

## Technical information



## Modem libraries for Saia® PCD

Controls Division

Complete network building via modem or teleservice and alarm transmission via SMS, pager or DTMF

Substantial advantages when PG5 modem libraries are used:

- Expansion of the firmware's integral modem connection to include attractive applications, such as SMS, pager and DTMF.
- Connection of up to three modems to the PCD possible with modem libraries.
- Construction of complex modem functions or of a network simply by positioning graphical building blocks (FBoxes). No knowledge of modems is required.
- Diagnostics FBoxes to help with the commissioning of modem communications.
- Abnormal events cleared by remote diagnosis.

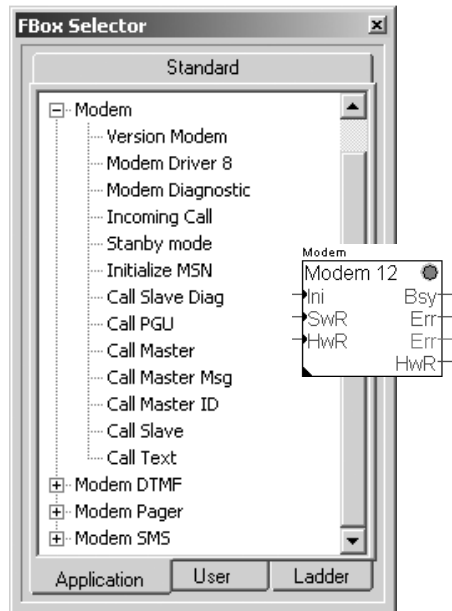
Features of PG5 modem libraries:

- Network programming allowed via modem connections.
- Insertion within pre-existing network programs by using Send and Receive FBoxes from the communications family of the standard library.
- Teleservice: The dial tones of any telephone can be used for remote control of the PCD.
- PCD remote control via SMS text messages.
- Alarm initiation: transmission of SMS text messages to a mobile phone, or of pager messages to a pager.
- Connection of PCD networks to visual display systems via modem.

# Features common to all FUPLA FBoxes

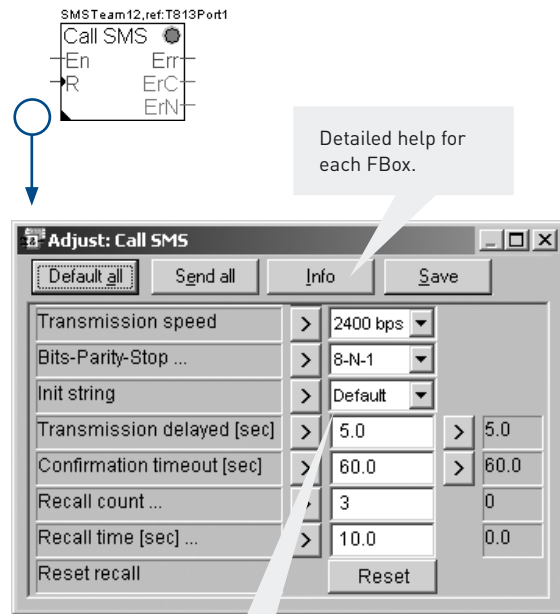
## Clear subdivision into families

All FBoxes (function boxes) are divided into families. Drag-and-drop can be used to place a selected FBox in the program. Modem libraries are installed in the “Application” directory.



## Parameter window with online view

To prevent unnecessary lines from cluttering the diagrams, FBoxes marked with a triangle have so-called “Adjust” windows.

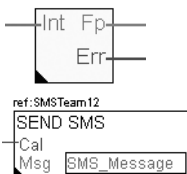


Default values are loaded on start-up and can be monitored or modified on-line.

## Easy differentiation between data types

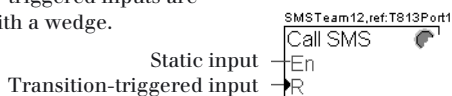
Each data type is identified with a different colour. This makes programs easier to read.

- Binary data           red
- Integer data         green
- Floating-point data   yellow



Text data is inserted in text fields.

Transition-triggered inputs are marked with a wedge.



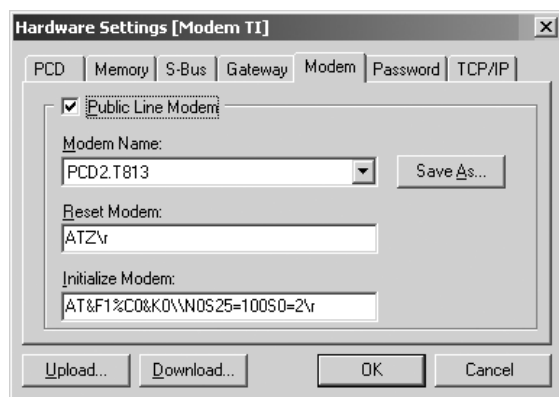
The “Adjust” window serves not only to set FBox parameters, but also allows individual parameters to be observed on-line. If required, parameters can also be changed on-line. For example, in the Modem-Driver-12 FBox it is possible to monitor the time to the next Recall and modify it on-line.

# General points about modems

## Modem function built into firmware

Every PCD already supports modem connection through its operating system. A modem connection can be established from your PC to a PCD without any programming and without the additional modem libraries.

This merely involves connecting a modem to the PCD and configuring that modem in the hardware settings.



Then, whenever the PG5 programming tool calls the PCD, that call will be accepted by the PCD, enabling the PCD to be programmed via modem.

FUPLA and IL programs can, of course, also be displayed on-line via modem.

Built-in password protection prevents any unauthorized person from dialling up the PCD.

## Advantages of modem libraries

The modem libraries do not only allow maintenance of the installation via modem and PG5, they also enable the PCD to send messages independently via pager or SMS in the event of any problems or incidents.

In addition, access protection can be further increased by programming a callback function. In this case the PCD is called first. The PCD registers the call, but does not accept it. The PCD then calls back a known number.

Entire modem networks comprising many slave stations can be produced with the modem libraries.

Diagnostics functions help with the commissioning of a modem application.

With modem libraries, the PCD can also contact a visual display system independently. Expanded functions enable the PCD to initiate special messages to the visual display system, for example: the station identification number or such messages as "Life check", "General Alarm", "Data Buffer" etc.

## Examples of solutions

**Task:** A PCD-controlled installation requires the immediate visit of a service engineer.

**Solution:** The PCD controller independently transmits a message via pager or SMS. The service engineer can immediately contact the PCD by telephone or mobile (no other resources required) and extract registers or flags for analysis, or overwrite them. Alternatively, a programming unit can be used with the PG5 to analyse the program and rectify faults.

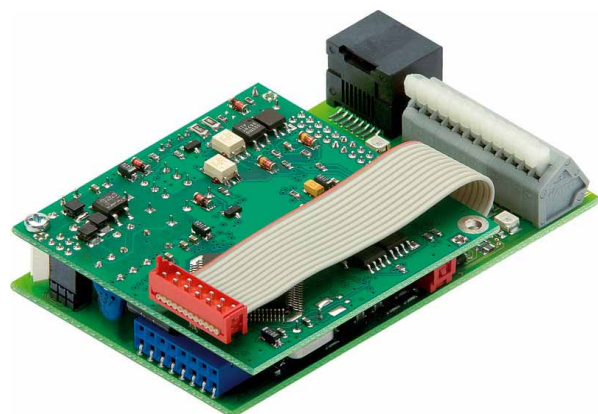
**Task:** A central control station has to fetch data from or supply data to installations that are physically remote from each other.

**Solution:** The control system exchanges information with the PCDs by telephone or via the GSM network. The connection can either be initiated by the control system, or by the PCD (confirmation by callback if required).

## PCD2.T8.. modem modules

Modems available for the PCD2/PCD1 and xx7 family include both analogue (PCD2.T815) and ISDN (PCD2.T850) versions. Although basically any Hayes-compatible modem can be used, SAIA-.T8.. modems offer a number of advantages:

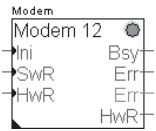
- The PCD7.F120 communications module is not required.
- The power supply for an external modem is not needed, since these modem modules draw their supply directly from the PCD.
- Installation of the modem is completed in 50 seconds, without costly wiring.
- With a PCD2.T8.. modem and the PCD2.F522 card, up to 5 modems can be connected to one PCD2.
- All FBoxes are tested with the PCD2.T8.. modem - this means no trouble with initialization strings.



# Basic Modem Library

## Modem installation and maintenance

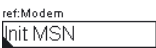
### Modem Driver 12



For every modem, parameters must be set in a modem driver FBox. This contains all the control functions for the serial port, modem and telephone line.

This FBox must always be present. Its position in the program precedes any other modem FBox.

### Initialize MSN



Initializes the MSN (Multiple Subscriber Number) of an ISDN modem. If no MSN is set, the ISDN modem will accept all calls on this line.

### Modem Diagnostic



Offers the programmer a wide range of diagnostic information during commissioning.

### Version Modem



Shows which version of the basic modem library is used in the program (on-line and off-line).

### Standby mode



With this FBox it is possible to overwrite the standby mode of the main modem driver FBox for a certain time.

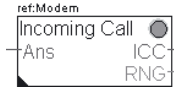
Several standby FBoxes can be used. If there is an H signal at the "En" (Enable) input, standby mode is active throughout the defined time.

## Documentation of FBoxes

To improve documentation, each FBox can also be provided with an individual name and comment. The name is not just for identification, but also links very different FBoxes to each other. For example, all FBoxes that communicate via the same interface might be provided with the same name. FBoxes that together constitute a function can therefore be coordinated at a glance.

## Call acceptance

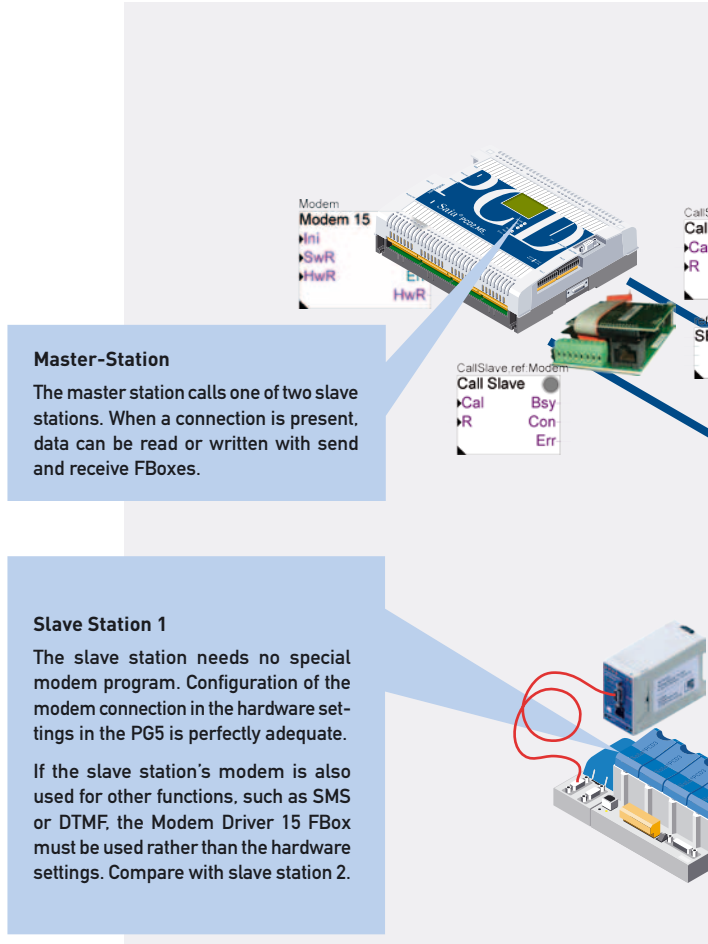
### Incoming Call



This FBox indicates when the PCD is called (ICC = H). The "RNG" signal denotes the number of ringing tones for a call. The call is accepted as soon as the "Ans" signal is set.

This FBox has many uses. For example, the principle might be never to accept a call, but to register it and call back the control station or programming unit directly after the call. This kind of callback function increases security from undesirable third-party access and means that call charges are paid by the PCD operator. See also Modem DTMF for more callback functions.

If the PCD is to accept a call, the modem must be connected to a port with full handshaking and the modem driver FBox must be defined accordingly. Port 1 has full handshaking. With the .F522 module, ports 2 and 4 will also have full handshaking.

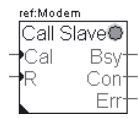


**Master-Station**  
The master station calls one of two slave stations. When a connection is present, data can be read or written with send and receive FBoxes.

**Slave Station 1**  
The slave station needs no special modem program. Configuration of the modem connection in the hardware settings in the PG5 is perfectly adequate.  
If the slave station's modem is also used for other functions, such as SMS or DTMF, the Modem Driver 15 FBox must be used rather than the hardware settings. Compare with slave station 2.

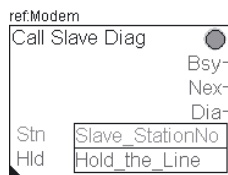
## Saia® S-Bus networks via modem

### Call Slave



Calls a PCD slave station when a positive edge is received at input “Cal”. Once the connection has been established, output “Con” (Connection) = H. This signal can, for example, be linked to send and receive FBoxes from the communications family of the standard library so that data can be exchanged.

### Call Slave Diag

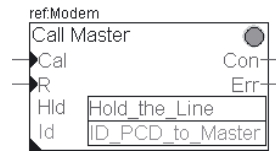


Works like “Call Slave” but also with IL and GRAFTEC programs. Calls a PCD slave station when the “Connect” flag in an IL program is set.

With “STXM SRXM” data can now be exchanged with the slave. The “Hld” flag („hold the line“ => shown as on the FBox) must be set sporadically to maintain the connection.

## Master Stations calling PG5 programming software or a visual display system

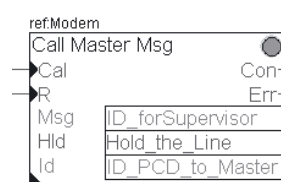
### Call Master



Calls a master station (usually a monitoring system) when a positive edge is received at input “Cal” and then switches the port to “SBus Slave mode”. Once the connection has been established, output “Con” (Connection) = H.

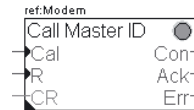
The “Hld” flag („hold the line“ => shown as on the FBox) must be set sporadically by the master to maintain the connection.

### Call Master Msg



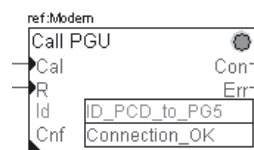
Mostly used for connections to monitoring systems. It works like the Call Master FBox. However, before transmission of S-Bus telegrams an additional “Msg” string is sent to the master. The master uses this string to identify the station.

### Call Master ID



Works like the Call Master Msg FBox. However, identification is not contained in a string, instead it is possible to select from a list of predefined messages in the Adjust window.

### Call PGU



This FBox calls the PG5 programming software. The PCD can therefore independently establish a connection with the service station, if necessary.

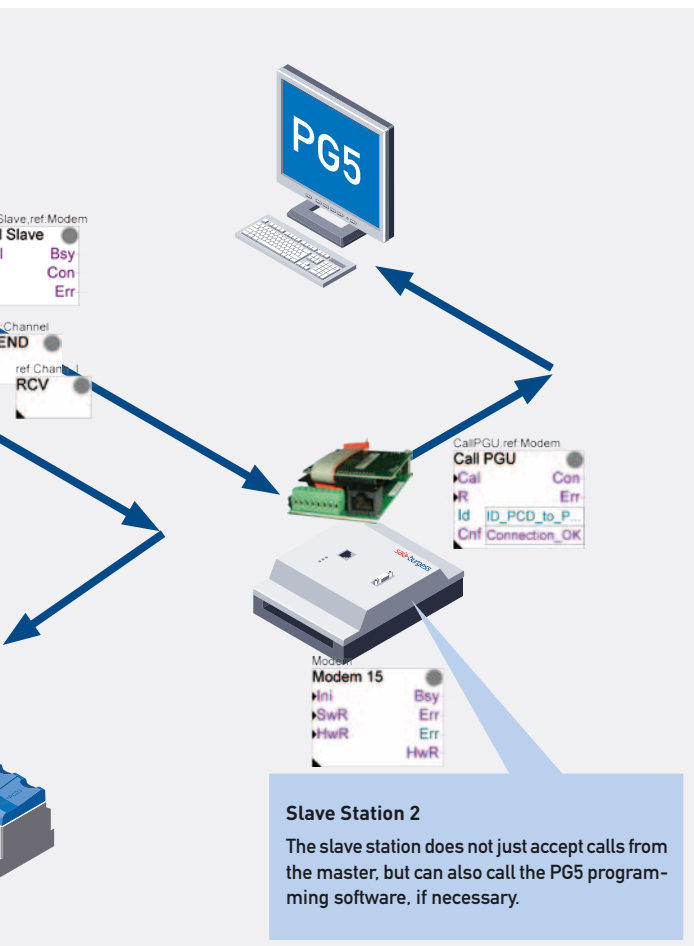
## Transmitting messages to displays and printers

### Call Text



Calls a terminal or printer when a positive edge is received at input “Cal”. The port then switches to text mode.

Once the connection has been established, output “Con” (Connection) = H. This signal can, for example, be linked to Send Text FBoxes from the communications family of the standard library in order to transmit strings to a display.

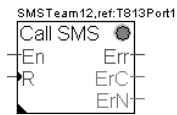


# Modem SMS library

## Modem SMS functions

Modem SMS allows SMS alarms and messages to be sent to any commercially available mobile phone. However, Modem SMS also offers additional functions, such as the transmission of previously composed text messages or system data (e.g. register values, etc.) and the receipt of SMS messages for controlling the PCD (GSM modem required on PCD).

### Call SMS

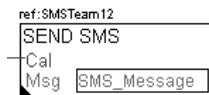


Initializes the modem for SMS message despatch. This Fbox also contains a list of mobile telephone numbers (up to 8). These numbers can be modified via DTMF, see “DTMF Update call number SMS”.

The reference (e.g. T813Port1) shows by name which modem driver FBox is being used to transmit the SMS.

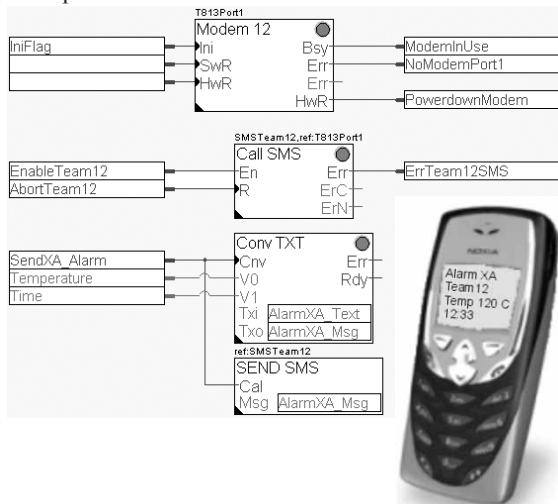
The name (e.g. SMSTeam12) of the Call SMS FBox in turn serves as a reference for the Send FBoxes.

### Send SMS



Transmits the text in “Msg” variables to one of the 8 mobile phone numbers. If the PCD is working with a GSM modem, the text can also contain variables.

Example:



“Modem12” initializes the modem. “Call SMS” initializes SMS functionality (the various mobile phone numbers, SMS service centre, etc.). Finally, the “Send SMS” FBox transmits the messages to the mobile phone numbers.

The text “AlarmXA\_Msg” contains the text message. Since this example involves the transmission not only of text, but also of text that incorporates variables (for example, “Temp 120 C” and the time: “12:33”), both variables must be integrated into the text before transmission of the message. This is achieved with the FBox “Convert Text Integer”.

### Send SMS Indirect Message



Works like the Send SMS FBox, but with the difference that the text message is contained in text memory, rather than in a “Msg” variable. The value of integer input “Msg” defines the text number.

Example: If there is a 6 at the input, text number 6 will be sent.

### Send SMS Indirect Destination



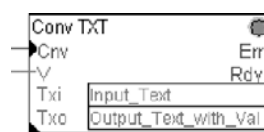
Works like the Send SMS FBox, but with the difference that the mobile phone number (1..8) is controlled via the “Dst” (destination) integer input, rather than being a fixed setting.

### Send SMS Indirect Message and Destination



In this case both text and destination are controlled via integer inputs.

### Convert Text Integer

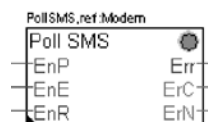


Inserts data from variables into a text. This FBox enables SMS messages to include current machine data. For example, a text will not just report “Facility overheating”, but would also advise the recipient of the exact temperature: “Facility temp. 120 C”.

## SMS reception and remote control of PCD

If a GSM modem has been connected to the PCD, SMS messages can also be transmitted to the PCD. The PCD interprets the SMS messages received and can therefore write to registers or flags, as required.

### Poll SMS



If necessary, the PCD can confirm the message after it has been received. This involves returning the SMS to the sender (reply) or forwarding it to another mobile phone (destination). In addition to returning the original message, it is also possible to confirm that the elements have been successfully written.

# Modem DTMF and Modem Pager Libraries

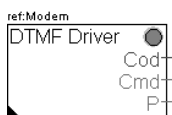
## Modem DTMF controls a PCD by telephone

The DTMF driver converts any telephone (including a mobile phone or ISDN) into a remote control for the PCD. The telephone keypad is used to provide control by means of DTMF signals. The PCD confirms each action with a negative or positive signal tone. The PCD must be equipped with an analogue modem, for example PCD2.T815.

- Positive confirmation short, high tone, 2 kHz, 0.8 second duration
- Negative confirmation long, low tone, 800 Hz, 2 second duration

If the PCD is intended to accept any call, the modem must be connected to a port with full handshaking and the modem driver FBox must be adjusted accordingly. Port 1 has full handshaking. The ..F522 module can be used to provide ports 2 and 4 with full handshaking also.

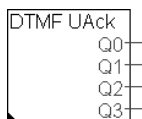
### DTMF Driver



Initializes the modem to accept DTMF signals. Also defines the password.

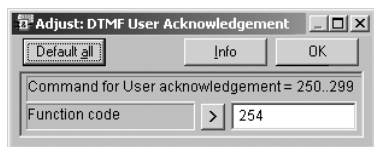
The reference (e.g. Modem) indicates the name of the modem driver FBox to be used for transmission of the SMS. DTMF standby mode must always be set in the modem driver FBox.

### DTMF Acknowledgement

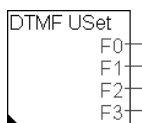


Generates a pulse lasting one second at the selected output. Every FBox has a number (250...299) and up to 10 outputs (Q0...Q9).

Example: 254 \* 3 #  
Sets output Q3 of FBox number 254 for one second.



### DTMF User Function Set

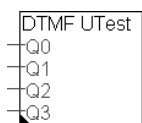


Sets or deletes a binary output. Every FBox has a number (500...549) and up to 10 outputs (F0...F9)

Example 1: 505 \* 3 \* 1 #  
Sets output F3 of FBox number 505.

Example 2: 505 \* 3 \* 0 #  
Deletes output F3 of FBox number 505.

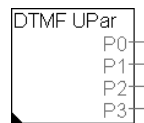
### DTMF User Function Test



Reads the status of a binary signal and indicates it with a tone. Every FBox has a number (550...599) and up to 10 inputs (Q0...Q9).

Example: 564 \* 3 \* 1 #  
Is input 3 of FBox 564 high? Positive confirmation: short, high tone; negative confirmation: long, low tone.

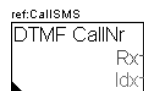
### DTMF User Function Parameter



Writes values to one of the integer outputs. Every FBox has a number (600...649) and up to 10 outputs (P0...P9).

Example: 605 \* 2 \* 250 #  
The value 250 is written to output P2 of FBox number 605.

### DTMF Update call number SMS



Changes the mobile phone number for SMS messages. Every FBox has a number 180...189.

Example: 180 \* 1 \* 00492345678 #  
Changes the telephone number at position 1 in the "Call SMS" FBox to 00492345678

## Modem Pager - for messages to text pagers

The modem pager family allows alarms and messages to be transmitted to any commercially available text pager.

### Call Pager



Initializes the modem for dispatch of pager messages. It also contains a list of all pager numbers (up to 8 per FBox).

The reference (e.g. Modem) indicates the name of the modem driver FBox to be used for transmission.

The name (e.g. CallPager) of the Call Pager FBox in turn serves as a reference to the Send FBoxes.

### Send Pager



Sends a message to one of the 8 pager numbers when input "Cal" = H. The text "Msg" contains the message. It can amount to 80 characters and may also contain variables.

### Send Pager Indirect



Works like the Send Pager FBox. The message is contained in a text. The "Msg" input is a register. The value in the register selects the text number.

Example: Register "Msg" is loaded with value 15. When the signal "Cal" = H, the modem transmits the message at text number 15. This enables different messages to be transmitted via one register value.

## Technical data

Controller type	All FBoxes will work with any PCD
System requirements	<p>Apart from a modem and a PCD, circumstances may require additional hardware components, for example: PCD7.F120 (RS232 interface for socket A) or PCD2.F520/..F522 (RS232 interface for sockets B1/B2).</p> <p>If the PCD is intended to accept a call, the modem must be connected to a port with full handshaking and the modem driver FBox must be adjusted accordingly. Port 1 has full handshaking. The ..F522 module will provide ports 2 and 4 with full handshaking also.</p> <p>The Poll SMS FBox only works with a GSM-Modem and the DTMF FBoxes require an analogue modem.</p>

## Order information

Type	Description
PCD9.M59 BAS M5	<b>Modem-Basis</b> Initialization and diagnosis, user profiles, list of phone numbers, password protection, establishment of connection, event or time controlled transmission or receipt of data between PCD systems and external devices (e.g. SCADA), Saia® S-Bus network via modem connections.
PCD9.M59 PAG M5	<b>Modem-Pager</b> Event or time controlled transmission of individual or multiple pager messages, supports TAP and a variety of specific national protocols.
PCD9.M59 SMS M5	<b>Modem-SMS</b> Event or time controlled transmission of individual or multiple SMS short messages, supports UCP and TAP. Receipt of SMS messages → control of PCD by means of SMS.
PCD9.M59 DTM M5	<b>Modem-DTMF</b> Supports the receipt of DTMF signals for control commands via telephone → control of PCD by means of DTMF signals.
In addition to the modem libraries, further libraries are also available as follows:	
PCD8.P59 000 M9	<b>PG5 Standard Library</b> The PG5 contains a standard library that includes more than 250 FBoxes. For PG5 details, see Technical Information 26/362; for standard library details see TI 26/367.
PCD9.B59 HVC M5	<b>PG5 HEAVAC Library</b> – Library with more than 150 FBoxes for tasks in heating, ventilation, air conditioning and building technology. – Objects from the HEAVAC library can be imported directly into the HMI editor.
PCD9.C59 EIB M5	<b>EIB Library</b> FBoxes for coupling a communication to EIB networks

## Contact

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