

ABB SPA-Bus

ABB SPA-Bus communication protocol

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Supported device types and versions

A protocol support data reading / writing from the digital protection modules of ABB VN devices.

Communication line configuration

- Communication line category: [Serial](#), [SerialOverUDP Device Redundant](#).
- Transmission parameters are set to 9600 Baud, 7 data bites, even parity, 1 stop bit.

Communication line parameters

[Communication line - configuration dialog](#) - **Protocol parameters** tab.

The parameters influence some optional protocol parameters. The following protocol line parameters can be used:

Table 1

Parameter	Meaning	Unit / Size	Default value
Software 7E1	Parameter starts a software generation and even parity check. A transmission device parameters can be set on 8N1 (i.e. 8 bits, no parity, 1 stop bit) instead of 7E1 (7 bits, even parity, 1 stop bit) which is commonly used in SPA-Bus protocol.	YES/NO	NO
Moxa Redundancy Check Timeout	Switching time in Moxa redundant devices in case of a communication error. This parameter is only relevant for SerialOverUDP Device Redundant line.	sec	5 sec
Max. Data Number Optimization	Optimization data reading at polling. If there are I/O tags with <i>Data Number</i> successive addresses, the polling is executed together until the value of this parameter is reached (i.e. if the value is 3, three I/O tags will be polled together). Value 1 switches an optimization off, each I/O tag is polled separately.	1 .. 32	1
Time T Broadcast Periode	Time T synchronization packet sending by broadcast at the address 900. When the parameter is 0 sec., the time synchronization sending is disabled.	0 .. 60 sec	10 sec
Expected T Packet Transmission Duration	Expected duration of T synchronization packet transmission by all the transmitting devices until the whole packet is received in own protection devices. This time is added to a current time when packet is being sent so that the time in packet is also a current time in the moment of the packet complete receiving by the device.	msec	20 msec
Date and Time D Broadcast Periode	Duration of Time and Date synchronization packet sending by broadcast on the address 900. When the parameter is 0 sec., the synchronization sending is disabled.	0 .. 3600 sec	60 sec
Expected D Packet Transmission Duration	Expected duration of Time and Date synchronization packet sending by all the transmitting devices until the packet is received completely in own protection device. This time is added to a current time when packet is being sent so that the time in packet is also a current time in the moment of the packet complete receiving by the device.	msec	35 msec

Station configuration

- Communication protocol: **ABB SPA-Bus**.
- Station address is a number in the range of 1 to 999, 0 is not used, 900 is reserved for broadcast.
- Time parameter settings - Polling parameters, are ignored, polling of the values is executed in the shortest period.
- Time parameter - Synchronization time, is ignored, a real time synchronization via the broadcast messages is controlled by the protocol line parameters "[Time T Broadcast Period](#)" and "[Date and Time D Broadcast Period](#)".

Station parameters

[Communication station](#) - **Protocol parameters** tab.

The parameters influence some optional protocol parameters. The following protocol line parameters can be used:

Table 2

Parameter	Meaning	Unit	Default value
Retry Count	Retry count of the request in case of a communication failure.	1 .. 20	2
Retry Timeout	Delay between a request retry in case of a communication failure.	msec	20 msec
Wait First Timeout	First waiting on response after sending the request.	msec	50 msec
Wait Timeout	Delay between reading the response until its completing.	msec	20 msec
Max. Wait Retry	Retry count of response reading until its completing.	-	20
Recovery Delay	Communication with station is delayed by defined time in case of communication error. If a line contains more stations (protective devices) and one of them will fail, it can slow down the communication of other functional stations. Next recovery of the communication with station will be delayed by a defined value (time). If the line contains only one station, the parameter value should be 0 sec.	sec	10 sec
Poll Events	Enables a periodic event reading by the function "Last events L". A time synchronization of the protective device must be also enabled. See the parameters "Time T Broadcast Periode" and "Date and Time D Broadcast Periode" .	YES /NO	YES
Value For Invalid Position	Integral value of "ERROR" state for conversion to a quadrat input Qi.	0, 1, 2, 3	3
Value For Off /Open Position	Integral value of "OFF" state for conversion to a quadrat input Qi.	0, 1, 2, 3	1
Value For On /Close Position	Integral value of "ON" state for conversion to a quadrat input Qi.	0, 1, 2, 3	2
Value For Intermediate Position	Integral value of "TRANS" state for conversion to a quadrat input Qi.	0, 1, 2, 3	0
Date Conversion Mask	Conversion mask to convert a date.		yyyy-mm-dd
Time Conversion Mask	Conversion mask to convert a time.		hh.mi:ss.mss
Debug Values	Starts a debug info about I/O tag values obtained by polling.	YES /NO	NO

I/O tag configuration

Possible value types: **Ai, Ao, Ci, Co, Di, Dout, Qi, TxtI, TxtO, TiA, ToA, TiR, ToR.**

I/O tag address items:

- **Channel:** channel number is required numerical address parameter intended for all data categories except for *F* and *C*.
- **Category:** data category code; if it is unknown, write "*Not defined*", if it is known, you can choose one of the following data categories:
 - *Input data I*
 - *Output data O*
 - *Setting Values S*
 - *Variable V*
 - *Memory data M*
 - *Slave identification F*
 - *Slave status C*

"*Slave Identification F*" and "*Slave Status C*" are unique. No other address parameter is required.

- "*Slave identification F*" returns 10 signs which identifies a device. We recommend to configure it as I/O tag of *TxtI* type.
- "*Slave status C*" returns the numbers 0, 1, 2 or 3. See also [Note 1](#).
- **Data Number:** required numerical address parameter for all data categories except for *F* and *C*.
- **Poll:** enables a periodic polling for all data categories except for "*Not defined*". The data category "*Slave identification F*" does not required the polling because it is static. If the periodic polling is disabled, the object is polled while starting the communication or when I/O tag value is unknown.
- **Event code - Intermediate position (00):** a numerical event address when object is in "Intermediate position". Set "TRANS" for Qi I/O tag type or a number according to parameter "Value for intermediate position" for I/O tags of Ai, Ao, Ci, Co types. A configuration is not allowed for I/O tags of Di, Dout types.
- **Event code - Off/Open position:** a numerical event address when the object passes to "Off/Open position". Set "OFF" for Qi I/ tags or the number according to parameter "Value for Off/Open position" for Ai, Ao, Ci, Co I/O tags.
- **Event code - On/Close position:** a numerical event address when the object passes to "On/Close position". Set "ON" for Qi I/O tags or the number according to parameter "Value for On/Close position" for Ai, Ao, Ci, Co I/O tags.
- **Event code - Invalid position (11):** a numerical event address when the object passes to "Invalid position". Set "ERROR" for Qi I/O tags or the number according to parameter "Value for invalid position" for Ai, Ao, Ci, Co I/O tags. The configuration is not allowed for Di, Dout I/O tags.

Note 1

When **E50** (slave reset) event or **E51** (slave event buffer overflow) occur, the value 0 is written to "*Slave status C*" aside from the I/O tag of C category exists or not.

Literature

- SPA-Bus Communication Protocol V2.5, Technical description, Version C, 1MRS 750076-MTD EN.

Changes and modifications

Document revision

- Ver. 1.0 - November 21st, 2010 - Document creation.



Related pages:

[Communication protocols](#)