SIEMENS

Cerberus® CS1140
Fire detection system

Maintenance instructions

Fire & Security Products
Siemens Building Technologies

1 About this document

Purpose

These instructions cover the maintenance work on the control unit type CS11 with standard equipment. They are a basic part of the general maintenance guidelines for fire detection systems and must be applied for all periodic maintenance work.

Target groups

This product documentation and the work instructions are aimed at the following persons, who have a particular function and have the corresponding training and qualification.

Maintenance Personnel	They carry out all the maintenance work indicated in the product documentation and check equipment for total serviceability.	They have had the technical training appropriate to their function and the product.

Reference documents

Information in	Document
004665	Operating instruction AlgoPilot B3Q4...
004598	Operating instruction AlgoPilot B3Q6...
1462	Operating instruction DZ1193
1164	Detector exchanger and detector tester RE6/RE6T/RE10
007227	Operating instruction detector exchanger and tester for Sinteso™ devices
008250	Operating instruction line tester for FDnet
257	Operating instruction LE3
1673 / 007011	DF11.. / FDF2x1-9 Techn. description, commissioning etc.
1276 / 007016	DLO11.. / FDL241-9 Techn. description, commissioning etc.

Work and operational safety

Before personnel begin work on the system they must have read and understood the related operating instructions, in particular chapter 2 ”Safety regulations”.

Disregard of the safety regulations

Before they are delivered, products are tested to ensure they function correctly when used properly. Siemens disclaims all liability for damage or injuries caused by the incorrect application of the instructions or disregard of warnings of danger contained in the documentation. This applies in particular to:

- Personal injuries or damage caused by improper use and incorrect use;
- Personal injuries or damage caused by disregarding safety instructions in the documentation or on the product;
- Personal injuries or damage caused by poor maintenance or a lack of maintenance.

Conventions

(...)	Additional information
..)	Notes
bold letters	Definitions of designations
–> see	Cross-reference

Document identification

Place		Signification
Title page		– System names – Product type – Document purpose
Last page	bottom left	– Document number – Version date
Last page	bottom right	– Manual – Register

Modification index

Version	Date	Brief description
e1386d	10. 2002	Edition EP7F
1386_e_en_--	06. 2004	Additional Sinteso™ devices

Training

Siemens Fire & Security Products offers a comprehensive training program for all products. Information on training courses can be found in the Siemens intranet under: http://web4.cerberus.ch/

Download

The most recently released technical documents for customers can be found in the Siemens intranet under: http://web4.cerberus.ch/.

2 Safety regulations

This chapter describes the danger levels and the relevant safety regulations applicable for the use of our products. Please read the work instructions as well as the chapter ”About this document” thoroughly before beginning any work.

2.1 Signal words and symbols

2.1.1 Signal words and their meaning

The danger level that is, the severity and probability of danger are indicated by the signal words listed below. Non-observance may lead to the consequences indicated:

DANGER
Imminent danger!
- May cause serious bodily injury or danger to life!

WARNING
Dangerous situation!
- May cause serious bodily injury or danger to life!

CAUTION
Possibly dangerous situation!
- May cause light injuries!

NOTE
Possibly harmful situation!
- May cause damage to the product or to objects in the immediate vicinity of the product!

2.1.2 Symbols and their meaning

The symbols listed below indicate the nature and origin of the danger.

Signal word	General danger

Signal word	Electrical voltage

Example for a danger warning

DANGER **External voltage**	Disconnect the module from power supply.

2.1.3 Classification and meaning of additional symbols

	Tips and information
	Refers to extremely important or critical decisions to be taken into account before continuing the work.

2.2 Safety-relevant working instructions

Country-specific standards
The products are developed and produced in compliance with the relevant international and European safety standards. Should additional country-specific, local safety standards or regulations concerning project planning, assembly, installation, operation and disposal of the product apply in the place of operation, then these standards or regulations must also be taken into account in addition to the safety regulations mentioned in the product documentation.

Electrical installations

DANGER **Work on electrical installations**	Any work on electrical installations may only be carried out by qualified electricians or instructed persons working under the guidance and supervision of a qualified electrician, in accordance with the electro technical regulations.

- Control units must be disconnected from the power supply during commissioning or maintenance work.
- Terminals with an external voltage supply must be provided with a sign ”DANGER - External voltage”.
- Mains leads to the control unit must be installed separately and provided with a clearly marked fuse.
- Earthing must be carried out in compliance with local safety regulations.
- When work is carried out in explosion-hazardous areas, the appropriate safety precautions must be taken.

Assembly, installation, commissioning and inspection work
- If any tools or accessories such as ladders are required, safe and suitable devices must be used.
- Prevention of spurious tripping of the remote transmission must be assured.
- Always inform the fire brigade before testing the remote transmission.
- The activation of fire control installations for test purposes must not cause damage to the system or parts thereof.
- Fire control installations must only be activated after the test has been completed and the system has been handed over to the customer.
- Third party systems or devices must only be activated in the presence of the responsible person.
- When work on management stations and system terminals are performed, the safety regulations of the connected sub-systems must be observed. This especially applies when switching-off system components.
- In the case of extinguishing systems, always use the ”General installation instructions” as a guideline. This guideline is available on request.

Testing the product operability

- Evacuate and cordon off extinguishing sector.
- Inform people about the possibility of occurring fog and noise.
- Inform people before testing of alarm devices; take the possibility of panic reactions into account.
- Inform the alarm and fault receiving stations connected to the system before running the tests.

Modifications to the system design and the product

Modifications to a system or to individual products may cause faults or malfunctioning. Please request written approval from us, and the relevant authorities concerning intended system modifications and system extensions.

Modules and spare parts

- Locally procured modules and spare parts must comply with the technical specifications laid down by the manufacturer. This compliance is always ensured for original spare parts supplied by us.
- Only use fuses with the specific fuse characteristics.
- Wrong battery types and improper battery exchange may introduce the danger of explosion. Only use the specified battery type or an equivalent battery type recommended by the manufacturer.
- Batteries require environmentally safe disposal. They must be handed in at the local collecting points.
- Please take into account that the extinguishing agent cylinders are pressurized and must be exchanged in compliance with the local safety regulations.

3 General

Basic principle
These guidelines assume that commissioning has bee carried out in accordance with the existing guidelines, i.e. that all functions have been tested, system data has been saved and archived.

Protocol
The values to be measured (as specified in this procedure) are part of the technical documentation in the system logbook.

	Systems or parts of systems should not be left switched off unnecessarily in order that the system is not too long out of commission.
DANGER	**Never connect or disconnect electronic modules while the power supply is switched on.** Always switch off the mains and battery supply first. Avoid electrostatic discharge. The hardware consists mainly of circuits with CMOS technology. When working with the modules, use the ESD protection mat. Do not unnecessarily touch components or p.c.b. tracks.

4 Test and measuring equipment

Multimeter
Accuracy ≤ 2%
Internal resistance 20 kΩ
Measuring ranges 1...500 VAC / DC, 100 mA...5 ADC, 10 Ω...10 MΩ

Battery test set
Load resistor 5 Ω

Maintenance-PC
System requirements see document 004081

Detector tester
Depending on detector type / detector system

➔ For all detectors **DO.., DOT**.. and **DT..**
  – Detector exchanger DZ1191
  – Detector exchanger and tester DZ1193

➔ For all Sinteso™ point detectors **FDOOT..., FDO...** and **FDT...**
  – Detector exchanger FDUD291

➔ For all Sinteso™ point detectors **FDOOT..., FDO..., FDT...,** Manual call points **FDM...** and alarm sounders **FDS221**
  – Detector exchanger and tester FDUD292 (wireless MC-Link)

➔ For the Sinteso™ input module **FDCI...,** in-/output module **FDCIO...** and the linear smoke detector **FDL...**
  – Detector exchanger and tester FDUD292 (via adapter cable FDUD202-A)

➔ For smoke detectors **DO..** and **DOT..**
  – Detector tester RE6 and test gas

➔ For heat detectors **DT..**
  – Detector tester RE6T and test gas

➔ For linear smoke detector **DLO..** and **A2400**
  – Detector tester RE10
  – Justierset DZL1191 to DLO1191
  – Adjustment set FDLU291

➔ For linear smoke detector **FDL241-9**
  – Adjustment set FDLU291

➔ For flame detector **DF.., FDF...**
  – Test lamp LE3, StabexHF for explosion hazard areas

➔ For radio smoke detector **DOW..**
  – Radio test set DZW1171

➔ For all AnalogPLUS and collective detectors
  – Detector test unit DZ1194

➔ For all collective detectors **MS6,7,9**
  – Detector test unit MG7/9

Line tester

Depending on line type

➔ For **collective detector lines**
- Alarm test probe (Zener diode 5.6 V with resistor 220 Ω)

➔ For **collective, interactive und AnalogPLUS detector lines**
- Line test set DZ1195

➔ For **AnalogPLUS detector lines**
- Line test unit DZ1131

➔ For **MS5 detector lines**
- 10 kΩ 0.5 W, resistor

➔ For **MS9i detector lines**
- Line tester CW9-02

➔ For **detector line FDnet**
- Line test unit FDUL221

5 Preparatory work

Information of system owner

- Inform the system owner how much work is involved and the time required completing it. Point out that system operation will be reduced.
- In large systems, an out-of-commission report must be filled in and signed by the system owner.

Blocking of system parts

- Blocking of
  - Remote alarm (advise monitoring station)
  - Fire control installations and means of alarm
  - Extinguishing stations

Time schedule

- Time schedule must be determined with the system operator for the following test sequences:
  - Alarm tests (incl. remote transmission)
  - Performance check of fire control installations
  - Any follow-up training
  - Any clarification

6 System data

System logbook
- Is the system logbook available and up-to-date?

Remote transmission
- Are the telephone numbers and the names of the remote transmission recipients up-to-date?

System disk
- Is the system data disk available and up-to-date?
- If configuration changes are made, then update the system disk. One disk remains with the system and a copy is filed with the project-engineering department.
- If no modifications are made, a new copy of the disk must be made every 5 years in order to prevent loss of data through ageing.
- The date of the new version must be recorded in the logbook.

Equipment program
- Check the equipment program version printed on the EPROM label. Replace older software versions with the latest if new functions and/or error corrections call for it.

Event memory
- Check the content of the event memory and take the necessary countermeasures.
- Replace all detectors in ”Drift” conditions.

Change of use
- Inspect all reported changes to the building, especially rooms with new utilization. Make all necessary modifications to the CS11 system with regards to these changes.

Planned modifications
- Check whether all modifications have been carried-out, e.g. changes to diagrams, fire department plans?

7 Power supply check

Current consumption

- Perform measurements of current consumption during emergency power operation and alarm mode at the highest alarm level (ALARM II and REMOTE ALARM). Compare the measured value with the calculated value for emergency power capacity.

Batteries

- Check of the batteries condition.
  - Measure **batteries voltage** (min. 23.0 V), asymmetry max. 1 V.
  - Measure **charging current**.
  - **Battery load check**
    ➔ A load check may only be carried out if the battery charging current is less than 50 mA.
- Battery check procedure:
  1. Disconnect the batteries from the charging unit. Do not overstress the battery connections.
  2. Connect the battery test set (5 Ω resistor) via the two batteries and load for 30 minutes.
  3. Measure the batteries voltage with connected test set.
     During test, the battery voltage may not fall below 11.0 V per battery and via both batteries not below 23.0 V. Batteries with lower voltage must be replaced.

Power supply fault

- Check one by one the following conditions:
  1. Mains connection interruption = MAINS FAILURE.
  2. Battery disconnection = BATTERY FAULT.

Mains

- Has the mains lead been correctly protected with fuses and labeled (as ”Fire protection system”) at the customer's power distribution panel?
- Are any surge protectors used still functioning correctly? If the mains fuse has blown due to lightning (ask customer), exchange surge protector.

Lithium batteries

- Check the lithium auxiliary batteries by disconnecting the power supply for approx. 15 minutes.
- After switching-on again, check the date, time and fault message.
- If there is any loss of date, replace the corresponding unit.

8 Control unit check

Hardware

- Assess the condition of the housing, visual check on hardware modules and batteries.
- Check mounting screws, terminals and plug-in connections.

9 Terminal check

Hardware
- Check conditions visually.

Earth connections
- Repair damaged earth connections.

Labeling
- Are the display equipment inscription strips correct and still clearly readable?

Performance check
- Performance check procedure:
  1. Login by entering operating code.
  2. Activate lamp test.
  3. Check operation at PRESENT / ABSENT.
  4. Switch 1 zone on/off.
  5. Activate 1 ALARM, acknowledge and reset.
  6. Activate 1 FAULT, acknowledge and reset.
  7. Log-out.
  8. Test operation and display of fireman's control panel.

Cleaning
- Clean display window and front panel with mild soap.
  ➔ **Do not use abrasive solvents.**

10 Printer check

Hardware
- Assess condition, visual check.

Printout
- Activate printer test. Does it print clearly and readably?

Events
- Is the correct event printed out?

Paper
- Check paper roll. Is a spare roll available?

11 System performance check

- The operation and checking of indicators must be take place at the main control panel or at the fireman's control panel.

Modes for detector test

- Two different modes can be chosen:
  1. **Detector test mode**
     - Alarm devices and control functions are disabled.
     - If the detector responds, it signals, "Test activation" for about 10 seconds with alarm indicator blinking.
  2. **Installation test mode**
     - All control unit functions work normally; alarm devices and control functions are enabled.
     - If the detector responds, it activates ALARM, the alarm indicator flashes. ALARM must be operated in the normal way.
  - For both test modes, in order to speed up the response time, the detectors themselves are switched to a special test mode bypassing the signal processing algorithms.
  - ➔ For details, refer to operating instructions for CT11.

11.1 Schedule for the performance check

Detector self-test

- Through the detector self-test the DO / DOT / DT115x and the Sinteso™ devices are subjected automatically to an extensive electrical function check. However, it is still necessary to conduct a physical function test on site in regular intervals.

Recommendation

- A visual check of the detectors must be performed once per year. Detectors that are strongly soiled or which are mechanically damaged must be replaced. Check the system for changes of use.

Intervals

We recommended the following schedule for the performance check. However, local national regulations have priority.

		Interval in years		
		1	**2**	**5**
SW clock	Check of date and time.	✘		
Detection lines: – collective, – MS9i	Check each line by means of detector activation and verify display.	✘		
	Activate all autom. detectors (can be done by customer).	✘		
	Activate 1 manual call point for each line.	✘		
	Activate all manual call points.		✘	
	Check detectors visually for soiling and proper application.	✘		
	With each line, check whether a short circuit or open line (remove detector) activates a FAULT signal.			✘
	Overhaul at the factory of all autom. fire detectors.	see chapter 11.2		
Detection lines: – interactive, – AnalogPlus, – MS9i Plus – FDnet	Activate 1 autom. detector and 1 manual call point for each line.	✘		
	Activate all manual call points: MS9i Plus		✘	
	interactive, AnalogPlus, FDnet			✘
	Activate ”Reconfigure D–Bus” for all AnalogPlus lines.		✘	
	Activate all MS9i Plus and AnalogPlus autom. detectors.	✘		
	Check detectors visually for soiling and proper application.	✘		
	Check of the function of I/O modules		✘	
	Check for each line whether a short circuit / open line activates a FAULT signal. ➔ Check the loop line function. ➔ During the short circuit also check the isolator function.			✘
	Overhaul at the factory of all autom. detectors.	see chapter 11.2		
Fire control installations	Check activation up to and including interface.		✘	
	Check customer system shut-down operations (work charged to the customer or carried out by the customer himself). Fix a time schedule with the customer.		✘	
Emergency operation function	Activate ALARM with reset button depressed: – Collective lines with test probe (1 line per collective module). – Other line types with 1 detector per line. ➔ Check activation of remote transmission. ➔ Verify indicators on emergency operation CT.		✘	
Alarm organization	Check the functioning of the delay times V1 and V2.	✘		
	Check of the delay time at mains failure.	✘		
	Alarm activation by autom. detector set to ABSENT = ALARM II.	✘		
	Alarm activation by manual call point set to PRESENT and ABSENT = ALARM II.	✘		
	Verify the automatic switchover PRESENT / ABSENT using event memory entry.	✘		
	Check activation of remote transmission equipment with ALARM II.	✘		
	Check WARNING level by activation of a zone via CT11.	✘		
Alarm equipment	In emergency power operation mode, check all alarm devices according to status level: – WARNING – ALARM I – ALARM II – REMOTE ALARM – FAULT	✘		
	Check the activation periods (if programmed) for PRESENT an ABSENT modes.	✘		
	Check the remote transmission equipment according to instructions provided by the remote transm. equipment supplier.	✘		

11.2 Intervals for the detector overhaul at factory

- Heavy-duty applications in industrial areas (chemical processes, conveyor belts for raw material etc.) were not taken into consideration in the standard values below. The values have to be adapted accordingly.
- All detectors must be activated during ”Detector test mode” after detector overhaul.

DT11xx and Sinteso™ devices will not be overhauled at the factory.

	Application area	Risk	Interval in years
Interactive detectors DO115x, DOT115x	clean	standard	8
		high	7
	moderate dust / dirt	standard	7
		high	6
R930, F930 AnalogPLUS detectors DO113x, DOT113x	clean	standard	6
		high	5
	moderate dust / dirt	standard	5
		high	4
MS6, MS7, MS9 Collective detectors DO110x	clean	standard	5
		high	4
	moderate dust / dirt	standard	3
		high	2

Definitions

- **Application area „clean”,** e.g.:
  - EDP rooms
  - Offices
  - Theatre, museum, churches, hotel guest rooms
  - Meeting halls, exhibition halls
  - Department stores, shopping halls
  - Hospitals
- **Application area „moderate dirt / dust”,** e.g.:
  - Storage and stock rooms, warehouses
  - Production halls and assembly areas
  - Cable ducts, risers, elevated floors
  - Wood industry, textile industry
- **High risk,** e.g.:
  - Rooms and areas with high value concentration or sensitive work processes.

12 Extinguishing controls check

Preparation

- Make sure extinguishing release is blocked, preferably at the release mechanism.

Emergency power operation

- Check **one extinguishing section during** emergency power operation.

Autom. detectors

- Check for each zone the control by autom. detector of extinguishing zone (with various zones per section, check each zone):
  1. Activate a detector = 1st EXTING.ALARM.
  2. Acknowledge.
  3. Activate a second detector together with the first detector = EVACUATION, EXTING.ALARM, EXTING.COMMAND.
  4. Reset panel and re-arm extinguishing mechanism.

Manual call points

- Check control by extinguishing manual call points:
  1. Activate extinguishing manual control point = EVACUATION, EXTING.ALARM, EXTING.COMMAND.
  2. Reset panel and re-arm extinguishing mechanism.

Control inputs

- Activate individually each stop/blocking button; door contact, agent loss and extinguishing blocked signal input. Check indication at control panel.

Line monitoring

- Simulate short circuit / open circuit on each monitored line. Check FAULT indication at control panel.

Reminder

- Reset all blocked functions back to normal at the end of testing.

13 Concluding work

Alarm test
- Carry out an alarm test with remote transmission in the presence of the customer / system operator.

Training
- Provide follow-up training.

System logbook
- Check the system log book if it is complete and updated.

System disk
- If changes have been made to the control unit configuration, update the system disk and send a copy to the project-engineering department.

Customer data
- Check the customer data sheet (telephone no. of contact person, etc.).

Spare parts
- Refurbish spare parts like fuses, detectors, etc.

Deactivations, zone isolations
- Restore all systems or parts of systems to their active status.

Confirmation
- Have the customer / system operator sign the service report?

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