

IO14A, IO14B

Combined Module with
3 AI + 1 AO + 8 DI + 2 DO

Data Sheet

Doc: 40421 v1.08





INTRODUCTION TO LB2 I/O SERIES

Before using the LB2 Series I/O Modules, read the LB2 User manual.

The Brodersen LB2 modules can be used with the RTU32N and RTU32M series products. The I/O modules are in two parts, a bottom part containing the backplane bus, and a top part containing the I/O board and logic. All LB2 I/O modules are hot pluggable and equipped with a 200 MHz processor to handle filtering, de-bouncing and logic processing of I/O.

Module firmware updates are managed by the RTU using Brodersen Worksuite. Use only genuine Brodersen bus cables for connection to Brodersen RTUs and extension of I/O module blocks. The LB2 connection cables are made to handle the power and shielding requirements of the LB2 bus communications. The maximum overall length of complete system is 30m. Each I/O module & Power supply module is calculated as 2cm. The cables are as their length indicates, e.g. UCC-610/100 cable is 100 cm.

The maximum number of I/O modules on one LB2 Bus is 60.

INTRODUCTION - IO14A/IO14B MODULE

The IO14A/IO14B modules provide 3 analog input channels (current), galvanically isolated both channel-to-channel and from the electronics; 1 analog output channel (current), galvanically isolated from the electronics; 8 digital input channels (10–30 VDC, including 2 counters up to 5 kHz), optically and galvanically isolated from the electronics; and 2 relay output channels, galvanically isolated both channel-to-channel and from the electronics. The digital inputs also support counter functionality.

Cable ordering codes:

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

POWER SUPPLY MODULE BACKPLANE PART

Description	Part Nr.
BUS module for IOs, Start	BB21A
BUS module for IOs, Middle	BB21B
BUS module for IOs, Extension	BB21C

VERSIONS / ORDERING CODES

Hardware basic version

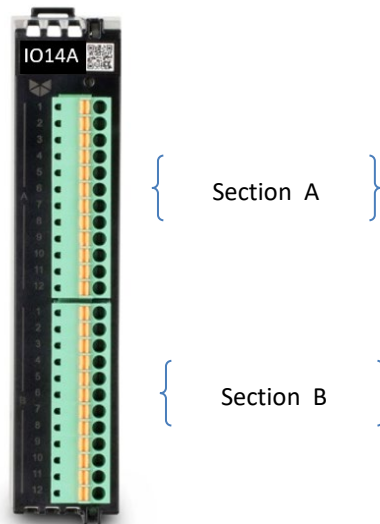
Order code: IO14A **Current input AI**

Order code: IO14B **Voltage input**

I/O INTERFACE

This module provides 3x analog input channels (IO14A has current inputs, IO14B has voltage inputs), 1x analog output channel (current), 8x digital input channels (10–30VDC – includes 2x 5kHz counters) and 2x relay output channels. Counters can also be DI.

2x 12 way 3.5mm pluggable spring clamp connectors. The maximum conductor cross sectional area is AWG 16 (1.3mm²). The wire conductor type should be Copper and it must meet the minimum temperature criteria of 105°C.



TERMINAL LAYOUT

Connector top section A:

Pin 1:	DO0 N.O.
Pin 2:	DO0 Common
Pin 3:	DO0 N.C.
Pin 4:	DO1 N.O.
Pin 5:	DO1 Common
Pin 6:	DO1 N.C.
Pin 7:	AI0 +
Pin 8:	AI0 –
Pin 9:	AI1 +
Pin 10:	AI1 –
Pin 11:	AI2 +
Pin 12:	AI2 –

**Connector bottom section B:**

Pin 1:	DI Common
Pin 2...9:	DI0 – DI7
Pin 10:	AO0 Vin +
Pin 11:	AO0 I out
Pin 12:	AO0 Vin -

ELECTRICAL**Power consumption (from backplane bus):**

- Current consumption (min*): 90mA @ 12V
- Current consumption (max**): 150mA @ 12V
- Power consumption (min): 1.1W
- Power consumption (max): 1.8W

* All relay outputs are de-activated, and analog output channel is disabled.

** All relay outputs are activated, and analog output channel is sourcing the maximum value.

Analog inputs:

3 channels (differential analog inputs), with 16-bits resolution is provided. IO14A channels can measure current, IO14B channels can measure voltage.

Input ranges*:

- Type A (current mode): 0/4-20mA, 0/3.5-20.5mA
- Type B (voltage mode): 0/1-5V, 0/0.875-5.125V

* Each channel can be configured (through Worksuite) to operate in one of the above ranges.

Effective resolution:	16 bit
Update time:	30ms (for all 3 channels)
Accuracy (at 25°C):	±0.1%
Temperature drift:	± 25ppm/°C
Power-freq. noise rejection:	50Hz
Digital low-pass filter:	User selectable

Input impedance:

- Type A (current mode): 250 Ohm ±0.1%
- Type B (voltage mode): > 1MΩ

Isolation:

- Input to digital: 1500Vrms output to electronics, 1 minute
- Channel to channel: At least 250V

Analog output:

1 channel of analog output with 16-bits resolution is provided. The channel has a current output and could be supplied internally (AO0 Vin+ is left unconnected) or

through 18-30VDC field power (feed to AO0 Vin+ terminal).

Output range:	0/4 to 20mA
Resolution:	16 bits
Accuracy (at 25°C):	±0.1%

Max load impedance:

- 700 Ohm with internal supply (AO0 Vin+ = N.C.)
- 1K Ohm with external supply (AO0 Vin+ > 20V)

Isolation (output to digital): 1KV output to electronics, 1 minute

Relay outputs:

2 mechanical non latching relay outputs, SPDT, are provided.

Load voltage: Max 125 VDC

Load current resistive:

- 2A @ 30VDC
- 0.25A @ 125VDC

Output delay: 5ms (typical)

Output isolation: 2KV output to electronics, 1 minute

Digital inputs:

8 bipolar optical isolated digital inputs for 12...24VDC are provided. Inputs are isolated from each other and electronics.

Inputs 0...5 will provide software counters, with up to 100 Hz counting frequency @ 50% duty cycle. Inputs 6 and 7 will provide high speed hardware counters, with up to 5kHz counting frequency at 50% duty cycle.

A user programmable debounce filter, in 1ms units, is provided for each digital input, to filter out noise or mechanical relay bounce.



DI input voltage:

Input 0...5	Activated 10 - 30 VDC. Deactivated Max 3 VDC.
Input 6...7	Activated 5 - 30 VDC. Deactivated Max 2 VDC.
DI input current:	
Input 0...5	typical 2.5 mA @ 12 V
Input 0...5	typical 5 mA @ 24 V
Input 6...7	typical 4 mA @ 12 V
Input 6...7	typical 8 mA @ 24 V
Input delay:	
Counters (DI 6-7)	100 µs typical. Up to 5kHz @10-30VDC
Isolation:	
	3750Vrms input to electronics, 1 minute

Absolute maximum ratings*:

Analog input current (type A): ±30mA
 Analog input voltage (type B): ±40VDC
 Analog output power (Vin+): ±35VDC
 Digital Input voltage: ±40VDC

* **Note:** Exceeding the absolute maximum values **MAY CAUSE PERMANENT DAMAGE** to the module

Over voltage category II (OV II):

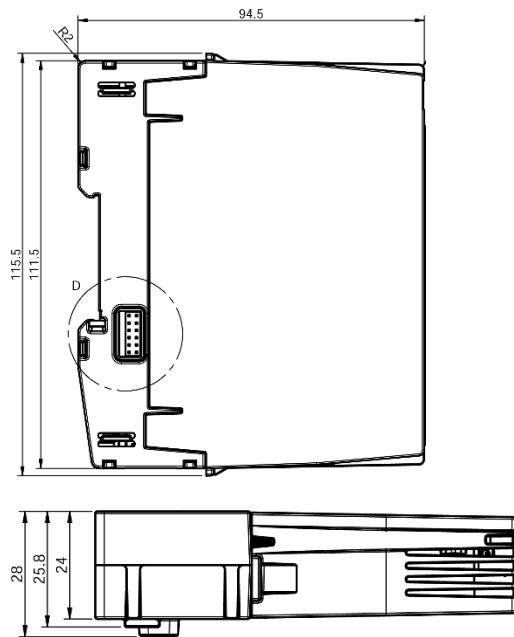
250VAC/VDC

Separated/Safe Extra Low Voltage (SELV) limits:

VAC (RMS) 30V
 VAC (Peak) 42.4V
 VDC 60V

Note: The SELV limits relies on input supply and all connected voltages.

MECHANICAL



Mounting	DIN 35
Width	24 mm
Height	111.5 mm
Depth	94.5 mm
Weight	102 grams

ENVIRONMENTAL CONDITIONS

Ambient operating temperature range	-25°C to +75°C
Ambient storage temperature range	-40°C to +85°C
Marked degree of protection	IP20
Humidity	0...99.8%
Ventilation Restrictions	No
Pollution degree	2



STANDARDS

EMC:

- **IEC 61000-6-2:** EMC - Immunity standard for industrial environments
- **IEC 61000-6-4:** EMC - Emission standard for industrial environments
- **IEC 50121-4:** Railway applications - EMC - Emission and immunity of the signalling and telecommunications apparatus

Safety:

- **IEC 60950-1:** Safety requirements for Information technology equipment
- **IEC 61010-1:** Safety requirements for electrical equipment for measurement, control, and laboratory use

Environmental:

- **IEC 60068-2-1:** Environmental testing - Cold
- **IEC 60068-2-2:** Environmental testing - Dry heat
- **IEC 60068-2-30:** Environmental testing - Damp heat, cyclic (12 h + 12 h cycle)
- **IEC 60068-2-78:** Environmental testing - Damp heat, steady state
- **IEC 60068-2-6:** Environmental testing - Vibration (sinusoidal)
- **IEC 60068-2-27:** Environmental testing – Shock


MODULE LED STATUS

A dual color (red/yellow) LED is provided on the module to indicate the module status. Yellow indicates the module mode / state and red indicates module error or warnings (according to the table below):

Status	Yellow	Red
Normal operating	ON	OFF
Communication timeout	Blinking	OFF
Module is not configured / wrong configuration	Single flashing	OFF
Module is configured but is in stopped mode (ready for being started)	Double flashing	OFF
Module is in firmware update mode	Quadruple flashing	OFF
Communication error	N/A	Blinking
Communication warning	N/A	Single flashing
Corrupted module info in EEPROM	N/A	Flickering
Hardware fatal error	OFF	ON
No module power	OFF	OFF

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.

SAFETY PRECAUTIONS

- Follow the national safety regulation (IEC 61010-1) 
- Only skilled person is allowed to install and operate the modules.
- Disconnect the input supply while working with relay module.
- Modules can only be mounted in an end-use enclosure which provides protection against fire, electrical and mechanical hazards.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.