DESCRIPTION

I/O Expansion module with 8 galvanic isolated outputs for applications like e.g. traffic light control.

The outputs is equipped with current sensors for detecting high or low current. The limit alarms are reported as digital inputs in the I/O database. Limits are fixed values for both low and high alarms. If required the limits can also be controlled via the application program of the used Master module

The switching output module is in general for 3 kind of incandescent lamps:

- 210-240VAC
- 40-50VAC
- 10-15VAC

The outputs is galvanic isolationed 3,75kV from electronics, and 500V output to output.

The UCL-8LCO is delivered as an I/O expansion module in a 180 mm compact housing for DIN rail mounting. Other expansion modules can be attached via the second Local Bus connector if required to enlarge number of I/O.
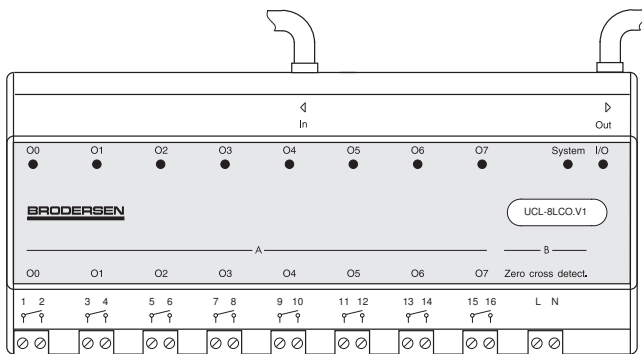
VERSIONS/ORDERING CODES

UCL - 8LCO.V1

Type:
I/O Expansion module   UCL

Input/output:
8 Output (16 alarm DI)   8LCO

Rated switching voltage
10-15 VAC   V1
40-50 VAC   V2
230 VAC   V3
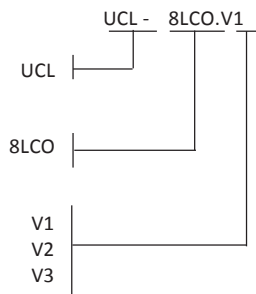
UCL-8LCO.VX

TECHNICAL DESCRIPTION

General
Control of the light is done via an output. The output can be either 100% active (constant ON) or 0% active (constant OFF), including flashing up to 2Hz.

In general 3 kind of input ranges is supported:

· 210-240 VAC 100W
· 40-50VAC 40-60 W
· 10-15VAC 50W

The module monitors the current for each output to detect excessive currents or wire break. The high or low current limit is defined for each input type. The alarm levels is fixed but are configureable in the factory. All outputs on one module shares the same alarm level set.
A time delay, for the alarms on each output, is also provided. Again, the time delay is in general fixed, but changeable in the factory (range: 1 to 10s). All High and Low alarms have the same time delays.

The current alarms is reported as virtual digital inputs in the module data-base. 2 byte for all lamp outputs, one byte input is reserved for alarm status (ON or OFF) while the other byte input report the alarm level (high or low).

Optional light dimming is expected to be carried out external to this module and will not affect the behavior or settings of the module. The normal current at the lowest dimming level must be well above the Low Current Alarm Level.

Functional description
The UCL-08LCO is designed as a compact expansion module for use in Light Control systems.
It receives digital output information on 8 lamp outputs and transmits digital alarm information over the local bus. The physical outputs are, except for small process delays, a one-to-one mirror of the digital output data. The physical output currents are monitored to detect external failures as short circuits or broken lamps, as well as internal failures in the output switches. To prevent alarms from the high inrush current of the lamps, a time delay is defined after lamp is turn on. If the output after this delay, draws too much - or too little current an alarm will be reported. This delay is typical 1 – 3 seconds.
When the lamp is turned off, a delay is inserted after which the output current should be zero - typical 200 milliseconds.

To minimize EMI, the module is provided with a voltage synchronization input. Outputs will be switched ON and OFF in the voltage zero crossing phase, thereby reducing the switched voltage and current. This will also reduce the stress on the switching components and improve reliability.

To each output there is a yellow Light Emitting Diode, LED. The LED can be in 3 states: OFF, ON or Flashing.
OFF and ON relates to the normal conditions of the output, while the LED will be flashing if there is an alarm on the output. The module is provided with two green LEDs. The System I/O indicates the activity on the local bus.
The module will come in three variants - each designed to a specific output voltage level.

BRODERSEN

Digital Output and Control Module
AC switching output module with current measurement, UCL-8LCO

Configuration
Configuration is done on module level in factory. The default alarm levels is defined as:

> Lov level alarm = Inom - 90%
> High level alarm = Inom + 30%

Table 1   Default configuration settings

Type/power:	I_{nom} [A]	High Alarm I_{nom}+30%[A]	Low Alarm I_{nom}−90%[A]	Alarm delay [Sec.]
230V/30W	0,13		0,013	1,0
230V 100 W	0,43	0,56		1,0
42V/40W	0,95		0,10	1,0
42V/60W	1,43	1,85		1,0
15V/50W	3,33		0,33	1,0
10V/50W	5,00	6,5		1,0

Alarm limit for one of three types switching voltages can in factory be adjusted for each type but not for each output.

The lamp type and alarm limit information is located in Non Volatile Memory board and is programmed in factory during calibration. The calibration procedure ensure that every output current measurement is calibrated and adjusted seperately.

IO DATABASE (DIGITAL)

Type ID
When scanning the Slave to which the UCL-8LCO module is connected it will respond with 2 bytes:
1.   16 DI identification: UCL-16DI.xx
2.   8 DO identification: UCL-8DO.xx

If AI visible:
1.   16DI identification: UCL-16DI.xx
2.   8AI identification: UCL-8AI.xx
3.   8DO identification: UCl-8DO.xx

Data IO scan.
The 8 digital outputs reported (1 byte) in the Slave database define the physical outputs:

  Lamp Outputs: DO 0..7

Logical "1" equals "light ON".

The inputs (2 bytes) are virtual inputs used for alarm status and alarm level:

  Alarm Status: DI 0..7 (OFF = no alarm, ON = alarm)
  Alarm Level/type: DI 8..15 (OFF = low alarm, ON = high alarm)

### IO DATABASE (VIRTUAL ANALOGUE)

Virtual analogue inputs
When scanning the Slave to which the UCL-8LCO module is connected it can also respond with 8 words virtual analogue input words which is the internal current measurement levels. The analogue values are reported as 12-bit values (0-4095 integers).

The virtual analogue inputs is only used in an Slave application program in case the predefined limits are not acceptable. Use of these unfiltered value will require average calculations and timer functions in your application program.

The virtual analogue inputs can be hidden and not be reported on the local bus. And they will then not be found in the Slave module database.
Use the switch near the local bus connector to hide the AI's. Default the AI's is not hidden.

Switch for hiding AI's in database:
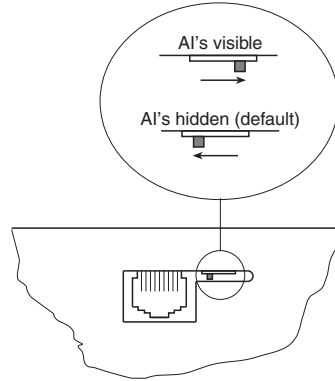
TECHNICAL DATA

DIGITAL INPUTS
Only virtual inputs exists. They are internally connected to alarms from the current measuring circuits.

Alarm limits
Alarm levels is selected according to specification.
Factory default settings:

> No alarm   : I_{nom} - 50% < I < I_{nom} +20%
> Low alarm: I < I_{nom} - 90 %
> High alarm: I > I_{nom} + 30%

DIGITAL OUTPUTS (PORT A)
3 AC type output configuration is available; one for each voltage. Only resistive loads, like incandescent lamps are allowed. DC voltage operated lamps are **not** allowed.

Ratings:

	Vmax [VAC]	Max Power *)	I_{Max} [A]	I_{Leak} [µA]	R_{ON} [Ohm]
Type V3: 230V/100W	275	130W	0.17	100	3
Type V2: 42V/40–60W	75	80W	1.9	100	0.160
Type V1: 10-15V/50 W	35	70W	6.5	100	0.060

*)   at T_{amb} = 55 °C, derate to 75% at T_{amb} = 65 °C

Isolation: Output – Output: 500 V
                   Output – Electronics : 3.75 kV

Protection: Internal fuses are provided in sockets.
                  Replaceable by removing the top cover. The fuses are Littlefuse shortleg type similar to type no. 663.250HXSL

Switching freq.:
                  Max. 2Hz.

Output delay:
                  $T_{OFF – ON}$ 2 – 25 ms
                  $T_{ON - OFF}$ 2 – 25 ms

Output control:

Zero-crossing output control is available. Zero crossing control is enabled whenever an AC voltage is connected to the AC sync. input. The AC voltage must have the same frequency, phase and level as the lamp voltage.

VOLTAGE SYNC. INPUT (PORT B)

Input Voltage: Max. 275 VAC

The AC voltage must have the same frequency, phase and level as the lamp voltage.

Input Load: Typical : 1 W

GENERAL

Indicators: One for each digital output (yellow):
LED off - output not active
LED on - output active and current within the limits
LED flashing - output active and high or low alarm.

Two green LEDs indicating module status:
System LED on - Module OK
I/O LED on - local bus OK

Current consumption: 140mA (at 12V DC) supplied by slave via LocalBus cable.

Ambient temp:

-10 - +55°C.
-20 - +65°C at 50% derating of current load.

EMC: EN 50081-1/EN50082-2.

Climatic:
Dry heat: IEC 68-2-2, Test Bd, Temp. +55°C, Duration 8h.
Cold: IEC 68-2-1, Test Ad, Temp. -10°C, Duration 8h.
Damp heat: IEC 68-2-3, Test Ca, Temp. 40°C, RH 95%, Duration 8h.

Mechanical:
Vibration: IEC 68-2-6, TestFc (sinusoidal), Freq.10-150 Hz, Amp. 4g, 5 sweeps in 3 orthogonal axes.
Shock: IEC 68-2-27 (half sine), Acc. 15g, Pulse time 11msec., 3 x 6 shocks.
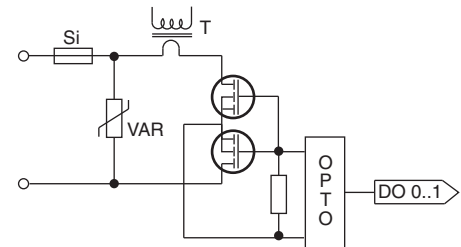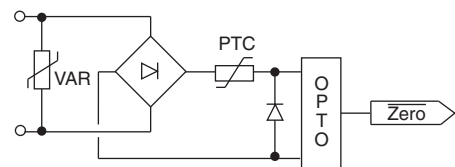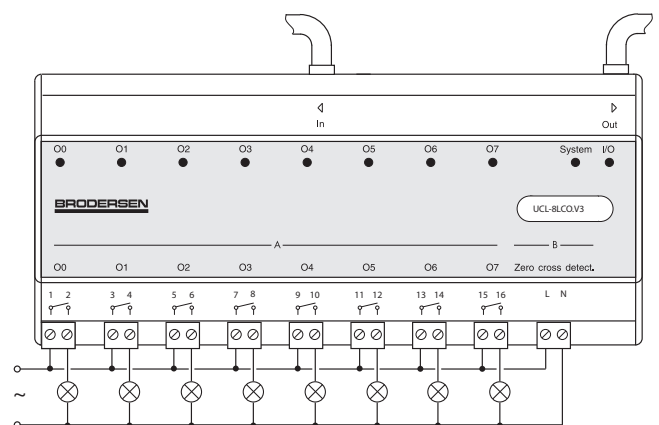
Protection: IP20.

Mounting: 35 mm DIN-rail, EN50022.

Terminals: Max. 1.5 mm^2 wire.

Housing: Anodized aluminium with plastic ends. According to DIN 43880.

Dimensions: HxWxD: 80 (+ connectors) x180 x 62 mm.

CIRCUIT CONFIGURATION

Output

Sync. input

WIRING DIAGRAM

Wiring notes:

It is recommended to connect the used phase and neutral to the port B, in order to have zero cross detecting. Using the zero cross detection will lower the switching emission.

Use ferrules on your wires to achive best possible connection in the screw terminals.

Be careful when plugging in and out the terminals. If wrong alligned at plugging in the connector, the quality of the electrical connection can be reduced.

Remember to cover the un-used local bus connector on the last connected expansion module. A label for covering the connector is supplied with the Bitbus or Telemetry Slave used.

LocalBus cable UCC-505 is used to connect to the Slave.