overflow line (1) is closed. • Solenoid valve (3) in overflow line (2) is closed. • Switches "Group alarm" in the device controller.
5	N.O.	---	---	---	---
6	N.O.	---	---	---	---
Outputs					
1	Changeover contact	---	---	---	Switches the following messages in the device controller when the compressors are faulty. <ul style="list-style-type: none"> • "ER 04.1", Compressor 1 • "ER 04.2", Compressor 2
2	Changeover contact	---	---	---	<ul style="list-style-type: none"> • Make-up setting values exceeded • Switches the following messages in the device controller. <ul style="list-style-type: none"> – "ER 06", Make-up time – "ER 07", Make-up cycles – "ER 11", Make-up quantity – "ER 15", Make-up valve – "ER 20", Maximum make-up quantity
3	Changeover contact	---	---	---	Switches the following messages in the device controller: <ul style="list-style-type: none"> • "ER 01", Minimum pressure • "ER 10", Maximum pressure
4	Changeover contact	---	---	---	Switches the following messages in the device controller: <ul style="list-style-type: none"> • "ER 03", Maximum water level
5	Changeover contact	---	---	---	<ul style="list-style-type: none"> • Switches at manual mode • Switches at manual mode
6	Changeover contact	HW drain	---	---	<ul style="list-style-type: none"> • Active when water level 85 % is exceeded. • Inactive when water level 70 % is reached.

Default setting of the Servitec I/O module

Location	Signal evaluation	Message text	Fault memory entry	Priority	Signal on the input triggers the following action
Inputs					
1	N.C.	External temperature monitoring	Yes	Yes	<ul style="list-style-type: none"> • Pump 1 switched off. • Pump 2 switched off. • The solenoid valves in the overflow lines are closed. <ul style="list-style-type: none"> – Solenoid valve (2) in overflow line (1) – Solenoid valve (3) in overflow line (2) • Output relay (1) is switched.
2	N.C.	External signal, Minimum pressure	Yes	Yes	Switches output relay (1).
3	N.C.	Manual make-up	Yes	Yes	<ul style="list-style-type: none"> • Starts the make-up cycle. • Switches output relay (5).
4	N.O.	Emergency-Off	Yes	Yes	<ul style="list-style-type: none"> • Pump 1 switched off. • Pump 2 switched off. • Solenoid valve (1) in the make-up line is closed. • Solenoid valve (2) in overflow line (1) is closed. • Solenoid valve (3) in overflow line (2) is closed. • Switches "Group alarm" in the device controller.
5	N.O.	Manual pump 1	Yes	Yes	<ul style="list-style-type: none"> • Starts pump 1 • Switches output relay (5).
6	N.O.	Man U-1	Yes	Yes	<ul style="list-style-type: none"> • Opens the solenoid valve (2) in overflow line (1). • Switches output relay (5).
Outputs					
1	Changeover contact	---	---	---	---
2	Changeover contact	---	---	---	---
3	Changeover contact	---	---	---	Switches the following message in the device controller: <ul style="list-style-type: none"> • "ER 01", Minimum pressure
4	Changeover contact	---	---	---	Switches the following message in the device controller: <ul style="list-style-type: none"> • "ER 10", Maximum pressure
5	Changeover contact	---	---	---	<ul style="list-style-type: none"> • Switches at manual mode • Switches at manual mode
6	Changeover contact	Make-up fault	---	---	<ul style="list-style-type: none"> • Make-up setting values exceeded • Switches the following messages in the device controller. <ul style="list-style-type: none"> – "ER 06", Make-up time – "ER 07", Make-up cycles – "ER 11", Make-up quantity – "ER 12", Filling time – "ER 13", Filling quantity – "ER 15", Make-up valve – "ER 20", Maximum make-up quantity

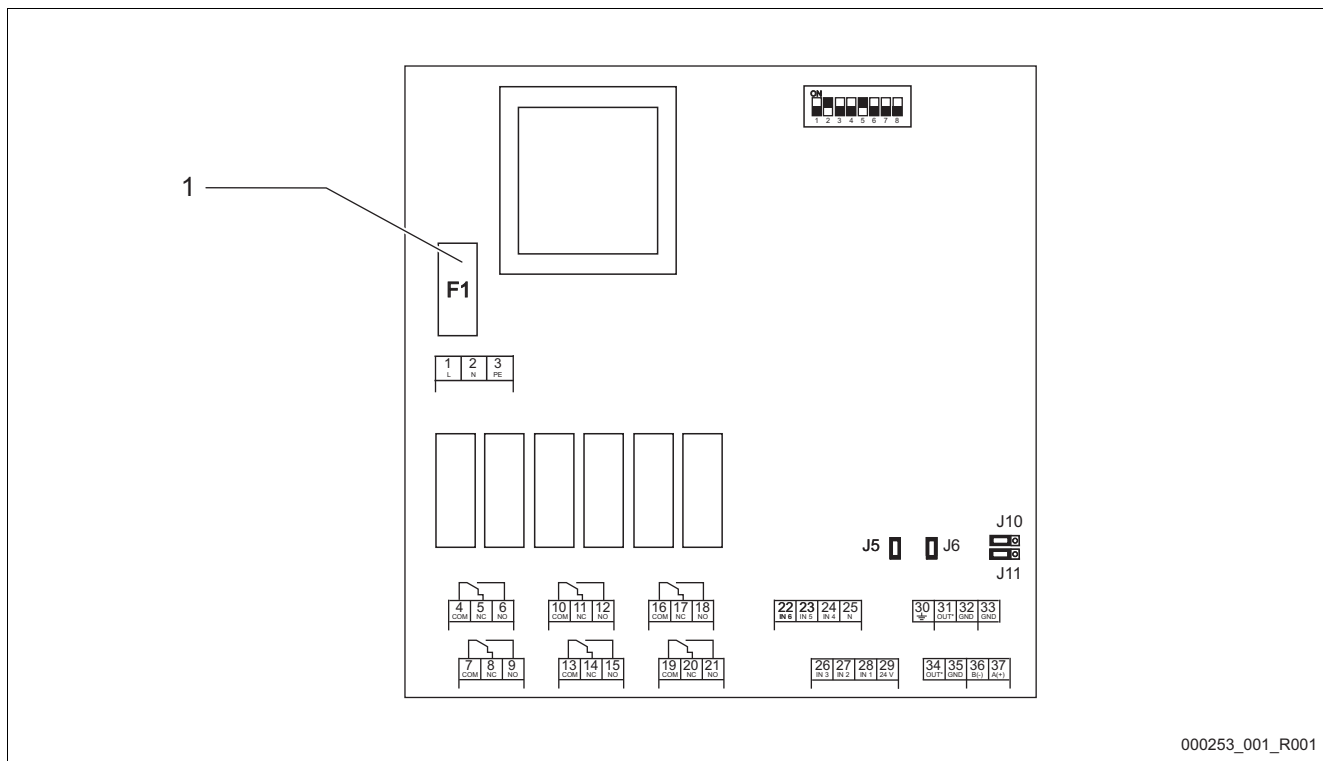
6 Replacing the fuses



Danger – electric shock!

- Risk of serious injury or death due to electric shock. Some parts of the main board may still carry 230 V voltage even with the device physically isolated from the 230 V power supply.
 - Before you remove the covers, completely isolate the device controller from the power supply.
 - Verify that the main circuit board is voltage-free.

Fusing is provided on the I/O module's main circuit board.



000253_001_R001

1	Feeble current fuse F1 <ul style="list-style-type: none"> • 250 V, 0.16 A time-lag
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Proceed as follows:

1. Disconnect the I/O module from the power supply.
 - Pull the power plug from the bus module.
2. Open the terminal space cover.
3. Remove the housing cover.
4. Replace the defective fuse.
5. Re-attach the housing cover.
6. Close the terminal space cover.
7. Reconnect the power supply for the module.

The fuse replacement is completed.

7 Annex

7.1 Reflex Customer Service

Central customer service

Switchboard: Telephone number: +49 (0)2382 7069 - 0

Customer Service extension: +49 (0)2382 7069 - 9505

Fax: +49 (0)2382 7069 - 523

E-mail: service@reflex.de

Technical hotline

For questions about our products

Telephone number: +49 (0)2382 7069-9546

Monday to Friday, 8:00 a.m. – 4:30 p.m.



Thinking solutions.

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