SIEMENS

Advanced Central Controller

AC5102

Technical Manual

Rev 4.0

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Siemens AB

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Technical specifications and availability subject to change without notice.

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1 About this document

This document contains information on the mounting and installation of the product. For information on configuration refer to the SiPass integrated user manual.

Contacting us

If you have technical questions regarding the product, please contact our Technical Competence Center.

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2 Scope of Delivery

1 x AC5102 Advanced Central Controller

7 x 6-Position connector

1 x 3-Position connector

1 x Installation manual

3 Details for Ordering

Type	Part no.	Designation	Weight
AC5102	S54507-C22-A1	Advanced central controller (ACC)	990 g
Accessories, not included in scope of delivery!			
ACK5110	6FL7820-8FB11	SiPass integrated modem cable	200 g

4 General Safety Precautions

⚠ WARNING

We decline any liability for material damage or personal injury caused by improper use or non-observance of these safety instructions. In such case any guarantee expires.

⚠ WARNING

Connection, commissioning and maintenance must only be carried out by suitably qualified personnel.

Correct and safe operation of this device depends on proper transport, storage, installation and connection, as well as careful operation and maintenance.

⚠ WARNING

Work on electrical systems should only be performed by trained personnel under the supervision of a certified electrician in accordance with the appropriate regulations.

Please read and comply with the following notes before assembling and installing the unit:

- Please ensure that the controller is installed in a clean room. Please ensure that the central control unit is protected from damaging environmental influences such as direct sun exposure, operation-dependent vibrations, dust, etc.
- Never install the controller close to heaters and sinks. Avoid the proximity of sources of electrical or mechanical interferences. If the controller is installed in an enclosed space such as behind paneling or in small niches, please ensure sufficient ventilation. Please use electrically conducting floor coverings to minimize electrostatic charges.
- Keep the conditions for ambient temperature and humidity as stated in the technical data.
- Use a separate electrical circuit with a specially marked fuse (“red") to supply a.c. voltage to the unit.
- Please ensure that switching off other tools or devices does not disconnect the electrical circuit to the unit. Attach a note in the cabinet about the location of the power supply fuse (low-voltage distributor number / mains fuse number). Please ensure that the fuse is easy to access.
- Please ensure that the cable duct covers the cable entry opening.
- Use only shielded cables with extra-low voltage for all lines leading to the inside of the controller. Connect the cable shielding to all connection points. Ground cable shielding only on one side.
- The precautions applicable for CMOS technology are to be applied to activities involving server circuit boards and soldering.
- Never install a live circuit board.

5 Standards and Guidelines

5.1 EU Directives

This product complies with the requirements of the European Directives 89/336/EEC “Directive of Electromagnetic Compatibility” and 2006/95/EEC “Low Voltage Directive”. The EU declaration of conformity is available from

Siemens AB, Infrastructure & Cities
Security Products
Englundavägen 7
SE-171 24 Solna, Sweden

European Directive 2004/108/EC „Electromagnetic Compatibility”

Compliance with the European Directive 2004/108/EC has been proven by testing according to the following standards:

Emitted interference:	EN 61000-6-3 EN 55022 Class B
Interference resistance:	EN 50130-4

5.2 FCC

This equipment complies with the FCC Rules CFR 47 Part 15 Emission Class B limits.

This equipment has been tested and found to comply with the limits for a Class B, digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turnings the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

5.3 UL-Directives

UL 294 Access control units, not UL evaluated for Household or Commercial Burglary.

CSA C22.2 No. 205

RS232, RS422, USB, LAN, Power Fail, Tamper and Alarm Out connections not evaluated by UL.

Wiring methods shall be in accordance with ANSI/NFPA 70, National Electrical Code; CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations; and the authority having jurisdiction.

For UL approved installations, the unit must be powered by a UL 294 and CSA C22.2 No. 205 power limited power supply, such as AlarmSaf CPS400C-UL/CSA-APD8F.

The unit must be installed within a protected premise.

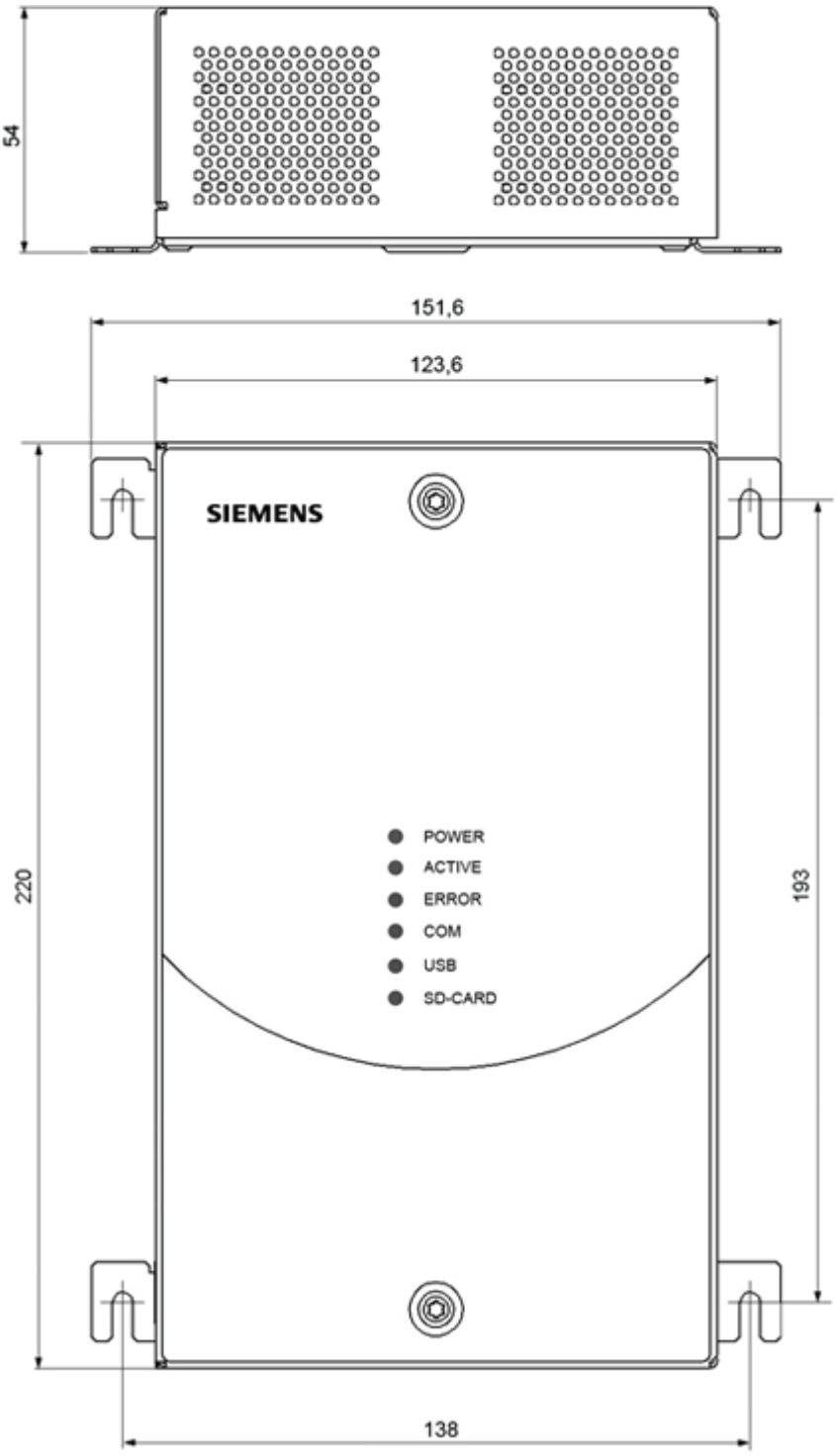
If the unit is wired for fail secure operation, it must be used in conjunction with UL Listed panic hardware. The unit shall not impair the intended operation of panic hardware used in conjunction with it.

6 Technical Specifications

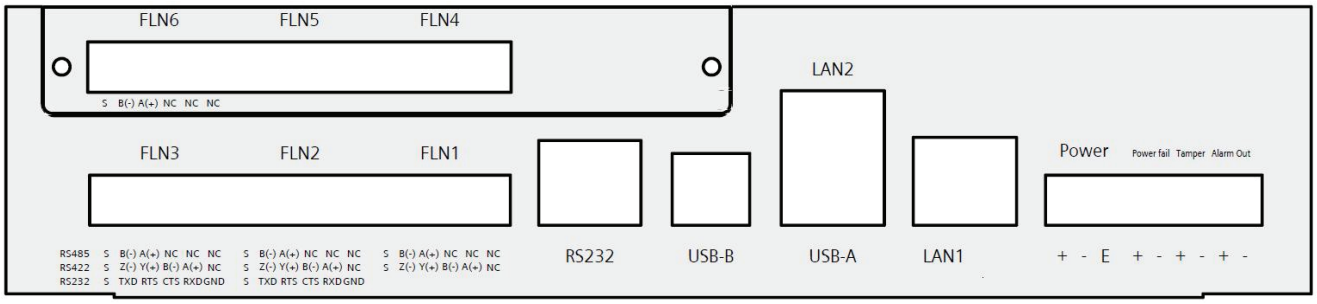
Additional components	ACK5110 cable for modem connection
Communication interfaces	● 6 x Field level network (FLN): – FLN 1: RS232 (modem port) or RS422 / RS485 – FLN 2 & 3: RS232 / RS422 / RS485 – FLN 4,5,6: RS485 only (expansion module) ● 1 x RS232 RJ12 (RxD, TxD, GND) ● 2 x LAN: RJ45 (10/100 MB Ethernet) ● 1 x USB-A ● 1 x USB-B
Operating voltage	12-30 VDC
Power consumption	Max. 10 W (fully loaded)
Alarm inputs	1 x Tamper input, 1 x Power fail input
Alarm output	1 x Alarm output (optical relay, max. 12 V, 100 mA)
Door capacity	96
Card capacity	500,000
Indicators	Power, Active, Error, COM, USB, SD-Card, 4 x Ethernet
LCD Display	None
Keypad	None
Tamper switch	Yes (Internal)
RTC battery	3.0 V, type CR2032
Microprocessor	AT91SAM9G20 RISC Processor Based on ARM v5TEJ Architecture
Main memory	128 MB
Flash memory	256 MB; Firmware is field-updatable
Operating temperature	0 to +50 °C
Environment	Indoor use only
Housing	Steel
Colour	Grey and blue
Storage temperature	-30 to +65 °C (-22 to 149 °F)
Humidity	5 – 93% (non condensing)
Dimensions (W x H x D)	124 x 220 x 54 mm
Approval	CE, UL294, C-Tick, FCC

6.1 Dimensions

Note that the unit is recommended to be mounted in upright position to achieve the best ventilation.



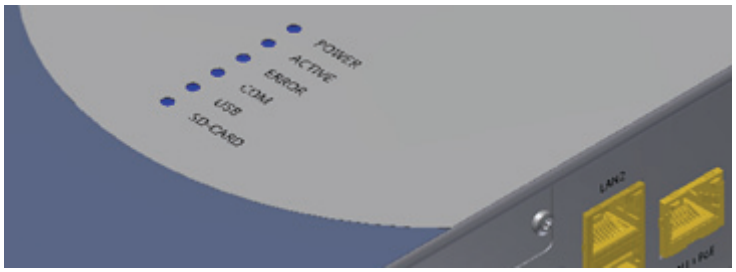
6.2 Interfaces



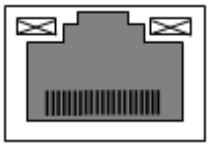
The following table provides a brief description of each port.

Port Name	Brief Description
FLN 1	Local RS485/RS422 communications for connection of up to 16 local devices. **NOTE: FLN1 and RJ45 RS232 ports are shared. Only one port can be connected at any given time.**
FLN 2-3	Local RS485/RS422/RS232 communications for connection of up to 16 local devices
FLN 4-6	Local RS485 communications for connection of up to 16 local devices
RS232	Modem port: RJ-45 (RS232) port for dialup communications with the host system
USB-B	USB port to connect to a PC for initial network configuration and for diagnostic purposes
USB-A	USB port for connection of USB devices, like a flash key
LAN 1-2	Ethernet ports for communication with the host system via LAN
Power	Connection for a 12-30 V DC power source.
Power fail	Input for the connection of a power fail signal used to monitor the status of the external power supply
Tamper	Input for the connection of a tamper switch, used to monitor the status of the cabinet door
Alarm out	Optical relay (max. 12 V, 100 mA) used to connect an alarm output device such as a siren / buzzer / strobe light.

6.3 Indicators (LEDs)



The following tables describe the operation of the LEDs located on the ACC.

Front LEDs		
POWER	On: The ACC is connected to the power supply	
ACTIVE	Blinking: The ACC is working correctly.	
ERROR	On: An error has occurred.	
COM	Blinking: The ACC is communicating via the FLN ports	
USB	On: A USB device is connected	
SD-CARD	On: A SD-Card is inserted	
Ethernet ports LEDs		
Green	On: Link 10 Mbp Blinking: Activity 10 Mbp	
Orange	On: Link 100 Mbps Blinking: Activity 100 Mbps	
Yellow	Off: Full duplex On: Half duplex Blinking: Collision activity	

7 Installation

Required tools & material

- Medium-duty drill and associated drill-bits
- 4 Mounting screws or standoffs (approx. 4mm diameter)
- T20 Torx screwdriver
- Wire cutters
- Cable strippers

Expected installation time

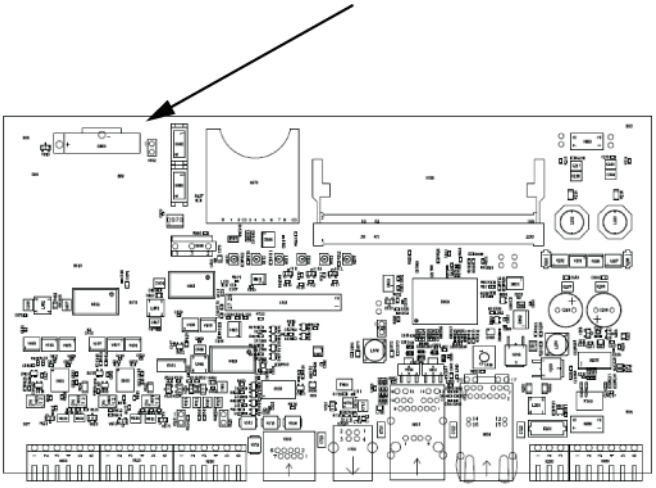
45 minutes and additional time for each local device installed on an FLN channel.

Installation instruction

1. Place the ACC against the surface to which it is to be affixed and mark the location of the mounting holes.
2. If being mounted within a cabinet, align the ACC mounting lugs with the holes located on the cabinet backplane and proceed to step 5.

	⚠ CAUTION
	Do not apply power to the ACC or associated components at this stage.

3. Select the appropriate drill bit according to the mounting surface / hole size and drill the holes in the locations marked (if required).
4. Fasten the ACC to the surface using screws or standoffs.
5. Connect the ACC. See section: Hardware Connections [→ 15].
6. Remove the cover and remove the battery protecting tab on the base board (see arrow below). Mount the cover back.



7. Apply power to the ACC and test its operation. This step will require configuration of the ACC and downloading of the device database. Firmware upgrade may also be required.

8 Hardware Connections

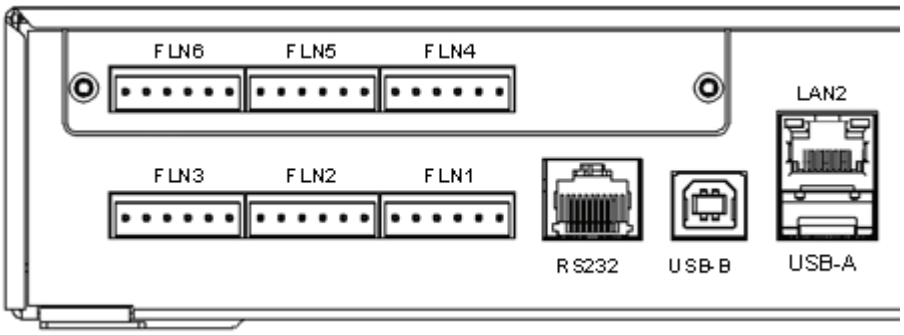
1. Connect an Ethernet cable to the **LAN1** or **LAN2** port on the ACC.
2. Connect the local devices to each of the 6 FLN ports on the ACC.
   Up to 16 devices can be connected to each FLN port, for a total of 96 devices per ACC. See section: FLN connectivity options [➝ 16].

!	*NOTICE*
	• Maximal length of an ACC FLN Bus (RS485) is 1200 m. • No “star” or “branch” wiring to the FLN-devices. The devices have to be wired in series (only one line) according to the RS485 electrical specifications. • Ensure that the polarity of each connection is correct. • The cable shield of t he FLN should be connected directly to the FLN-connector (Terminal S) of the ACC. Connect at this end ONLY!

3. Connect an alarm device (if required) to the ALARM OUT ports on the ACC.
4. Connect a tamper switch (if required) to the TAMPER ports on the ACC.
5. Connect the power fail signal from a PSU to the POWER FAIL ports of the ACC.
   Note: A short circuit between the two power fail input pins indicates a power failure.
6. Ensure that the ACC is correctly grounded, by connecting the ground terminal on the ACC's power port to the building earth ground.
7. Check all connections thoroughly.

8.1 FLN Connectivity Options

The AC5102 has 6 FLNs (Field Level Network) to communicate with devices, which operates over RS485.



At the 6 FLN-ports the following devices can be connected:

ADS52x0 (SRI)	Single Reader Interface
ADD51x0 (DRI)	Dual Reader Interface
ADE5300 (ERI)	Eight Reader Interface
AFI5100 (IPM)	Input module
AFO5100 (OPM)	Output module
AFO5200 (8IO)	In and output module

Connection between ACC (FLN) and DRI

ACC FLN 1-6	DRI RS485 bus
+ (non-inverting)	+ (non-inverting)
- (inverting)	- (inverting)
S (shield)	Unconnected

8.2 Bus Termination of the FLNs

The FLNs requires failsafe resistors on one end and a 120Ω bias resistor on both ends of the bus.

FLN 1, 4, 5 & 6

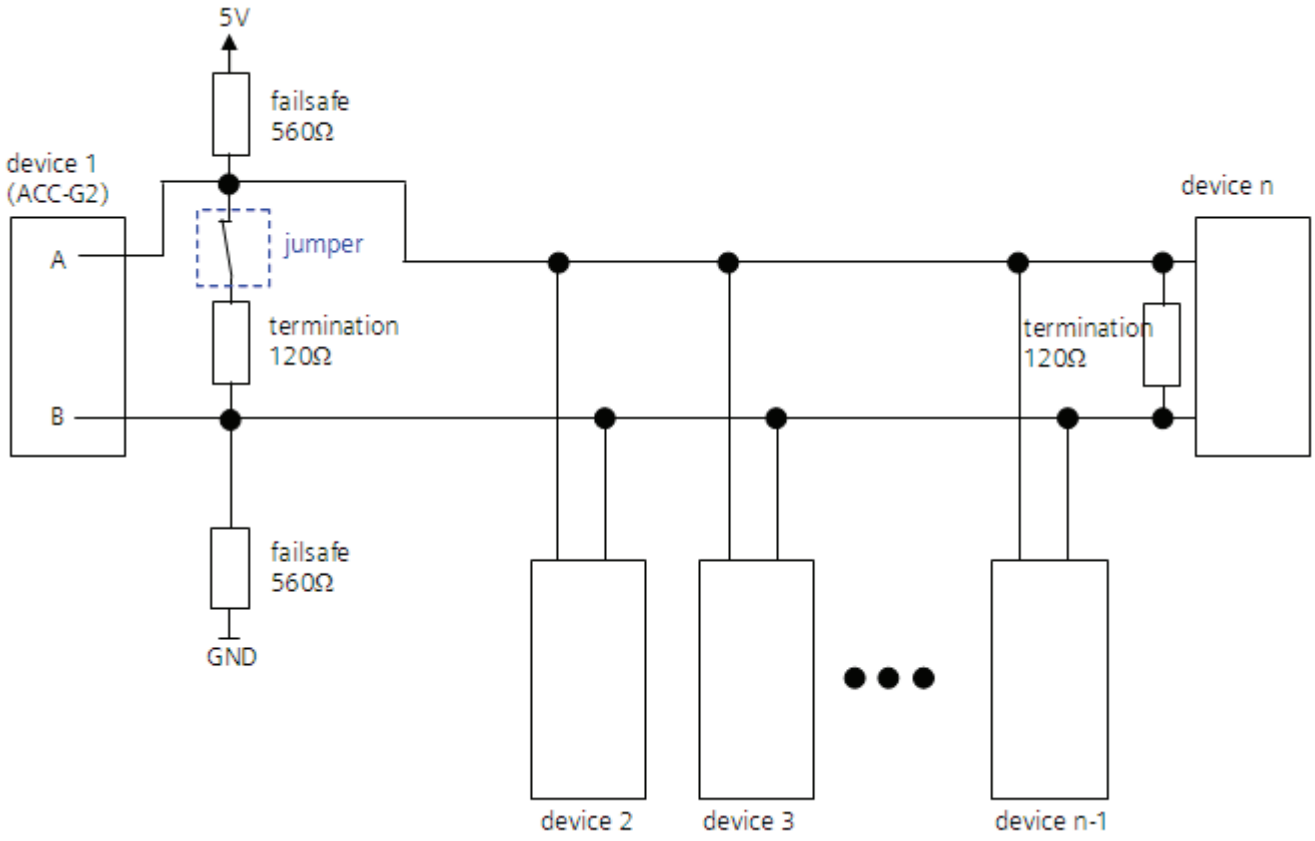
For RS485 and RS422 functionality the following jumpers must be closed.

FLN1	FLN4 (Expansion board)	FLN5 (Expansion board)	FLN6 (Expansion board)
X510, X520	X205	X203	X201

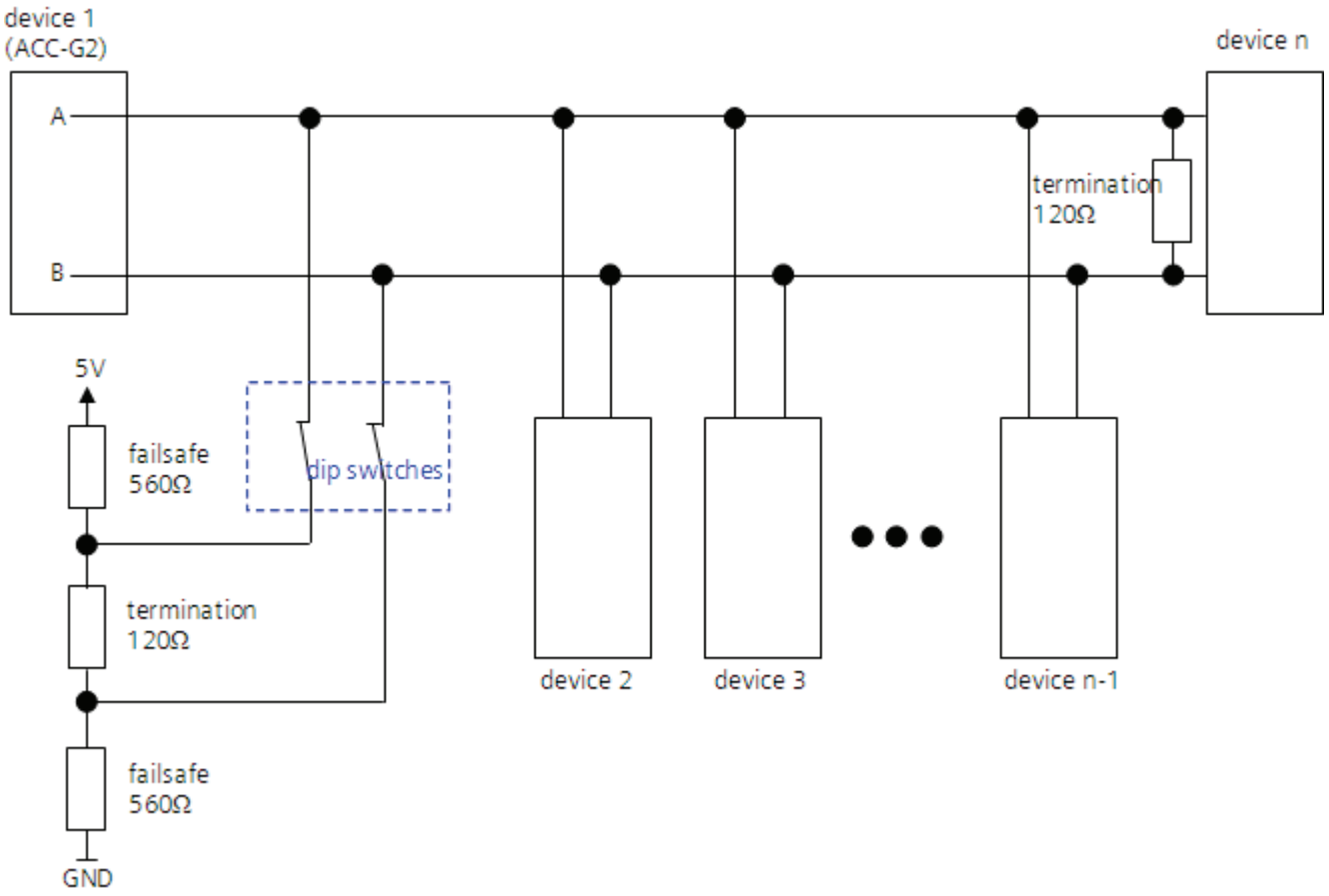
FLN 2 & 3

For RS485 and RS422 functionality the following double dip switches must be closed.

FLN2	FLN3
X602, X603 Each dip switch consists of two switches	X600, X601 Each dip switch consists of two switches

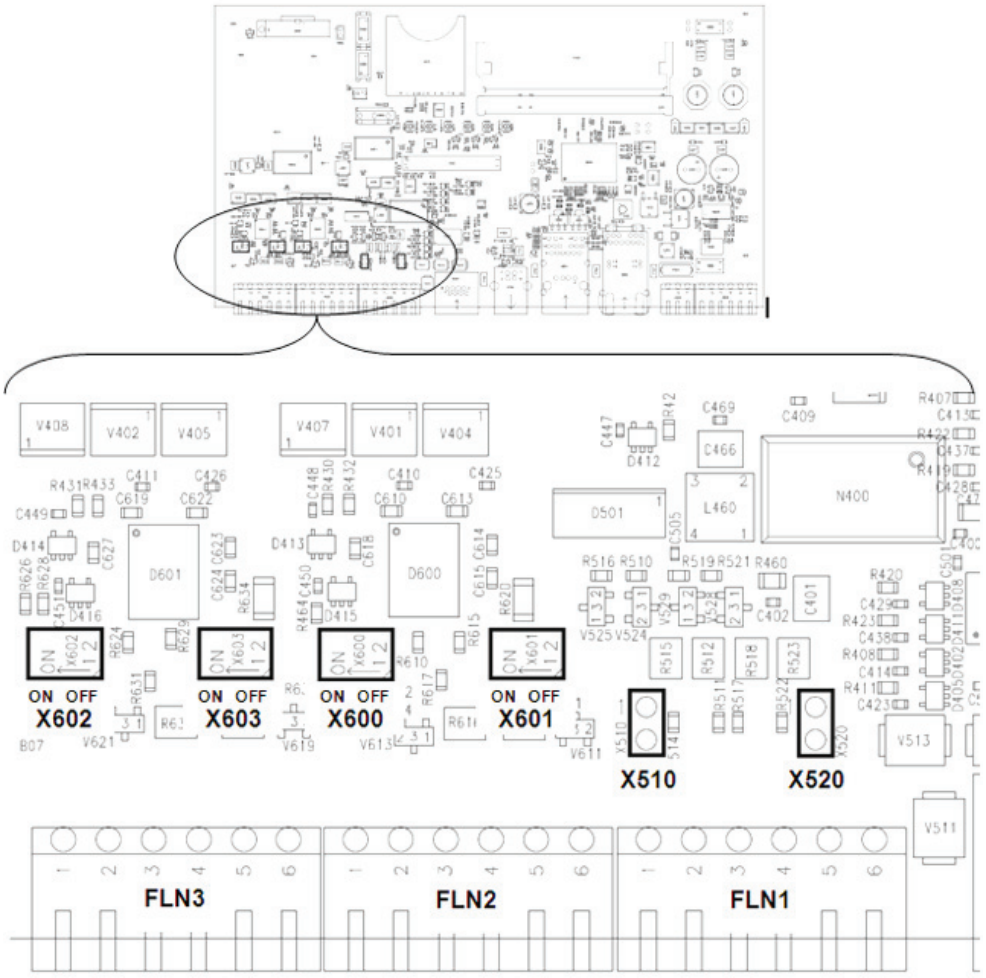


FLN 1, 4, 5 & 6 termination



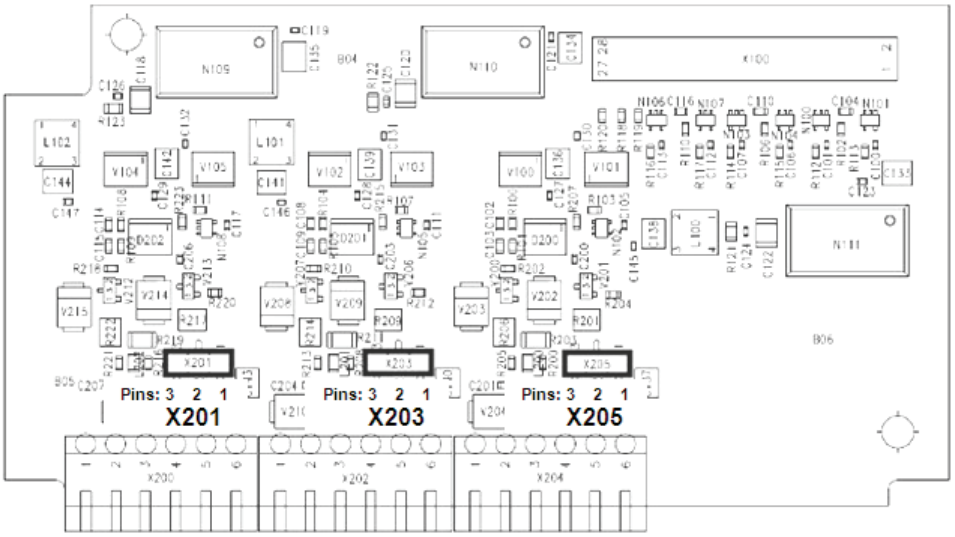
FLN 2 & 3 termination

8.3 Jumper Description



Main board

X600 ... X603	ON = switch closed. End of line is enabled. OFF = switch open. End of line is disabled.
X510 & X520	Jumper fitted = switch closed. End of line is enabled. Jjumper not fitted = switch open. End of line is disabled.



FLN Expansion board

X201 ... X205	Jumper fitted on pins 2 & 3 = switch closed. End of line is enabled. Jumper fitted on pins 1 & 2 or not fitted = switch open. End of line is disabled.

8.4 FLN Device Load Limitations

Each device produces a certain load on the FLN. The following table outlines the equivalent load value for each FLN device.

Device	Configuration Units
ADS52x0 (SRI)	1 load
ADD51x0 (DRI)	2 loads
AFI5100 (IPM)	4 loads
AFO5100 (OPM)	4 loads (2 when used in one lift control)
ADE5300 (ERI)	8 loads
AFO5200 (8IO)	2 loads
AT15100 (IAT-010)	1 load

The following table outlines the maximum value of configuration loads that can be connected to each FLN.

FLN Channel	Maximum Configuration Unit Value
FLN 1	16 loads
FLN 2	16 loads
FLN 3	16 loads
FLN 4	16 loads
FLN 5	16 loads
FLN 6	16 loads

Example of a Load calculation: ADE5300 + AFI5100 + 2 x ADD5100 = 16 loads

8.5 Recommended Cable Specifications

The following table provides a guideline for selecting an appropriate cable type for connection of an integrated security system only. Other cable types are also compatible with the system and can be used to achieve the same results.

Communication Type	Cores	Pairs	AWG	Stranding	J-Y(st)Y Ø (mm)	Wire Type	Insulation	Shield	Jacket
RS485	4	2	24	7 x 36	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	6	3	24	7 x 36	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	8	4	24	7 x 36	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
RS232	4		24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	6		24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	8		24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
RS422	4	2	24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	6	3	24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	8	4	24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
RJ45	8	4	24	Solid	0,6	Bare Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
	8	4	24	7 x 32	0,6	Tinned Copper	Polyethylene	Aluminum foil- Polyester tape	PVC
Power	2	1	18	19 x 30	1,0	Tinned Copper	Polyethylene	Unshielded	PVC

8.6 Maximum Cable Length

RS232	3 m
USB	3 m
Power fail	3 m
Tamper	3 m
Ethernet	100 m
FLN (RS485, RS422)	1200 m

9 Software Configuration

The network settings of the AC5102 Controller can be configured using a Windows application, and an appropriate USB cable. This configuration requires the USB RNDIS driver (an Ethernet-over-USB driver) to be installed.

The pre-requisites required for this configuration are listed below.

To download a copy of the latest software and configuration guide, please contact your Siemens product distributor.

Prerequisites

1. AC5102 Controller
2. Host PC with a spare USB port (running the Windows Operating System)
3. A-B USB Cable
4. Configuration application for the Windows Host
5. RNDIS USB driver

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