Modbus
Feld Bus Module

FBM

April.11

FBM 16

Technical Data

Type	
FBM 16	8 un.inputs 0-10Vdc, 4-20mA, Sensor NTC 10K High Speed Pulses Digital Contact 8 un.outputs 0-10Vdc, 4-20mA
FBM 21	8 un.inputs 0-10Vdc, 4-20mA, Sensor NTC 10K High Speed Pulses Digital Contact 13 Relay Outputs
FBM 32	32 un.inputs 0-10Vdc, 4-20mA, Sensor NTC 10K High Speed Pulses Digital Contact
Operating temperature	-30 ...+70 C
Protection	IP31
Power Supply	12-24Vac/dc +/-20% 50-60Hz
Consumption	100mA at 12Vdc
Power supply	24 Vac/dc (±10%)
Temperature sensor	10K thermistor +/-0,5C
Relay contacts rating	max 1A
Guidleines	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**
- **Allows up to 254 unique devices on one network**

Design Features

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

Available in several input/ output configurations, the FBM modules provide conenient 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 0-10Vdc, 4-10mA or digital contact.

The outputs are available in digital contacts 1 Amp, 0-10Vdc or 4-20mA analogue outputs or PNP-sinking.

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

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Ordering Code

FBM 16	8 anlogue inputs, 8 analogue outputs
FBM 21	8 analogue inputs, 13 relay outputs
FBM 32	32 analogue inputs

Inputs

Each input of a FBM can be jumper-configured in 1 of 3 ways:

0-10Vdc, 4-20mA, Digital Contact, Pulse and thermistor

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

The registrers addresses are as follows:

Input register adresses

Model	Number of Inputs	Register Addresses
FBM 16	8	108-115
FBM 32	32	100-131
FBM 24	8	108-115
FBM 21	8	118-133

A 10Vdc 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 Comminications.

Outputs

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

The switches have 3 states - ´hand´. off, on, auto.

When switched to ´hand´ the corresponding output will be switched on - 10V analogue, contacts closed for relay or 0V for sinking outputs.

When switched to ´off´ the output will be set to 0V for analogue, open contact for relay or open circuit for sinking outputs.

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

For Digital or Sinking outputs, a register value 0 is de-activate and register value 1000 is activated.

Output register adresses

Model	Number of Inputs	Register Addresses
FBM 16	8	100-107
FBM 32	0	-
FBM 24	16	100-107 & 166-123
FBM 21	13	100-112

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)

For relay and sinking outputs, the output will be activated by any number greater than 512.

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 grater 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 voa the calibration register located at register 13.

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

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.

Bandrate

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

Accesing FBM Series Registers via Serial Communications.

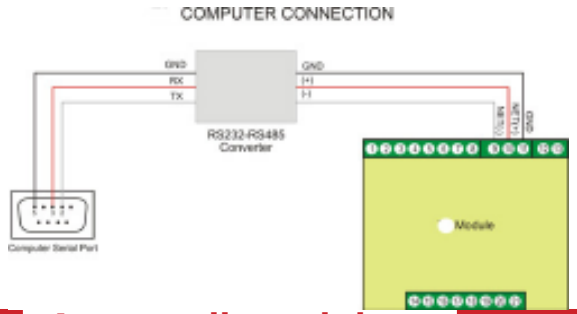
The FBM modules have a built-in interface for communication over an RS485 network.

Communicaiton is currently implemented using Modbus protocol.

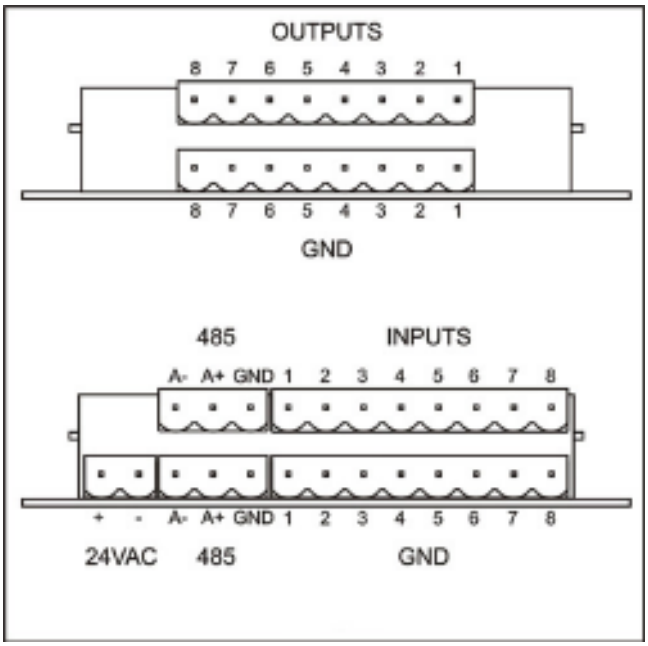
Connecting FBM module to a computer

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

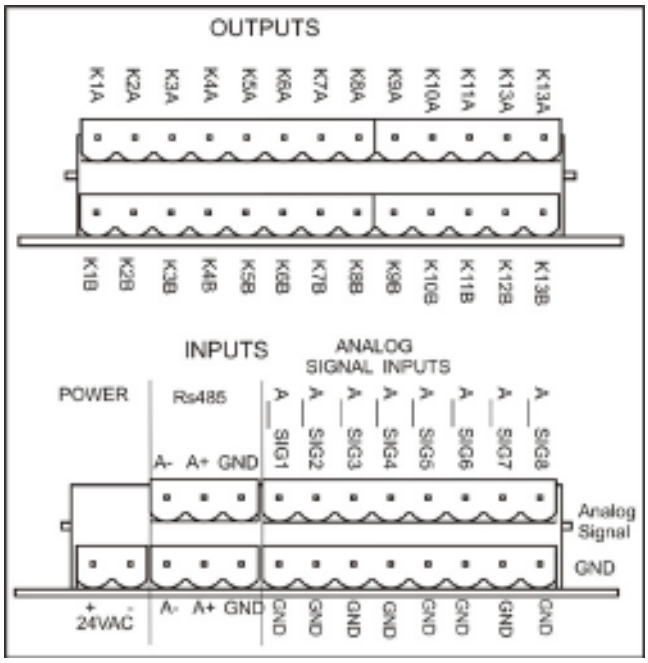
A RS 232 to RS 485 converter is required in order to communicate with a standard PC.



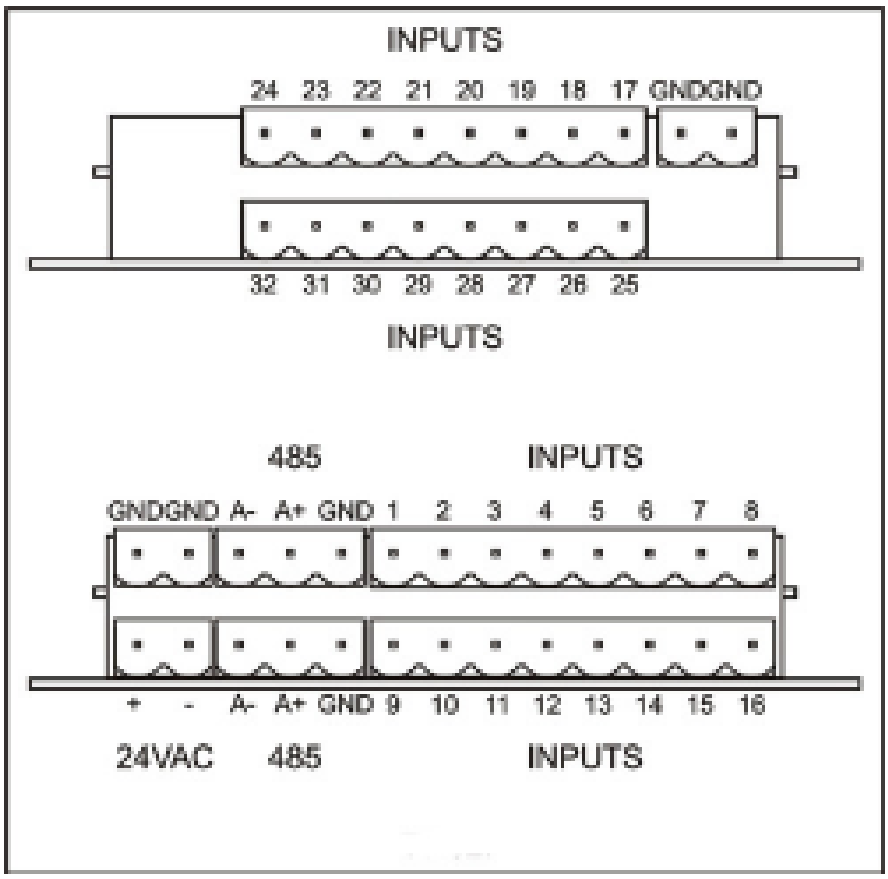
Wiring Diagram



FBM 16



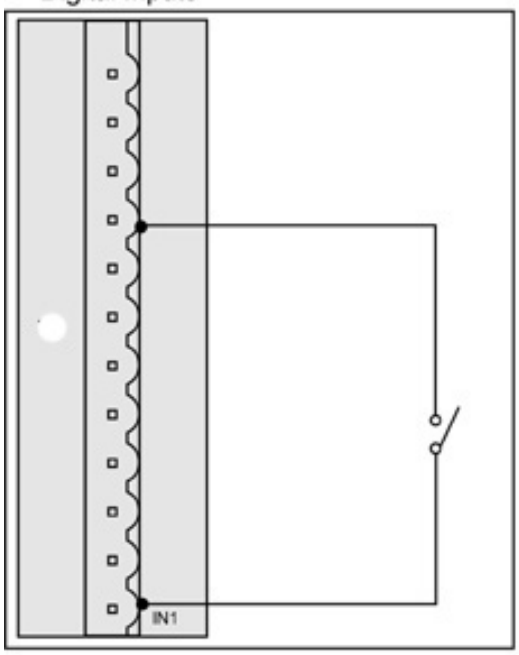
FBM 21



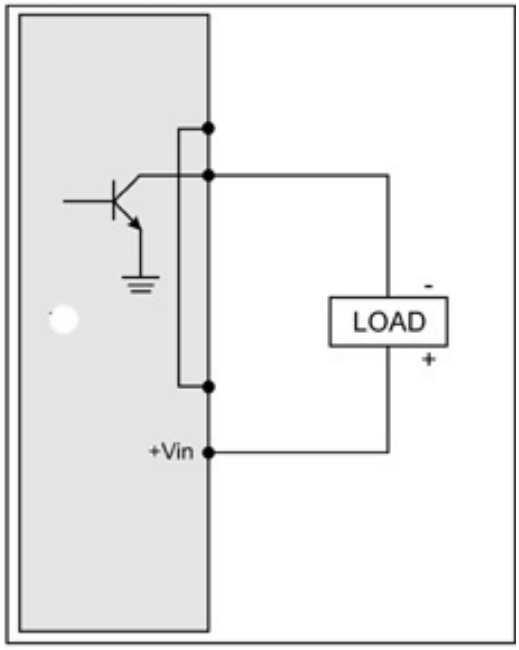
FBM 32

Wiring Diagram

Digital Inputs

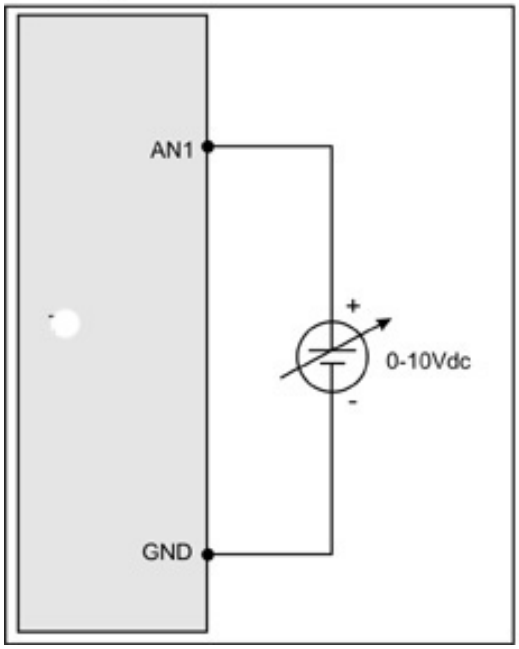


Digital Outputs

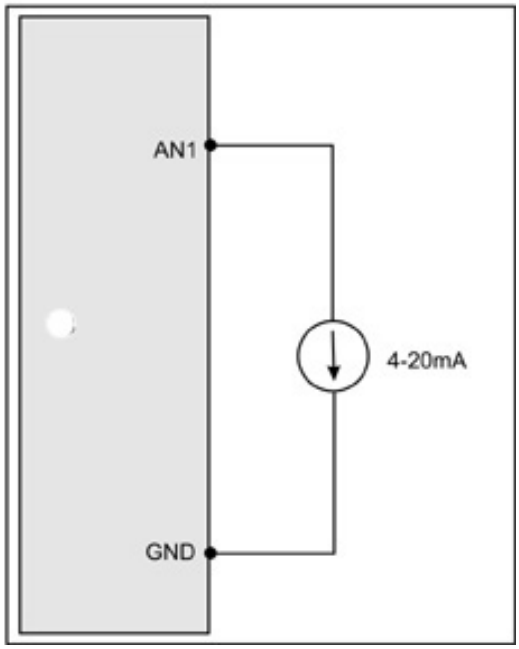


Analog Inputs

Voltage 0-10V



Current 4-20mA



Master Timer Clock Function for MPC in a Network

The FBM series can act as a master timeclock for the MPC network to set series of MPC:s to occupied and unocupied mode.

The system works by connecting an ordinary mechanical timeclock or a separate controller to input #1 of the network controller.

Whenever the timeclock contact opens or closes, a message is sent from the network controller out to the MPC:s to go into occupied and unoccupied mode.

Opening the contact cennected to input #1 of the FBM signals an occuoied event, the network controller wll send an occupied command to each MPC in the network.

This command is sent only once to each MPC sothat the user in the room can change the fan speed manually.

Closing the contact on input #1 will signal an unoccuppied event, all controllers in the network are set to unoccupied mode.

This command is sent to each MPC only once so that the local user has manual override control.

The FBM netork controller eill maintain a list of MPC that are succesfully commanded for each timeclock event so that each timeclock event is transmitted to each MPC one time.

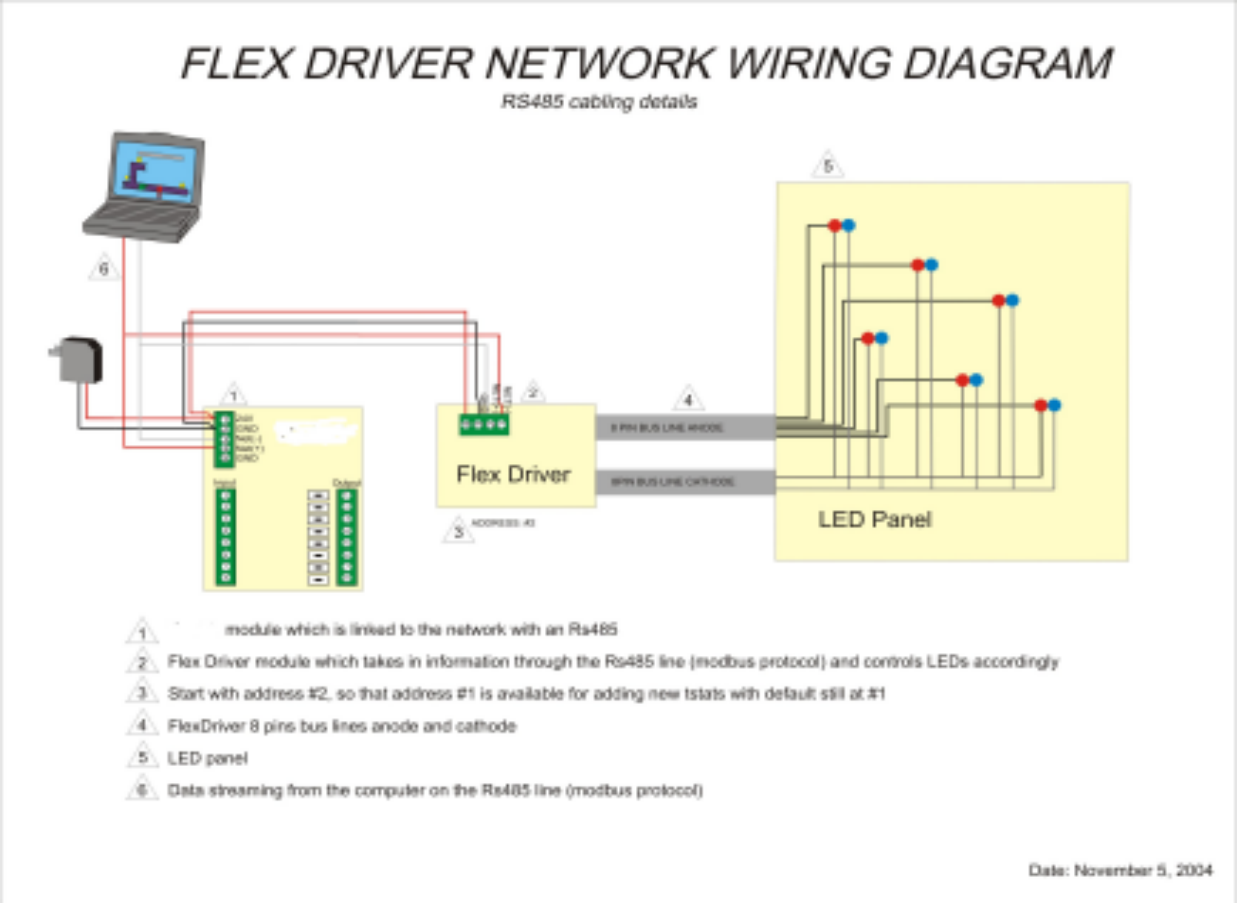
In this way, the users in the rooms will have local control between timeclock events.

If a MPC happens to be offline, the FBM will repeat the event command until the MPC comes back online and a response is recieved.

The FBM polls each MPC and waits approx 1 second for a response, starting from #1 and on up to #254.

Below is a typical wiring diagram for a Maser timeclock and several MPC:s connected on the RS 485 network.

Take FBM 16 an an example



The FBM can act as a master for the FlexDriver as well.

Given the FlexDriver is only a Slave, the multipurpose FBM is used at a medium to talk to the FlexDriver device.

It can receive data from other modules and translate the information into stream of data which the FlexDriver can understand,

Rhe FBM as an example