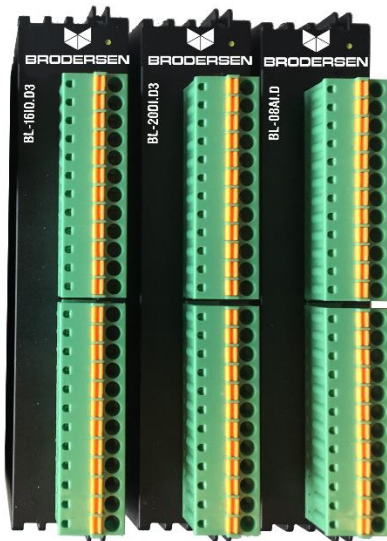


# DO20A

## LB2 I/O Series Module with 20 High Side output

### Data Sheet

Doc: 40418 v1.00 / February 20<sup>th</sup>, 2019





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**INTRODUCTION TO LB2 I/O SERIES**

Before use of LB2 Modules see LB2 User manual document nr. 40430. Link to document

The Brodersen LB2 modules can be used with RTU32N & RTU32M series. The I/O modules are in two parts, bottom part containing the backplane bus, and top part containing the I/O board and logic. All LB2 modules are hot plug. LB2 modules are all equipped with 200 MHz processor to process I/O, handle filtering, SOE, debounce, module clock and general module logic.

Firmware update is handled from RTU level in Brodersen worksuite. Use only genuine Brodersen bus cables for connection to Brodersen RTUs and extension of I/O module blocks. The connection cables for LB2 is special made to handle the power requirements and shielding to run communication. The maximum overall length of complete system is 5m. Each I/O module & Power supply module is calculated as 2 cm. The cables are as the length indicates, e.g. UCC-610/1 count as 100 cm.

Maximum possible system configuration is 250 I/O modules on one LB2 Bus.

**Cable ordering codes.**

- UCC-610/1      100cm LB2 Cable
- UCC-610/2      200cm LB2 Cable
- UCC-610/25    25cm LB2 Cable
- UCC-610/50    50cm LB2 Cable

**IO MODULE BACKPLANE PART**

Description	Part nr.
<b>BUS module for I/Os, Start</b>	<b>BB21A</b>
<b>BUS module for I/Os, Middle</b>	<b>BB21B</b>
<b>BUS module for I/Os, Expansion</b>	<b>BB21C</b>
<b>BUS module for power supply, Start</b>	<b>BB41A</b>
<b>BUS module for power supply, Middle</b>	<b>BB41B</b>
<b>BUS module for main CPU, Start</b>	<b>BB61A</b>
<b>BUS module for main CPU, Middle</b>	<b>BB61B</b>
<b>BUS module for redundant CPU (Middle)</b>	<b>BB61R</b>
<b>BUS module for system I/Os, Start</b>	<b>BB81A</b>
<b>BUS module for system I/Os, Middle</b>	<b>BB81B</b>

**VERSIONS / ORDERING CODES**

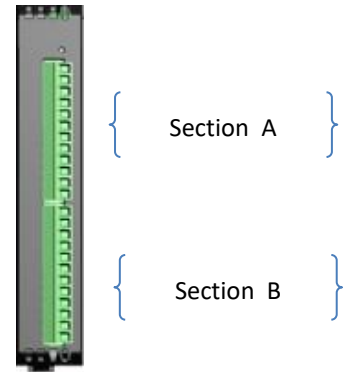
**Hardware basic version**

**Order code: DO20A**

**I/O INTERFACE**

**Connectors Digital output:**

2x 12 way 3.5mm pluggable spring clamp connector  
Conductor Area CSA: 1.5mm<sup>2</sup>



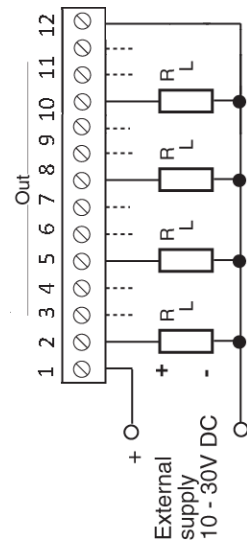
**INPUT TERMINALS LAYOUT:**

**Connector Top section A:**

Output terminals layout are as follows:

Connector Bottom:

- Pin 1:            Vin + Section A
- Pin 2..11        Digital output 0-9 section A.
- Pin 12:          Vin – Section A



*Electrical diagram digital out*

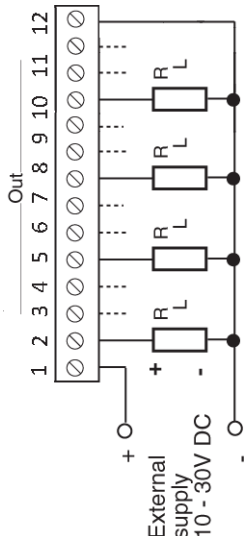


**Connector Bottom section B:**

Output terminals layout are as follows:

Connector Bottom:

- Pin 1: Vin + Section B
- Pin 2..11 Digital output 10-19 section B.
- Pin 12: Vin – Section B



Electrical diagram digital out

**ELECTRICAL**

**Module power supply.**

Supply voltage: 12 VDC +/- 20 %  
 Power consumption: 25mA @ 12V

**DIGITAL OUTPUT.**

20 smart high side switch, optical isolated, digital outputs for 10..30 VDC are provided. Arranged in two sections of 10 outputs. The sections are channel to channel isolated and isolated from electronics. The outputs are protected against Short-circuit, overload, over temperature, over voltage, wrong connections.

**External feed voltage:**

10 – 30 VDC

**Output current:**

Max 0.5A, max 2A per section ( 10 output )

**Output delay:**

100 µs typical

**On resistance:**

160mΩ ( typ. )

Output leakage current:  
 7µA (max. in off state)

**Protections:**

Short-circuit, overload, over temperature, over voltage, wrong connections.

**Isolation:**

2kV V input to electronics, 1 minute.

**Ambient temperature range:**

-40°C to +70°C

**MODULE STATUS LED FLASHING CODES.**

A two color (red/yellow) LED is provided on the module. This indicates the module status with different blinking patterns. The yellow is indicating module mode (run, stop). The red indicate module error or warnings. Each pattern / color will operate in 2 sec duty cycles. When the red LED is inactive (off), only the 2 sec yellow duty cycle will operate ( yellow is always active ). When the red LED is active, a switch between 2 sec yellow, and 2 sec red patterns will occur. The patterns in table 1 are possible:

**Table 1 Module LED pattern**

LED	Pattern
Off	LED is constantly off
on	LED is constantly on
Blinking:	LED is flashing, 200 ms on, 200 ms off
Flickering:	LED is flashing, 50 ms on, 50 ms off
Single Flash:	LED pattern is, 200 ms on, 1800 ms off
Double Flash:	LED pattern is, 200 ms on, 200 ms off, 200 ms on, 1400 ms off
Triple Flash:	LED pattern is, 200 ms on 200 ms off, 200 ms on 200 ms off, 200 ms on 1000 ms off
Quadruple Flash:	LED pattern is, 200 ms on 200 ms off, 200 ms on 200 ms off, 200 ms on 200 ms off, 200 ms on 600 ms off

Table 1

**Table 2 Yellow I/O module LED Codes:**

Yellow LED	Pattern Description
Off	No module power
on	Module is Operational mode.
Blinking:	Module is in Operational Timeout, caused by missing RTU heartbeat "timeout from CPU to I/O module". Outputs will be managed according to failsafe configuration (Last state, forced On, forced Off)
Flickering:	NA
Single Flash:	No valid node ID. Normal after power up.
Double Flash:	Module is assigned a valid node ID, and is Stopped.
Triple Flash:	NA
Quadruple Flash:	Module is in firmware update mode.

Table 2

**Table 3 RED I/O module LED Codes:**

Red LED	Pattern Description
Off	No warnings or errors.
on	Module LB2 communication error.



	A number of LB2 communication errors has occurred, which has caused the LB2 error counters to reach the error level. The module will automatically stop any transmission on the bus, to prevent LB2 bus corruption for other modules (nodes). The module will still listen for NMT commands, and a communication reset command will reconfigure module configuration / communication, if the error was temporary.
<b>Blinking:</b>	NA
<b>Flickering:</b>	Corrupted module information / calibration data in eeprom. Fatal error
<b>Single Flash:</b>	Module communication error warning. A number of LB2 communication errors has occurred, which has caused the LB2 error counters to reach the warning level. A number of successful communications will automatically reset this warning.
<b>Double Flash:</b>	NA
<b>Triple Flash:</b>	NA
<b>Quadruple Flash:</b>	NA

*Table 3*