Technical Data

**Type**

FBM 16  
8 un. inputs 0-5Vdc or 0-20mA,  
Sensor NTC 10K  
Digital Contact  
8 outputs 0-10Vdc

FBM 21  
8 universal inputs 0-5Vdc, 0 -20mA  
Sensor NTC 10K  
High Speed Pulses <100hz  
Digital Contact  
13 Relay outputs

FBM 22  
10 universal inputs  
0-5, 0-10Vdc or 0-20mA,  
Sensor NTC 10K  
High Speed Pulses <500hz  
Digital Contact  
8 Relay outputs  
4 analogue outputs 0-10Vdc

FBM 32  
32universal inputs  
0-5V, 0-10Vdc or 0-20mA,  
Sensor NTC 10K  
Digital Contact

**Operating temperature**  
-30 ... +70 C

**Relay Output**  
0.5A@125Vac or 1A@30Vdc

**Protection**  
IP31

**Power Supply**  
12-24Vac/dc +/-20% 50-60Hz

**Consumption**  
100mA at 12Vdc

**Length of cables**  
1200m or more

**Power supply**  
12-24 Vac/dc (±10%)

**Temperature sensor**  
10K thermistor +/-0,5C

**Guidelines**  
These products meets the CE-approvals

**Material, enclosure**  
Flame proof plastic

**Features**

- Surge-protected analogue inputs 10-bit resolution
- Outputs individually be switched to ON, OFF, AUTO
- Enclosure provides durability i comm. environments
- Standard modbus protocol allows up to 254 unique devices on one RS 485 network

**Design Features**

The FBM are general purpose input/ output modules for building integrators.

Available in several input/ output configurations, the FBM modules provide convenient termination for field devices and interfacing to your:

- HVAC
- lighting
- temperature sensors
- other typical building automation applications.

Each of the analogue inputs can be jumper configured for signals of either 0-5V, 0-10Vdc, 0-20mA or digital contact, sensor 10K, high speed pulses.

The outputs are available in digital contacts 0,5 resp.1 Amp, and 0-10Vdc analogue outputs.

The modules are slave devices that can be easily controlled via RS 485 serial interface using the industry standard Modbus protocol.

**Special Features of FBM 22**

The FBM 22 has a few special features which the other FBM do not have due to a more advanced CPU.

In on/off mode, inputs 1 through 8 can count pulses up to 1 khz on each channel.

In analogue mode, inputs 1 thru 8 are 12 bits compared to the previous 10 bits, input 9 and 10 remain as 10 bits and slower at pulse counting.

For systemintegratörer there is a significant improvement with larger rom and ram space: 128K versus 64K for the flash space and 3K ram versus 1K of ram space compared to earlier models.

This gives more room for system integrators to add features such as Bacnet, PLC typ logic, logging etc.

Secondly there is the second serial port, curently the port is unused but systemintegrators will be able to use the second port to manage a subnet of local sensors, keypads and displays for example, or use it in repeater mode to extend and isolate the RS 485 main network.

**Ordering Code**

FBM 16  8 analogue inputs, 8 analogue outputs
FBM 21  8 analogue inputs, 13 relay outputs
FBM 22  10 analogue inputs, 8 relay outputs, 4 an.O/P
FBM 32  32 analogue inputs
Inputs

Each input of a FBM can be jumper-configured in 1 of 3 ways: 0-5V, 0-10Vdc, 0-20mA, Digital Contact, Pulse and sensor.

The value of each input is stored as a 10-bit number in the respective modbus register.

The registers addresses are as follows:

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of Inputs</th>
<th>Register Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBM 16</td>
<td>8</td>
<td>108-115</td>
</tr>
<tr>
<td>FBM 32</td>
<td>32</td>
<td>100-131</td>
</tr>
<tr>
<td>FBM 22</td>
<td>10</td>
<td>190-199</td>
</tr>
<tr>
<td>FBM 21</td>
<td>8</td>
<td>118-133</td>
</tr>
</tbody>
</table>

A 5Vdc or 20mA, would give a reading of 1024.

Each input has a corresponding LED which will light up if the value of the input is greater than 512.

For more info on reading the input registers, see Serial Communications.

Outputs

The state of each output is determined by its corresponding switch position.

The switches have 3 states - 'hand', off, and auto.

When switched to 'hand' the corresponding output will be switched on - 10V analogue, contacts closed for relay.

When switched to 'off' the output will be set to 0V for analogue, open contact for relay.

When switched to 'auto' analogue outputs will be set to the level stored in the corresponding MODBUS output register.

For Digital outputs, a register value 0 is de-activate and register value 100 is activated.

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of Outputs</th>
<th>Register Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBM 16</td>
<td>8</td>
<td>100-107</td>
</tr>
<tr>
<td>FBM 32</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>FBM 22</td>
<td>12</td>
<td>100-111</td>
</tr>
<tr>
<td>FBM 21</td>
<td>13</td>
<td>100-112</td>
</tr>
</tbody>
</table>

These registers can be changed using the RS485 serial interface.

For analogue outputs, a 0 corresponds to 0V.

Likewise 1 1024 corresponds to 10V.

Outputs (cont...d)

The output registers are stored in RAM, thus contents of each register will be lost upon power-off.

Each output has a corresponding LED which will light up if the value of the output is greater than 512 (5V).

For more information on writing the output registers, see on Serial communications.

Analogue Output Calibration

The FBM has an output calibration feature that allows for an adjustment of +/- 1,28V.

Calibration is controlled via the calibration register located at register 13.

By default, this is 128, which corresponds to 0V calibration.

A value of 0 would give a -1,28V offset.

A value of 255 would give a +1,28V offset.

It is recommended that the calibration be determined while the output is set to 5V.

The calibration value is located in flash memory and will be restored upon power-up.

Baudrate

All FBM have adjustable Baudrates set by Modbus register 15.

By default baud is set to 19,2kbps.

Value 1 will set the baud to 19200bps.

Value 0 will set the baud to 9600bps.

Accessing FBM Series Registers via Serial Communications.

The FBM modules have a built-in interface for communication over an RS485 network.

Communication is currently implemented using Modbus protocol.

For detailed information on Modbus Protocol, see chapter entitled ModbusSerial Communications.

Connecting FBM module to a computer

The FB modules connect to a computer serially via the RS485 interface.

A RS 232 to RS 485 converter is required in order to communicate with a standard PC.
Wiring Diagram

FBM 16

FBM 21

FBM 32

FBM 22
Jumper Settings

We reserve the right to make changes and improvements in our products which may effect the accuracy of the information contained in this leaflet.