FLEXIT

118265EN-01
2020-05

SP90

ART.NO. 112439

EN

INSTALLATION INSTRUCTIONS

CS2500 - Expansion module/IO-module

Our products are subject to continuous development and we therefore reserve the right to make changes. We also disclaim liability for any printing errors that may occur.

Contents

Symbols

DANGER! When a text box is this colour, it means that a life-threatening or serious personal injury may be the consequence of not following the instructions.

NOTICE! When a text box is this colour, it means that a poor utilisation ratio or product operating issues may be the consequence of not following the instructions.

CAUTION! When a text box is this colour, it means that material damage may be the consequence of not following the instructions.

INFO! When a text box is this colour, it means that it contains important information.

SAFETY INSTRUCTION

- To avoid the risk of fire, electric shock or injury, read all the safety instructions and warning texts before using the unit.
- All electrical connections must be carried out by qualified electricians.
- If the power lead is damaged, it must be replaced by the manufacturer, the manufacturer's service agent or a similarly qualified person.
- The unit must not be used to extract combustible or flammable gases.
- It is the installer's responsibility to carry out a full safety and function assessment of the appliance.
- All electrical power to the unit must be shut off before carrying out service or maintenance, including cleaning:
  1. Switch off the unit in the following menu on the handheld terminal: 'Start page > SERVICE SWITCH > OFF'.
  2. Wait until the unit has stopped.
  3. Switch off the all-pole switch.

- This unit is only designed for ventilation air in homes and commercial buildings.
- To maintain a good indoor climate, comply with regulations and avoid condensation damage, the unit must never be stopped apart from during service/ maintenance or in connection with an accident.
- The unit must not be operated without the filters being in place.
- All plumbing work must be carried out by an authorised plumber.
- The location of the water battery must be approved by a plumber owing to the risk of water leaks.
- Check whether the unit's operating voltage is 400V or 230V.
- The electric battery must be configured in accordance with the operating voltage.

1. Product description

SP90 is an extension module that can be connected to a CS2500 controller.

The extension module offers the following features:
- Power supply AC 24 V or DC 24 V via the controller
- 8 universal I/Os (configurable inputs / outputs, for analog or digital signals)
- 4 relay outputs (NO contacts)
- 2 analog outputs (DC 0...10 V)

DANGER! All electrical connections must be carried out by qualified electricians.

2. Commission Modbus modules

CS2500 controller and the expansion module SP90 are involved in this action:

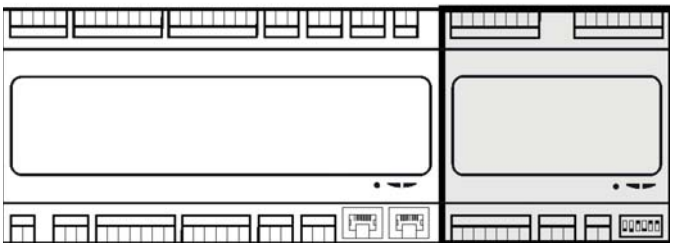


fig. 1

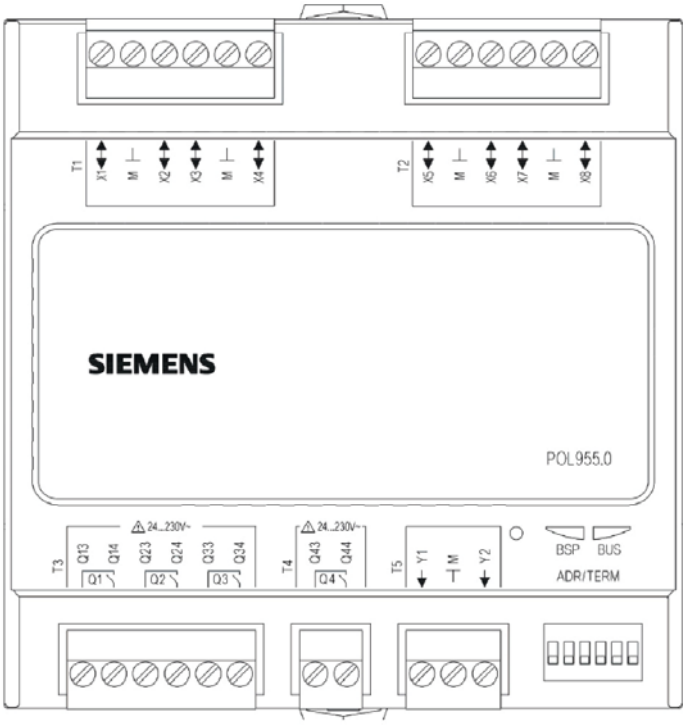


fig. 2

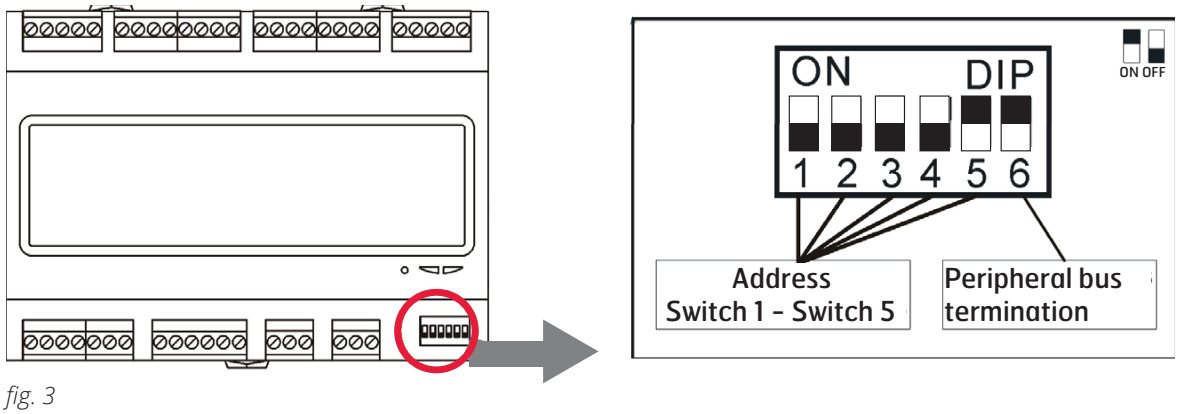


fig. 3

3. Installation

Complete following tasks to install the expansion module:

Step	Action
1	Disconnect the power for CS2500-Controller
2	Connect the expanison module to the unit with the enclosed contact. Connect the two units to each other with the contact. (See fig. 1)
3	Connect the units that are required for the desired functionality. Use the enclosed contacts. (See fig. 2) **OBS! The external components are not included in this accessory, they have to be ordered separately.**
4	Adjust dip-switch according to fig. 3.
5	Connect the CS2500 controller to power.
6	Installation is done, but you have to configure it to get the correct function.

3.1. Login

Two keys means that you need to be logged in at level 3 to be able to make changes. The password for this level is ”2000”.

See the main manual for the regulator for more information about logging in and different levels.

4. Connections

Step		Function
Q13	DO	Fire fan
Q14	DO	Fire fan
Q23	DO	Free
Q24	DO	Free
Q33	DO	Additional cooling, pump
Q34	DO	Additional cooling, pump
Q43	DO	Additional water/electric heating
Q44	DO	Additional water/electric heating
Y1	AO	Mixing damper (0–10V)
M	-	G0
Y2	AO	Additional cooling (0–10V)
X1	AI	External temperature setpoints (0–10V)
M	-	G0
X2	AI	Temperature, exhaust
X3	AI	Temperature frost guard, additional heating
M	-	G0
X4	AI	Temperature, supply air, with additional sequence
X5	AO	Additional heating (0–10V)
M	-	G0
X6	DI	Alarm, additional electric heating
X7	-	Free
M	-	G0
X8	-	Free

5. Configuration

Proceed as follows to configure the expansion module:

Step	Action
2	Choose Main index > Configuration > Configuration 1 > Expansionsmodules
3	Choose ”One”.
4	Choose ”Restart” and then ”execute”
5	Main configuration is now done, and the system will restart.
6	If the configuration is performed correctly both BSP and BUS will have a green light.

Activate functions:
You have to activate the functions that you are going to use. Choose the sections that match the different functions.

6. Additional cooling

The default function of the main regulator is to control two heating and three cooling steps. The SP90 module can control additional steps, either in sequence or as a standalone temperature zone.

An additional cooling coil can be connected to the system. It can be included in the temperature regulation loop in two different ways, either as a separate temperature zone (standalone) or as part of the ordinary sequence.

To activate the function:

Start page > Main menu > Configuration > Configuration 1 > Additional cooling

Parameter	Function
Water	Analogue output for liquid cooling
DX 1step	One digital output for DX cooling
DX 2steps	Two digital outputs for DX cooling, regulate in sequence.
DX 3steps	Two digital outputs for DX cooling, regulate binary.
ModBus	ModBus controlled valve in combination with liquid cooling

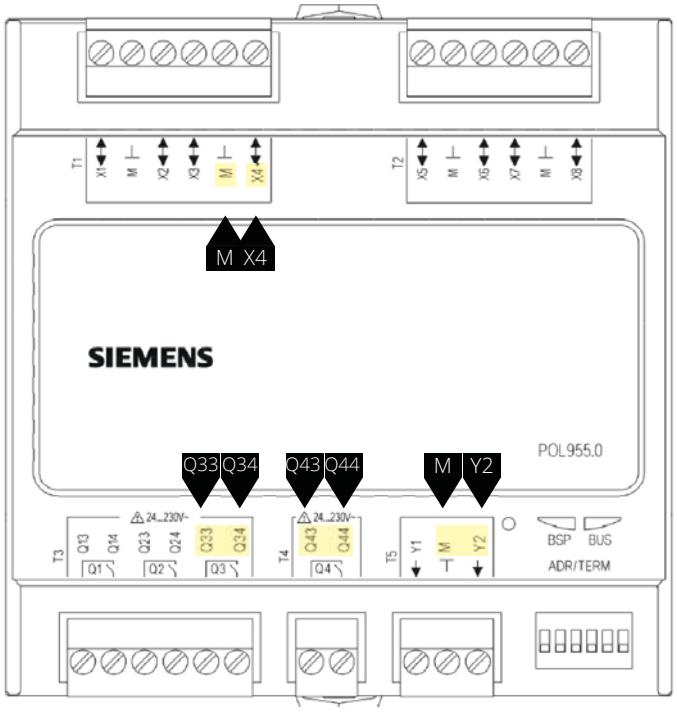
After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

To configure the function:

Start page > Main menu > Configuration > Configuration 2 > Cooling 2 control

Parameter	Function
Sequence	Additional cooling is included in the cooling sequence after the ordinary cooling steps DX1-DX3
Standalone	Additional cooling is regulated separately independently of the ordinary temperature regulation. **NB!** This function requires installation of an additional supply air sensor.



Block no.	Function
Q33	Q33 Additional cooling/DX1
Q34	Q34 Additional cooling/DX1
Q43	Q43 Additional cooling/DX2
Q44	Q44 Additional cooling/DX2
X4	Supply air sensor, Additional cooling
M	Supply air sensor, Additional cooling
Y2	Additional cooling 0-10V
M	Additional cooling G0

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

RESTART

After the restart, outputs for the DX steps must be selected.

Start page > Main menu > Configuration > Config. In/Outputs> Temp. control outputs>

Ex. DX cooling output1 = 1Q3
Ex. DX cooling output2 = 1Q4

If 'Standalone' is selected, the setpoint for Additional cooling is adjusted via:

Start page > Quick menu > Settings > Setpoints/Settings

Parameter	Function
Setpoint additional seq.	Indicates the supply air temperature for Additional cooling in 'Standalone' mode

For other cooling settings, see chap. 6 Cooling in the main manual.

7. Additional heating

An additional heating coil can be connected to the system. It can be included in the temperature regulation in two different ways, either as a separate temperature zone (standalone) or as an additional coil as part of the ordinary sequence.

7.1. For water heating

To activate the function:

Start page > Main menu > Configuration > Configuration 1 > Additional Water heating

Parameter	Function
Yes	Additional liquid heating activated
Yes+Preh.Outdoor temp.	Additional liquid heating activated as pre-heating and controlled by the outdoor temperature
Yes+Preh.Frost protection temp.	Additional liquid heating activated as preheating and controlled by the frost temperature sensor
ModBus	ModBus controlled valve in combination with liquid heating

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

RESTART

7.1.1. For configuration of water heating

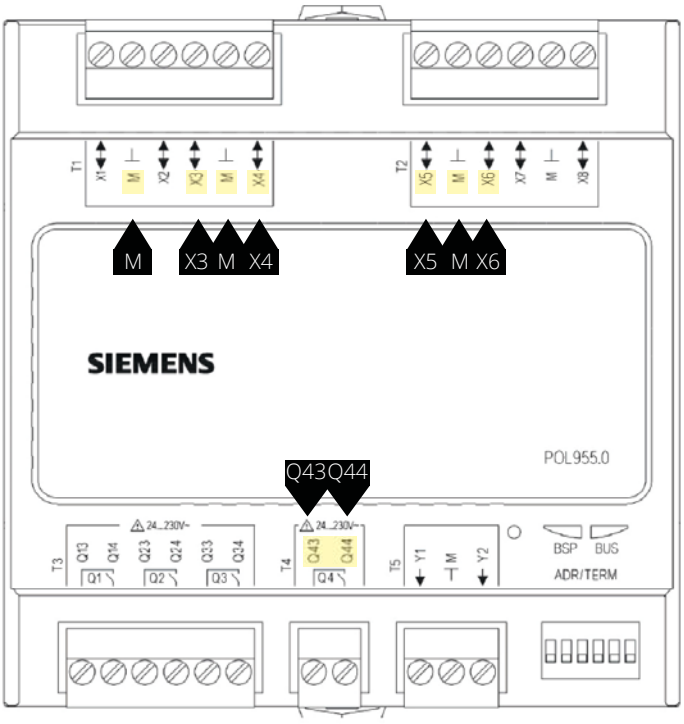
Start page > Main menu > Configuration > Configuration 2 > Frost protection, additional Water heating

Parameter	Function
No	No frost protection
Sensor	Frost protection via sensor
Sensor+2 sp	Frost protection via sensor and two set-points
Guard	Frost protection via guard
Sens+Guard	Frost protection via sensor and guard
2sp+Guard	Frost protection via sensor, two setpoints and guard

7.1.2. For configuration of circulation pump for water heating

Start page > Main menu > Configuration > Configuration 2 > Pump, additional Water heating.

Parameter	Function
No	No circulation pump activated
Yes	Circulation pump without maintenance operation
Yes+Motion	Circulation pump with maintenance operation



Block no.	Function
X3	Return water sensor
M	Return water sensor
X4	Supply air sensor, additional heating
M	Supply air sensor, additional heating
X6	Frost guard (digital input)
M	Frost guard (digital input)
Q43	Pump output, additional heating
Q44	Pump output, additional heating
X5	Additional heating 0-10V
M	Additional heating G0

Start page > Main menu > Configuration > Configuration 2 > Additional water heating regulation

Parameter	Function
Standalone	Additional heating is regulated separately independently of the ordinary temperature regulation **NB!** This function requires installation of an additional supply air sensor
Seq.: Heating-Additional heating	Additional heating is included in the heating sequence AFTER the ordinary heating step
Seq.: Additional heating-Heating	Additional heating is included in the heating sequence BEFORE the ordinary heating step

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 2 > Restart > Execute

RESTART

7.1.3. For parameter setting of the water heating

Start page > Main menu > Unit > Temperature regulation > Additional water heating

Parameter	Function
Regulator	Current heating regulator value
Output signal	Current value at analogue output
Setpoint additional seq.	Setpoint for additional sequence when Standalone mode is selected
Frost protection	Current frost regulator value
Pump	Current pump status
Preheating	Current preheating mode
Frost guard	Current position of frost guard

If "Standalone' is selected, the setpoint for Additional water heating is adjusted via:

Start page > Quick menu > Settings > Setpoints/Settings

Parameter	Function
Setpoint additional seq.	Indicates the supply air temperature for Additional water heating in 'Standalone' mode

7.2. For electric heating

To activate the function:

Start page > Main menu > Configuration > Configuration 1 > Additional electric heating

Parameter	Function
No	No additional electric heating coil activated
Analogue	Additional heating coil with analogue control activated
1Step	Additional one-step electric heating register activated
2Step	Additional two-step electric heating register activated
3stepBin	Additional three-step electric heating register activated

After the restart, outputs for the electric steps must be selected.

Start page > Main menu > Configuration > Config. In/Outputs> Temp. control outputs>

Additional electric heating output1 = 1Q3
Additional electric heating output2 = 1Q4

After making a change in a configuration menu, a restart is required.

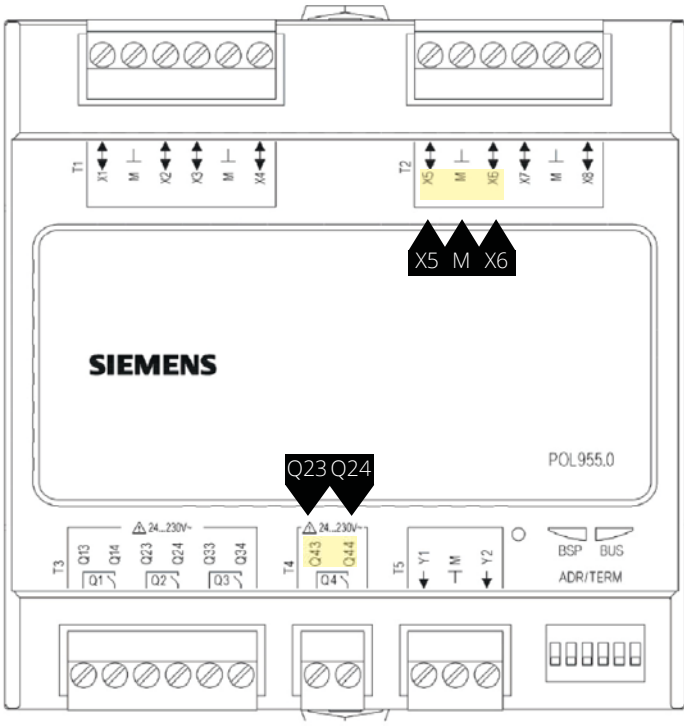
Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

RESTART

7.2.1. For configuration of electric heating

Start page > Main menu > Configuration > Configuration 2 > Alarm, additional electric heating

Parameter	Function
No	No alarm input activated
Yes	Alarm input activated



Block no.	Function
X5	Analogue output electric heating 0–10V
M	Analogue output electric heating G0
X6	Fire thermostat DI
M	Fire thermostat DI
Q23	Electric heating output 1 DO
Q24	Electric heating output 1 DO
Q43	Electric heating output 2 DO
Q44	Electric heating output 2 DO

Start page > Main menu > Configuration > Configuration 2 > Additional electric heating regulator

Parameter	Function
Standalone	Additional heating is regulated separately independently of the ordinary temperature regulation **NB!** This function requires installation of an additional supply air sensor
Seq.: Heating-Additional heating	Additional heating is included in the heating sequence AFTER the ordinary heating step
Seq.: Additional heating-Heating	Additional heating is included in the heating sequence BEFORE the ordinary heating step

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 2 > Restart > Execute

RESTART

7.2.2. For parameter setting of the additional heating

Start page > Main menu > Unit > Temperature regulation > Additional electric heating

Parameter	Function
Regulator	Current heating regulator value
Output signal	Current value at analogue output
Operation	Current position of electric heating register
Setpoint additional seq.	Setpoint for additional sequence when Standalone mode is selected
Alarm	Alarm mode for additional heating
Start step 1	Heating regulator value in % for start of first step
Start step 2	Heating regulator value in % for start of second step
Start step 3	Heating regulator value in % for start of third step
Hysteresis, power down	Power down hysteresis in % of steps
Max.signal fan st.	Limits the maximum heating requirement in % at the different fan steps

> Example of start step and power down hysteresis and limitation of heating requirement at different fan steps	
Start step 1 = 20%	Start step 2 = 40%
Fan step 1 = 30%	Fan step 2 = 60%
Power down hysteresis = 10%	
Heating step 1 switches in at 20% heating requirement and remains at max. 30% force while the fan is on step 1. Switches off when the heating requirement has fallen to 10%.	
Heating step 2 switches in at 40% heating requirement and remains at max. 60% force while the fan is on step 2. Switches off when the heating requirement has fallen to 30% or the fan goes down to step 1.	

Start page > Quick menu > Settings > Setpoints/Settings

If "Standalone' is selected, the setpoint for Additional electrical heating is adjusted via:

Parameter	Function
Setpoint addi-tional seq.	Indicates the supply air temperature for Additional electric heating in 'Standalone' mode

8. Fire fan

The unit has a potential-free output to control an external fire fan. This function is activated via the fire/smoke input. This assumes that the fire alarm function is activated in the automatic control system (see main manual).

Configure as follows::

Main menu > Configuration > Configuration 1 > Fire fan

Parameter	Function
Yes	Function activated
No	Function deactivated

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

RESTART

After the restart, the unit starts with an alarm: 'No config. IO' This means that an output must be defined for the fire fan function.

This is done via:

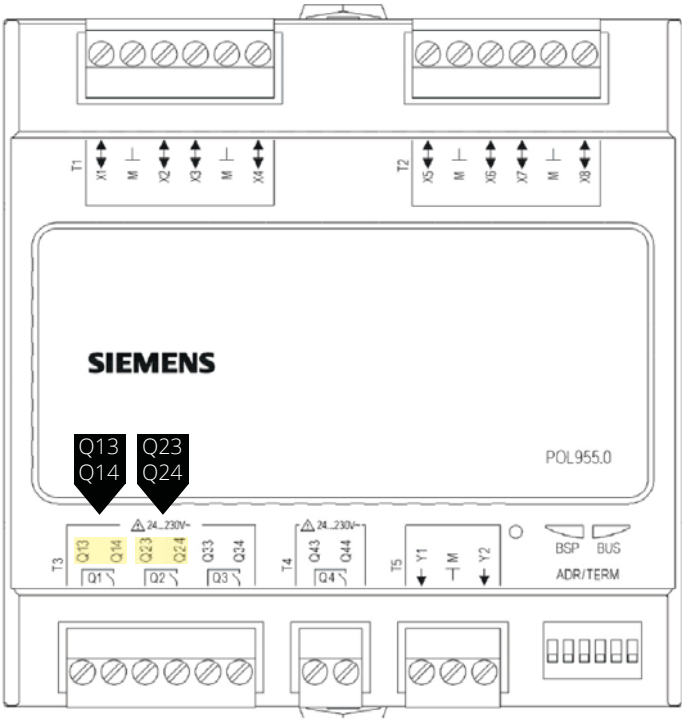
Main menu > Configuration > Config. Inputs/Outputs > Outputs, Fans > Fire fan Select

Parameter	Function
Q11	Selected unless the operating mode indication function is activated
Q12	Selected unless the DX step 2/3 function is activated

To switch contact function for the output:

Main menu > Unit > Outputs > Fire fan > Contact function

Parameter	Function
NO	Output normally open
NC	Output normally closed



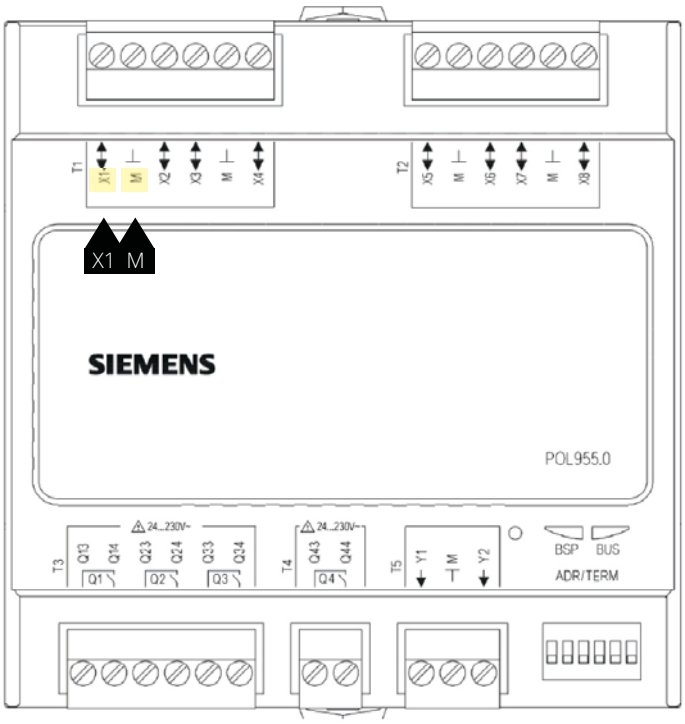
Valg	Block no.	Function
Q11	Q13	Fire fan output
	Q14	Fire fan output
Q12	Q23	Fire fan output
	Q24	Fire fan output

9. External setpoint

The temperature setpoint can be controlled externally. It is possible to specify whether the external setpoint is to be used as setpoint compensation or an absolute value. The value corresponds to the comfort setpoint.

Start page > Main menu > Configuration > Configuration 1 > External setpoint

Parameter	Function
No	External setpoint deactivated
Volt	External setpoint activated and regulated via 0-10 V
Ohm	External setpoint activated and regulated via 0-2.5 kOhm
QAA27	Not used
BSG21	Not used



Block no.	Function
X1	External setpoint signal 0-10V
M	External setpoint G0

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

RESTART

9.1. For configuration of external setpoint

Start page > Main menu > Configuration > Configuration 2 > Ext. setp. function

Parameter	Function
Comp.	Setpoint compensation
Main	Main setpoint

> Example of setpoint compensation
The comfort setpoint is set to +20 degrees
Ext. setpoint curve Y1 = -5
Ext. setpoint curve Y2 = +5
0 V at the input produces a setpoint of +15 degrees
10 V at the input produces a setpoint of +25 degrees

> Example of main setpoint
Ext. setpoint curve Y1 = +10
Ext. setpoint curve Y2 = +30
0 V at the input produces a setpoint of +10 degrees
10 V at the input produces a setpoint of +30 degrees
The comfort setpoint in the regulator has no function

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 2 > Restart > Execute

RESTART

9.2. For parameter setting of external setpoint

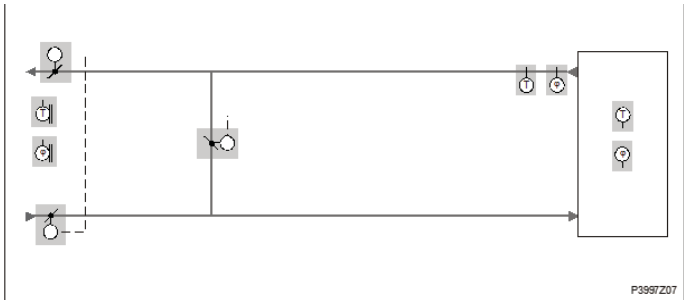
Start page > Quick menu > Settings > Setpoints/Settings > All settings > External setpoint

Parameter	Function
Ext. setpoint curve Y1	Indicates the lowest external setpoint
Ext. setpoint curve Y2	Indicates the highest external setpoint

10. Mixing damper

A mixing damper can be installed to recycle the extract air back into the supply air duct. This can be done with up to 80% recycled air and 20% outdoor air.
The following is a simplified summary of the components involved.

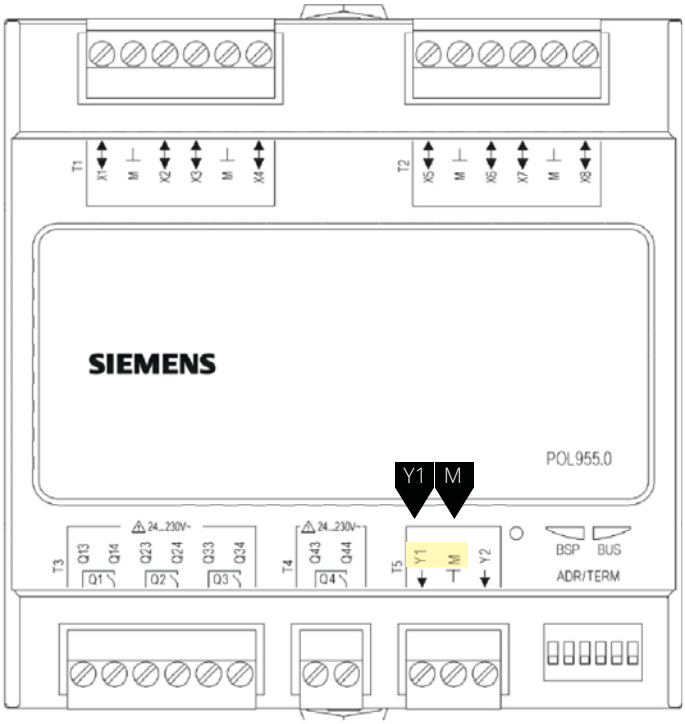
All dampers must have a 0–10V control system for stepless regulation between open and closed position.



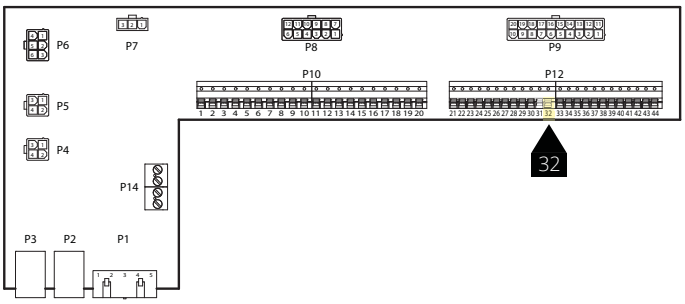
To activate the function:

Start page > Main menu > Configuration > Configuration 1 > Mixing damper

Parameter	Function
Active	Mixing damper activated, output signal 100% for full circula-tion.
Invert	Mixing damper activated, output signal 0% for full circulation.
MB Extract air	Not used
MB Supply air	Not used
MB Mixing	Not used
Limit extract air fan	The extract air fan is controlled by the position of the mixing damper.



Block no.	Function
Y1	Damper output 0-10V Mix damper
x	Damper output G0 Mix damper
P12-32	+24V power supply Mix damper



After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 1 > Restart > Execute

RESTART

10.1. For configuration of the heating sequence

Start page > Main menu > Configuration > Configuration 2 > Mixing damper sequence

Parameter	Function
Damper-Heating	Mixing damper primary, heating register (recovery system+heating) secondary
Heating-Damper	Heating register (recovery system+ heating) primary, mixing damper secondary

After making a change in a configuration menu, a restart is required.

Start page > Main menu > Configuration > Configuration 2 > Restart > Execute

RESTART

10.2. For parameter setting

Start page > Main menu > Unit > Temperature regulation > Mixing damper

Parameter	Function
Regulator	Current regulator value for mixed air
Output signal	Current value for damper actuator
Recovery	Shows current heat recovery. For Mixing damper = Normal, this value is always the same as the output signal. For Mixing damper = Inverted, this value is always the inverted output signal.
Min. outdoor air	Minimum outdoor air/minimum position of damper. Here the minimum airflow can be set as a percentage. This ensures that a certain volume of outdoor air is always blown into the room.
Start time	Time for the regulator's start process (100% recirculation).
Start temp.	Temperature limit for start process

> Example of mixing damper

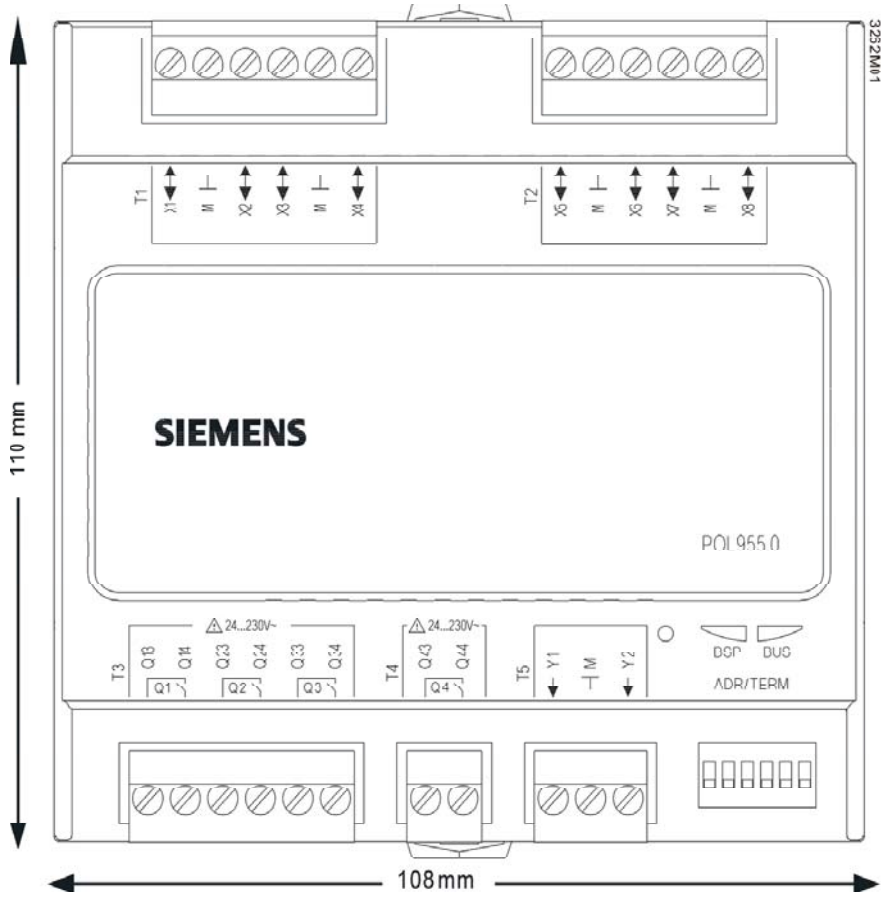
At the start, the mixing damper is entirely open during the period for Start time if outdoor air temperature < Start temp. The regulator determines the current position after this period.
If heating is required at the start, the heating register is activated in parallel and after start has been completed the mixed air regulator for heat recovery is set to max. (100% - Min. outdoor air).

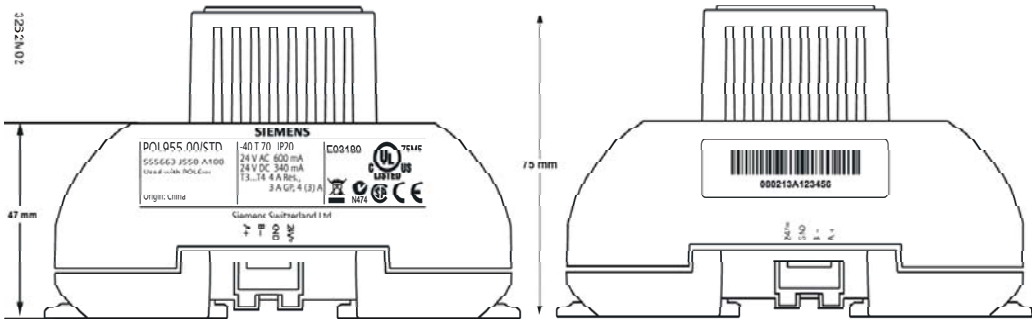
11. Technical data

Technical data		
Power supply	Operating voltage Frequency Power consumption Connection	AC 24 V ±20%; DC 24 V ±10% 45...65 Hz (AC) 600 mA, (DC) 340 mA Peripheral bus
Relay outputs Q1...Q4	Relay: Type, contact Contact rating Switching voltage Nominal current (res. / ind.) Switching current at AC 19 V	Monostable, NO contact AC 24 V...230 V (-20%, +10%) Max. AC 4 A / 3 A (cosφ 0.6) Min. AC 30 mA
Universal I/Os X1...X8	Configurable Reference potential Contact voltage Over voltage protection Up to 40 V	Via software Terminals Max. DC 24 V (SELV) Up to 40 V
	Analog inputs (X1...X8) Ni1000 Sensor current Resolution Accuracy within the range -50...150 °C	 1.4 mA 0.1 K 0.5 K
	Pt1000 Sensor current Resolution Accuracy within the range -40...120 °C	 1.8 mA 0.1 K 0.5 K
	NTC 10k (B25/85 = 3977K) Sensor current Temperature range -50...-26 °C -25...74 °C 75...99 °C 100...124 °C 125...150 °C	 140 µA Accuracy / Resolution 1 K / 0.2 K 0.5 K / 0.1 K 1 K / 0.3 K 3 K / 1.0 K 6 K / 2.5 K
	NTC 100k (B25/85 = 3977K) Sensor current Temperature range -25...-11 °C -10...9 °C 10...99 °C 100...150 °C	 140 µA Accuracy / Resolution 3 K / 0.2 K 1 K / 0.1 K 0.5 K / 0.1 K 1 K / 0.2 K
	0...2,500Ω Sensor current Resolution Accuracy	 1.8 mA 1Ω 4Ω
Peripheral bus	Power supply	Ueff = AC 24 V ± 20%, fmain = 45...65 Hz or U = DC 24 V ± 10%, no internal fuse
	Bus termination selectable Solid wire Stranded wire (twisted and with ferrule) Cable lengths Addressing Termination	(680 Ω / 120 Ω +1 nF / 680 Ω) 0.2...1.0 mm² 0.2...1.0 mm² Max. 30 m DIP switches 1...5 DIP switch 6

Technical data		
Environmental conditions	Operation Temperature Humidity Atmospheric pressure	IEC 721-3-3 class 3K5 -40...70 °C <90% r.h. (non-condensing) Min. 700 hPa, corresponding t max. 3,000 m above sea level
	Transport Temperature Humidity Atmospheric pressure	IEC 721-3-2 class 2K3/2K4 -40...70 °C <95% r.h. (non-condensing) Min. 260 hPa, corresponding to max. 10,000 m above sea level
Protection	Degree of protection Safety class	IP20 (EN 60529) Suitable for use in plants with safety class II
Standards	Product safety Automatic electrical controls	EN 60730-1
	Electromagnetic compatibility Immunity in the industrial sector Emissions in the domestic sector	 EN 61000-6-2 EN 61000-6-3
	CE conformity EMC directive Low-voltage directive	2004/108/EC 2006/95/EC
	Listings	UL916, UL873 CSA C22.2M205
	RoHS directive	2002/95/EC (Europe ACPEIP (China)
General data	Dimensions of controller Weight excl. packaging Base Housing	108 x 110 x 75 mm 183.5 g Plastic, pigeon-blue RAL 5014 Plastic, light-grey RAL 7035
Status of LEDs	The status of the BSP LED is defined as follows: Status Red blinking at 2 Hz Green on The status of the BUS LED is defined as follows: Status Red on Green on Green on and red on (yellow)	 Meaning BSP error or slave address error BSP running Meaning Communication error Communication running Communication running but parameter not successfully configured

12. Dimensions





Right side

Left side

13. Recycling

The module contains electrical and electronic components and must not be disposed of together with household waste.

Local and existing legislation must be observed!

Flexit AS, Televeien 15, N-1870 Ørje
www.flexit.no