

# BAS1020



## Datasheet

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BAS1020 belongs to a family of freely programmable controllers designed to be scalable from the small to the very large installations. BAS1020 is well suited to control HVAC and natural ventilation and can function as a PLC.

BAS1020 contains all building blocks for control and supervision, ie. PIDs, trend curve data collection, time control, alarm handling aso.

BAS1020 is built with a modular design and can be extended to 140 I/O channels in all. Further more the BAS1020 has built protocols for a lot of different controllers, i.e. Multical/Maxical meters, InfoCal 5, Grundfos GENIbus, M-Bus, Modbus/IP, Modbus/RS485, LON, BACnet/IP etc.

BAS1020 is designed for DIN rail mounting

BAS1020 can, via the BAS Tool, be programmed to almost any conceivable task using the advanced builtin scripting language.

BAS1020 can communicate via M-Bus, RS232, RS485, Ethernet, LON and USB OTG.  
 BAS1020 can function as a standalone unit or as part of a larger system. This can be accomplished via the



BAS SCADA system.

BAS1020 can also connect to other SCADA systems via BAS OPC or BACnet.

BAS1020 has a built-in webserver and can be programmed to show a html5-based fully graphical interface that will work through any html5 enabled webbrowser on all platforms.

Technical data			
<b>Power supply:</b>	24 VAC or 20-40VDC with max 5% ripple 6W without modules 30W with modules	<b>Digital outputs</b>	4 Solid state 24V/1A must be protected against inductive loads
<b>Temperature range</b>	Storage -20 °C to +70 °C Active -10°C to +60°C	<b>Analog outputs</b>	4 0-10VDC
<b>Humidity</b>	Max. 90% RH, non con- densating	<b>Analog inputs</b>	8 0-10 VDC 0-1600 ohm (PT1000) 0-20 mA DC 0-44500 ohm
<b>Mechanical</b>	ABS/PC, IP20 157 x 86 x 58 mm 250 g	<b>Communications</b>	RS485 (optional) RS232 3 wire (optional) M-Bus (optional) 10/100 Mbit ethernet USB-OTG LON FT (optional)
<b>Real time clock</b>	± 10 minutes pr. year at 20°C RTC can operate for at least one year on the batte- ry backup	<b>Digital inputs</b>	4 With internal supply 5VDC over open circuit, max 10 mA Minimum pulse length 20 ms.

**Design**

BAS1020 is designed to be a general purpose controller. The BAS can be mounted in close proximity of the equipment to be controlled so that the necessary wiring can be minimized

BAS1020 is microprocessor based and consists of a motherboard with galvanic insulation of I/O. BAS1020 can be equipped with many types of sensors, transducers and controllable units. All I/O terminals are equipped with detachable connectors so the unit is easily serviceable

BAS1020 can read and write data from other BAS Series controllers either via RS485 or ethernet. Also data from NMEA units, M-Bus, ModBus/IP, Modbus/RS485, LON FT, Multical/Maxical, InfoCal and Genibus can be read/written These data can be incorporated like the BAS Series own data, i.e. the data can be used in calculations, it can be logged and monitored for alarm conditions aso.

**Powerloss**

BAS1020 uses flash and EEPROM memory so that the unit can restart after powerloss without any user intervention.

**RTC**

BAS1020 uses a RTC (real time clock) so that the system time is always correct. The time can also be synchronized via the internet if so desired. The clock will function approx. a year on the battery backup

**Daylight savings time**

BAS1020 changes between DST and standard time if so desired.

**Digital inputs:**

The inputs can be used to read alarms, status indicators, pulse counting etc. The inputs can be powered from the BAS1020. Using a jumper this supply can be removed and external supply be used. All channels can count.

**Digital outputs:**

The outputs can be used to control pumps, blowers etc The outputs can be pulse modulated.

**Analog inputs:**

The inputs can be used to read procesdata, ie. temperature/PT1000, current or voltage. Inputs in PT1000 mode are powered from the BAS1020. The inputs are jumperless.

**Analog outputs:**

The outputs can be used to control valves, blowerspeed etc.

**RS232/RS485/LON and ethernet**

Can be used for datacollection/communication via ModBus, M-Bus, http, BAS SCADA, other SCADA systems via BAS OPC, LON, BACnet/IP and communication with other units from the BAS Series

**Modules**

BAS1020 can utilize up to 15 external I/O modules and one communication module.

Legend:

- DI      Digital input
- AI      Analog input
- DO      Digital output
- AO      Analog output
- COMM   M-Bus communication

Module	DI	DO	AI	AO	Com
<b>BAS1020</b>	4	4	8	4	Ethernet USB-OTG LON-FT (Option) RS485 (Option) M-Bus(Option)
<b>BAS920DI</b>	8				
<b>BAS920DO</b>		8			
<b>BAS920AI</b>			8		
<b>BAS920AO</b>				8	
<b>BAS920COMM</b>					M-Bus, RS485/RS232 combo

BAS1020

Expansion Bus

10/100 Mbit ethernet  
 8 AI  
 4 DI  
 4 DO  
 4 AO  
 USB OTG  
 LON-FT/M-Bus/RS485 (Option)

Expansion bus for max. 15 modules

BAS920AI

8 Channels:  
 4-20 mA  
 0-10 VDC  
 PT1000  
 Autoconfiguration  
 Powered by expansion bus

BAS920DIOM

M-Bus/RS232  
 DI x 8  
 DO x 8  
 Uses 24VAC powersupply

BAS920DI

8 Channels:  
 0-3 VDC low  
 4.5-15 VDC high  
 Powered by expansion bus

BAS920COMM

M-Bus/RS232  
 RS485 Multidrop/RS232  
 Uses 24VAC powersupply

BAS920AO

8 Channels:  
 0-10 VDC  
 Powered by expansion bus

BAS920EXT

Bus extender module  
 Powered by expansion bus

BAS920DO

8 Channels:  
 Solid state relays  
 24V/1A VAC or VDC  
 Powered by expansion bus

**Software tools**

Using the BAS Tool the BAS1020 be programmed to many different tasks.

For an overview of the programming language please see the BAS Series Script Manual. Some programming objects/possibilities are mentioned here:

- Control of digital inputs (Alarms, pulsecount)
- Control and scaling of analog inputs so any read value is translated into human readable form, ie. Temperature and ohms for a PT1000 input etc,
- Control og digital outputs
- Control and scaling og analog outputs
- On/Off delays
- Alarmhandling from inputs and calculated values (including data read from foreign equipment)
- Timercontrol with weektimer, vacations and special days
- PID functions
- Logging of data, up to 160 000 measurements

- in all
- Communication with foreign equipment, logging, alarm control and calculations using these data
- All data can be monitored, logged and used in calculations etc.

The program is saved in flash and is kept even during powerloss. Selected data be saved i EEPROM so that fx. PID trim data can be saved

A Windows 7/Windows 10 emulation of the BAS1020 exists and most programs can thus be tested outside the physical installation.

**Communication**

BAS1020 has many communications possibilities:

- Ethernet**
- RS232**
- RS485**
- M-Bus**
- SCADA system**
- BAS Tool**

**Ethernet**  
 BAS1020 can communicate and an arbitrary number of data can be read and/or sent to other BAS Series substations. Also Modbus/IP and BACnet/IP can be used

**RS232/RS485 and M-Bus**  
 BAS1020 can read M-Bus data, read/write ModBus data from foreign ModBus units, read data from Multical/Maxical/Infocal over a serial line, read/write data on Genibus (Grundfos pumps) and read/translate data from NMEA units (weather stations).

**BAS SCADA**  
 Via the BAS SCADA system all data, both calculated and I/O data, be presented as a symbol, as a text, as a

number etc. with rich color graphics. Data can be fetched, changed and written. Communication to the BAS1020 uses TCP/IP over ethernet.

**BAS Display**  
 Via the BAS Display a fully functional web interface can be shown. Data can be password protected. Alarms can acknowledged, eventlog and trendcurves can be shown etc. Uses TCP/IP over ethernet.

**BAS Tool**  
 The BAS Tool software can be used for configuring and programming the BAS1020. Can use RS232/RS485/USB or Ethernet

**BAS Web**  
 Via a browser and a html5 based webpage a full fledged graphical interface can be shown on any html5 compatible browser and on almost all devices (Android, iOS, Linux, MacOS and Windows)

