

**20 S0 Combined fire alarm 900203****Use of the application program**

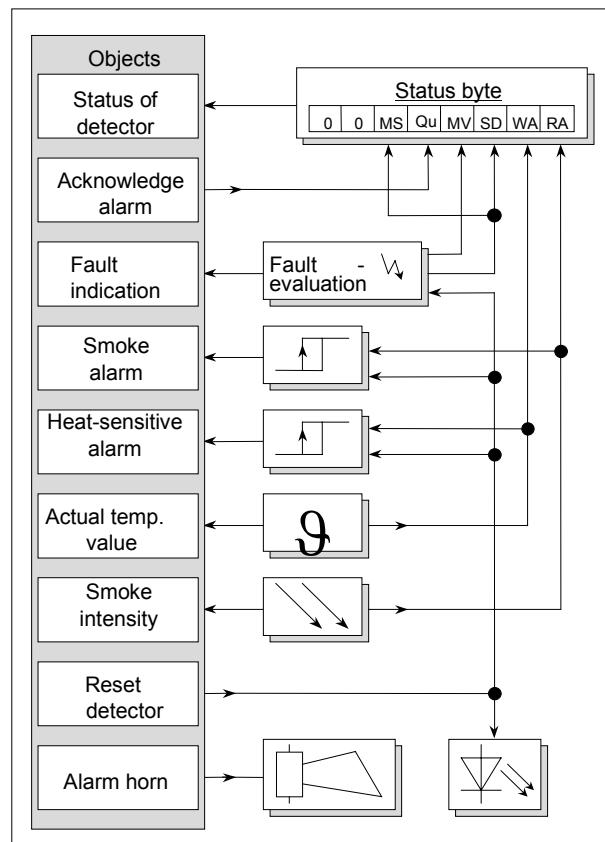
Product family: Monitor, Report

Product type: Sensors

Manufacturer: Siemens

Name: Combined fire alarm AP 256  
Order no.: 5WG1 256-3AB01**Functional description**

With this application program, it is possible to use the combined fire alarm AP 256 for the early detection of fires. The alarm and fault signals together with the smoke intensity and actual temperature value are transmitted via five communication objects. Further objects are available for switching the alarm horn, querying the status of the detector and for acknowledging and resetting the detector.

**Block diagram of the detector**

Alarm generation is carried out via two communication objects which the detector uses to sound the appropriate alarm on detection of smoke or heat.

It can be selected via a parameter whether one or both alarm signals are used.

The response threshold for the heat-sensitive alarm is fixed at 57°C, while two thresholds can be set for the smoke alarm.

The bus coupler sends a fault indication via a further communication object as soon as the sensor head is separated from the base or becomes dirty or defective. The fault indication and the two alarm signals are sent cyclically on the bus when the parameter is enabled. The repeat interval can also be selected. The cyclical sending stops until the alarm signals are confirmed via the object "Acknowledge alarm".

When a smoke or heat-sensitive alarm is detected or there is a fault with the detector, the integrated LED in the sensor head flashes. The alarm LED only stops flashing when the detector is reset via the communication object "Reset combined fire alarm". It is only possible to reset the detector when the level has fallen below the response thresholds for smoke intensity or the heat-sensitive alarm and the alarm signals have been confirmed via a bus telegram at the object "Acknowledge alarm".

The signal horn of the detector is not coupled with the alarm signals of the sensor. It can be switched on or off via switching telegrams to the object "Alarm horn".

The horn emits a short signal tone when the detector is initialised e.g. after bus voltage recovery. The alarm LED also lights up temporarily.

There are also two communication objects available for the smoke intensity and temperature value.

The measured temperature can be sent cyclically or when it differs from the previous value. It is possible to set the differential for sending the temperature.

The detector does not automatically transmit the level of smoke intensity. It can be read out if required via the ETS program or with a visualisation terminal.

It is possible to query the current operational status of the combined fire alarm via the communication object "Status of detector". The various alarm and status signals are stored in this 1 byte object in bits 0 to 5.

The individual bits of the communication object "Status of detector" contain the following alarms and signals:

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<b>Bit 0:</b>	<b>Smoke alarm</b>
logic "1":	Value exceeds response threshold
logic "0":	Value falls below response threshold

<b>Bit 1:</b>	<b>Heat-sensitive alarm</b>
logic "1":	Value exceeds trigger threshold
logic "0":	Value falls below trigger threshold

<b>Bit 2:</b>	<b>Sensor is defective</b>
logic "1":	Smoke or heat-sensitive detector is defective
logic "0":	Sensors function correctly

<b>Bit 3:</b>	<b>Dirt</b>
logic "1":	Smoke detector is dirty
logic "0":	Smoke evaluation functions correctly

<b>Bit 4:</b>	<b>Alarm acknowledgement</b>
logic "1":	Smoke alarm, heat-sensitive alarm or fault indication is not acknowledged
logic "0":	Alarm signals are acknowledged

<b>Bit 5:</b>	<b>Detector is faulty</b>
logic "1":	Detector is defective or separated from base
logic "0":	Detector functions correctly

<b>Bit 6 and 7:</b>	<b>Reserve</b>
Bits number 6 and 7 are not used.	
The content is always logic "0".	

Obj	Function	Object name	Type	Flags
0	Smoke alarm	Smoke alarm	1 Bit	CRTU

When the response threshold of the smoke detector is exceeded, a "1" telegram for smoke alarm is sent via the group address in this object. When the parameter is enabled, the alarm is sent cyclically. This cyclical sending continues until the alarm is confirmed via the object "Acknowledge alarm". The status of the object remains logic "1" until a reset is carried out via the object "Reset combined fire alarm" when there is an underflow in the response threshold. If the detector is reset when the value is above the response threshold, the alarm is triggered again. A "0" telegram for "Smoke alarm Off" or "Acknowledge alarm" is not sent. This object is only available if this function is enabled in the parameter for heat/smoke evaluation.

1	Heat-sensitive alarm	Heat-sensitive alarm	1 Bit	CRTU
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When the response threshold of the heat-sensitive detector is exceeded, a "1" telegram for heat-sensitive alarm is sent via the group address in this object. When the parameter is enabled, the alarm is sent cyclically. This cyclical sending continues until the alarm is confirmed via the object "Acknowledge alarm". The status of the object remains logic "1" until a reset is carried out via the object "Reset combined fire alarm" when there is an underflow in the response threshold. If the detector is reset when the value is above the response threshold, the alarm is triggered again. A "0" telegram for "Heat-sensitive alarm Off" or "Acknowledge alarm" is not sent. This object is only available if this function is enabled in the parameter for heat/smoke evaluation.

2	Fault indication	Fault	1 Bit	CRTU
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When the detector becomes dirty, defective or is separated from the base, a "1" telegram is sent via the group address in this object to indicate a fault with the sensor. When the parameter is enabled, the alarm is sent cyclically. This cyclical sending continues until the alarm is confirmed via the object "Acknowledge alarm". The status of the object remains logic "1" until a reset is carried out via the object "Reset combined fire alarm" when the detector is made operational again. If the detector is reset when it is still faulty, the alarm is triggered again. A "0" telegram for "Fault rectified" or "Acknowledge fault indication" is not sent.

3	Status of detector	Status	1 Byte	CRTU
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The current operational status of the combined fire alarm is stored in this object. Each bit designates a unique alarm or status signal. The object value is not sent automatically when there is a change in the status. The status of the detector can be read out and displayed if required via a visualisation terminal.

## Communication objects

Phys.Addr.	Program			
	no.	Function	Object name	Type
01.01.003	20 S0 Combined fire alarm 900203			
0	Smoke alarm	Smoke alarm	1 Bit	
1	Heat-sensitive alarm	Heat-sensitive alarm	1 Bit	
2	Fault indication	Fault	1 Bit	
3	Status of detector	Status	1 Byte	
4	Smoke intensity	Smoke intensity	2 Byte	
5	Actual temperature value	Temperature	2 Byte	
6	On / Off	Alarm horn	1 Bit	
7	Acknowledge alarm	Acknowledge	1 Bit	
8	Reset combined fire alarm	Reset	1 Bit	

## Note

The view of the objects can be arranged individually i.e. this view can vary.

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Obj	Function	Object name	Type	Flags
4	Smoke intensity	Smoke intensity	2 Byte	CRTU
		The smoke intensity recorded by the sensor is stored in this object. The numerical value lies between 0 and 150. This corresponds to a smoke density between 0 and 10% with a resolution of 0.066%. The object value is not automatically sent when there is a change in the smoke intensity. It can be read out and displayed if required via a visualisation terminal.		
5	Actual temperature value	Temperature	2 Byte	CRTU
		The temperature recorded by the sensor is stored in this object. The accuracy of the temperature measurement is $\pm 1K$ with a resolution of 0.5K. It can be set via parameters whether the temperature value is sent cyclically on the bus or when it differs from the previous value.		
6	On / Off	Alarm horn	1 Bit	CRWTU
		The alarm horn that is integrated in the sensor head is switched on or off via the group addresses in this object. A "1" telegram switches the horn on while a "0" telegram switches it off. The alarm horn is not coupled with the alarms of the detector. It can only be switched on or off via this communication object.		
7	Acknowledge alarm	Acknowledge	1 Bit	CRWTU
		The alarm signal or fault indication is acknowledged with a "1" telegram via the group addresses in this object. A "0" telegram has no effect. In the parameter setting "Repeat alarm cyclically", the cyclical sending of the alarms stops after an acknowledgement. The successful acknowledgement of the alarm signals is indicated with a logic "0" in the object "Status of detector" in bit 4 "Alarm acknowledgement".		
8	Reset combined fire alarm	Reset	1 Bit	CRWTU
		The detector is reset with a "1" telegram via the group addresses in this object when an alarm has been triggered. A "0" telegram has no effect. It is only possible to reset the detector, once the alarm signals are confirmed via the object "Acknowledge alarm". This can also be carried out in both communication objects via the same group address. When the detector is reset, the alarm LED that is integrated in the sensor head also stops flashing.		

Maximum number of group addresses: 16  
 Maximum number of associations: 16

## Parameters

## General

General	Temperature
Response threshold for smoke alarm	normal (3%)
Alarm generation	Heat-sensitive and smoke alarm
Repeat alarm cyclically	enabled
Base for repeat interval of alarm	Time base 1.0 sec
Repeat interval of alarm in seconds (2 - 127)	30

Parameters	Settings
Response threshold for smoke alarm	normal (3%) insensitive (5%)
	Two sensitivity ranges can be set for the smoke alarm. The response time for triggering a smoke alarm is dependent on the level of smoke intensity which lies above the set response threshold. "normal (3)": The smoke alarm is only triggered if the level of smoke intensity exceeds 3%. "insensitive (5)": The smoke alarm is only triggered if the level of smoke intensity exceeds 5%.
Alarm generation	Heat-sensitive and smoke alarm Only heat-sensitive alarm Only smoke alarm
	This parameter determines which sensors are used for generating the alarm. "Heat-sensitive and smoke alarm": The alarm can be generated via both the heat-sensitive detector and the smoke detector. "Only heat-sensitive alarm": The alarm can only be generated via the heat-sensitive detector. The communication object for the smoke alarm is not available. "Only smoke alarm": The alarm can only be generated via the smoke sensor. The communication object for the heat-sensitive detector is not available.
Repeat alarm cyclically	enabled disabled
	This parameter determines whether the smoke alarm, the heat-sensitive alarm and the fault indication should be sent repeatedly on the bus according to the cyclic time. "enabled": When an alarm is triggered, the alarm telegram appears cyclically on the bus. The cyclical sending stops when the alarm signals are acknowledged via the object "Acknowledge alarm". "disabled": The alarm telegrams are only sent once when the alarm signals are triggered.

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Parameters	Settings
<b>Base for repeat interval of alarm</b>	Time base 130 ms Time base 260 ms Time base 520 ms <b>Time base 1 sec</b> Time base 2.1 sec Time base 4.2 sec Time base 8.4 sec Time base 17 sec Time base 34 sec Time base 1.1 min Time base 2.2 min Time base 4.5 min Time base 9.0 min Time base 18 min Time base 35 min Time base 1.2 hr
<b>Repeat interval of alarm in seconds (2-127)</b>	<b>30</b>

The cyclic time is set here for sending the alarm telegrams at repeat intervals on the bus. The time is calculated from the selected base multiplied by the factor entered here. If the setting "Repeat alarm cyclically: disabled" is selected, both these parameters are not available.

Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.

## Temperature

General	Temperature								
<table border="1"> <tr> <td>Cyclical sending of the temperature value</td> <td>enabled</td> </tr> <tr> <td>Base for cyclical sending</td> <td>Time base 1.0 sec</td> </tr> <tr> <td>Factor for cyclical sending (2-127)</td> <td>60</td> </tr> <tr> <td>Differential for automatic sending of the temperature on modification</td> <td>inactive</td> </tr> </table>		Cyclical sending of the temperature value	enabled	Base for cyclical sending	Time base 1.0 sec	Factor for cyclical sending (2-127)	60	Differential for automatic sending of the temperature on modification	inactive
Cyclical sending of the temperature value	enabled								
Base for cyclical sending	Time base 1.0 sec								
Factor for cyclical sending (2-127)	60								
Differential for automatic sending of the temperature on modification	inactive								

Parameters	Settings
<b>Cyclical sending of the temperature value</b>	<b>enabled</b> disabled

This parameter determines whether the temperature value that is measured by the sensor is sent repeatedly on the bus according to the cyclic time.

"enabled": The current temperature value appears cyclically on the bus.

"disabled": The temperature value is not sent cyclically.

Parameters	Settings
<b>Base for cyclical sending</b>	Time base 130 ms Time base 260 ms Time base 520 ms <b>Time base 1 sec</b> Time base 2.1 sec Time base 4.2 sec Time base 8.4 sec Time base 17 sec Time base 34 sec Time base 1.1 min Time base 2.2 min Time base 4.5 min Time base 9.0 min Time base 18 min Time base 35 min Time base 1.2 hr
<b>Factor for cyclical sending (2-127)</b>	<b>60</b>

The cyclic time is set here for sending the current temperature value at repeat intervals on the bus. The time is calculated from the selected base multiplied by the factor entered here. If the setting "Cyclical sending of the temperature value: disabled" is selected, both these parameters are not available.

Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.

<b>Differential for automatic sending of the temperature on modification</b>	<b>inactive</b> 0.5 °C 1.0 °C 1.5 °C 2.0 °C 2.5 °C 3.0 °C 3.5 °C 4.0 °C 4.5 °C 5.0 °C
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This parameter determines whether the temperature value that is measured by the sensor is sent on the bus when it differs from the previous value.

"inactive": The temperature value is not sent automatically after a change.

"0.5 °C": The temperature value is sent if it differs from the previous value by at least 0.5 °C.

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"5.0 °C": The temperature value is sent if it differs from the previous value by at least 5.0 °C.