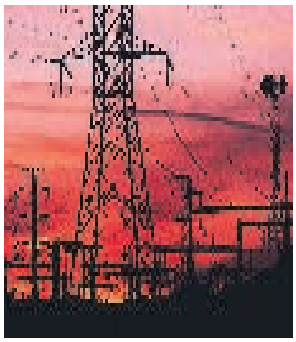
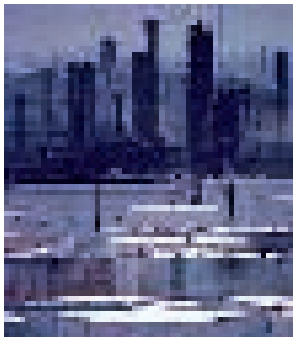
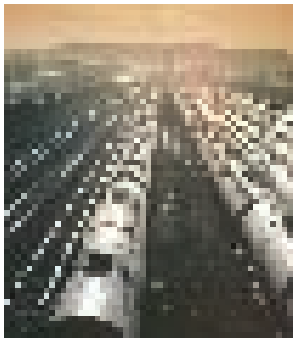
BRODERSEN

simplifying process

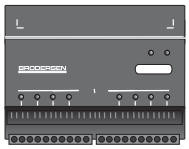


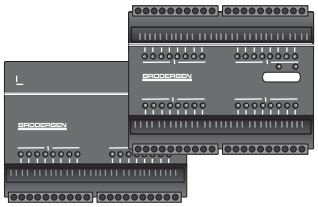


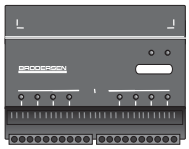


# I/O Expansion Modules Overview Brochure


## Overview Brochure I/O Modules

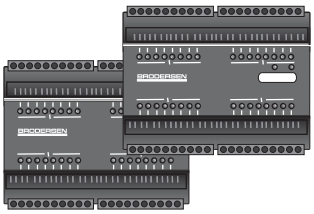


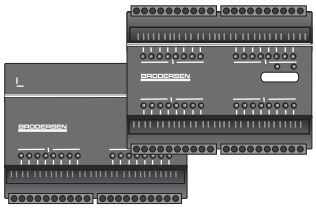


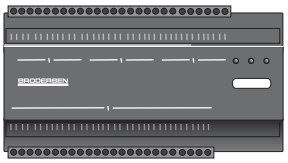


| TYPE | UCL-08DI.A1 | UCL-16DI.D1/UCL-32DI.DX | UCL-08DO.R1 |
|---|---|---|---|
| DESCRIPTION | Expansion module with 8 isolated digital inputs for direct connection to AC mains voltage. | Expansion module with 16/32 inputs. | Expansion module with 8 potential free relay outputs. |
| VERSION/ORDERING CODES | | | |
| Type | UCL-08DI.A1<br>UCL-08DI.A2 | UCL-16DI.D1<br>UCL-32DI.D1<br>UCL-32DI.D2<br>UCL-32DI.D5<br>UCL-32DI.D6 | UCL-08DO.R1 |
| INPUTS | | | |
| Digital inputs | 8 isolated digital inputs.<br>All equipped with optocouplers. | UCL-16...: 16 isolated digital inputs.<br>UCL-32...: 32 isolated digital inputs.<br>All equipped with optocouplers.<br>12V DC: Typical 3mA.<br>24V DC: Typical 6mA. | |
| Input ranges | UCL-08DI.A1: 100-265V AC<br>100-265V AC activated.<br>0-40V deactivated.<br>UCL-08DI.A2: 30-265V AC<br>30-265V AC activated.<br>0-8V deactivated. | UCL-16DI.D1: 10-30V DC bipolar<br>UCL-32DI.D1: 10-30V DC unipolar<br>UCL-32DI.D2: 30-60V DC unipolar<br>UCL-32DI.D5: 30-72V DC bipolar<br>UCL-32DI.D6: 10-30V DC bipolar<br>D1/D6: Max. 3V DC deactivated.<br>D2/D5: Max. 6V DC deactivated. | |
| Frequency | 40-70Hz. | | |
| Current | Typical 8mA (220V AC/50Hz). | | |
| Delay | 50-100ms. | Typical 5ms. | |
| OUTPUTS | | | |
| Digital outputs | | | 4 potential free SPST-NO contacts.<br>4 potential free SPDT-CO contacts. |
| Voltage<br>External voltage | | | Max. 240V AC. |
| Voltage drop | | | |
| Current | | | Max. 8A AC (resistive). |
| Peak current | | | |
| Leakage current (off) | | | |
| Output delay | | | Typical 10ms. |
| Relay lifetime | | | Min. 100.000 operations at rated load. |
| Contact material | | | AgCd (gold clad). |
| ISOLATION | | | |
| Inputs | Min.1.5kV AC between inputs.<br>Min. 4kV AC input to electronics<br>Min. 2kV AC input to chassis | 2kV AC (input to electronics). | |
| Outputs | | | 4kV AC electronics to contact or chassis.<br>1.5kV contact to another contact. |
| INDICATORS | One LED for each input (red). | One LED for each input (red). | One LED for each output (yellow). |
| CURRENT CONSUMPTION | Max. 45mA@12V DC. | UCL-16..: Max. 45mA.<br>UCL-32..: Max. 80mA. | Max. 170mA. |

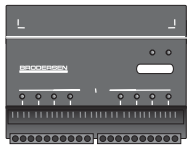
# Expansion Modules
# Digital I/O

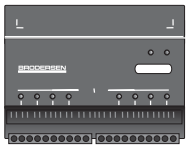


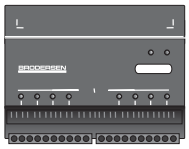




| UCL-16DO.P1/UCL-32DO.P1 | UCL-8DIO.P1/UCL-16DIO.P1 | UCL-36IO.P1 |
|---|---|---|
| Expansion module with 16/32 PNP or 32NPN open collector outputs. | Expansion with 8/16 digital PNP inputs and 8/16 PNP open collector outputs. | Expansion with 24 digital PNP input and 12 NO relay output. |
| UCL-16DO.P1<br>UCL-32DO.P1<br>UCL-32DO.N1 | UCL-8DIO.P1<br>UCL-16DIO.P1 | UCL-36IO.P1 |
| | UCL-8..: 8 bi polar<br>UCL-16..: 16 uni polar<br>All equipped with optocouplers.<br>10-30V DC activated.<br>Max. 3V DC deactivated. | 24 (negative common PNP)<br>All equipped with optocouplers<br>10-30V DC activated<br>Max. 3V DC deactivated. |
| | 12V DC: Typical 3mA.<br>24V DC: Typical 6mA. | 12V DC: Typical 3 mA.<br>24V DC: Typical 6 mA. |
| | Typical 5ms. | Typical 5ms. |
| 16/32 PNP or 32 NPN open collector.<br>All equipped with optocouplers. | 8/16 PNP open collector.<br>All equipped with optocouplers. | 12 potential free SPST-N/O contacts.<br>Max. 240V AC. |
| 10-30VDC.<br>Max. 1.5V (output activated).<br>Max. 0.5A. max. 2A totally per section.<br>Max. 5A in 1 second.<br>Max. 0.5mA.<br>Max. 1ms. | 10-30VDC.<br>Max. 1.5V (output activated).<br>Max. 0.5A.<br>Max. 5A in 1 second.<br>Max. 0.5mA.<br>Max. 1ms. | Max. 1A AC (resistive).<br><br>Typical 10ms.<br>Min. 100.000 operations at rated load.<br>Gold overlay silver alloy. |
| | 2kV AC (input to electronics, input to output). | 2kV AC (electronic to inputs). |
| 2kV AC (electronics to output). | 2kV AC (output to electronics, input to output). | 2kV AC 50Hz 1 min (IEC255-5).<br>4kV 1,2/50micro s. / impulse withstand (IEC255-5). |
| One LED for each output (yellow). | One LED for each input (red).<br>One LED for each output (yellow). | Digital input: None<br>Relay ouput: None<br>Power/System/IO: Green LED |
| UCL-16DO.P1: Max. 80mA.<br>UCL-32DO.X1: Max. 170mA. | Max. 60mA. | Max. 150mA |







| TYPE | UCL-08AI.DX | UCL-08AI.PX | UCL-08AI.J/K/R/S/T |
|---|---|---|---|
| **DESCRIPTION** | 8 channel analogue input expansion module for standardized process signals. | 8 channel analogue input expansion module for standardized RTD temperature sensors. The master or slave module will automatically linearise the measuring values from the expansion module. | The UCL-08AI.J/K/R/S/T are expansion modules with direct interface for thermo-coupled temperature sensors. The master or slave module will automatically linearise the measuring values from the expansion module. The module includes cold junction compensation circuit. |
| **VERSION/ORDERING CODES** | | | |
| Type | UCL-08AI.D1, 0-10V/0-20mA<br>UCL-08AI.D2, 4-20mA<br>UCL-08AI.D3, 0-5V<br>UCL-08AI.D4, -5V - +5V<br>UCL-08AI.D5, -10V - +10V<br>UCL-08AI.D6, 0-20mA | UCL-08AI.P1, Pt-100, -50-100°C<br>UCL-08AI.P2, Pt-100, -50-300°C<br>UCL-08AI.P3, Pt-100, -50-850°C<br>UCL-08AI.P51, Pt-500, -50-100°C<br>UCL-08AI.P52, Pt-500, -50-300°C<br>UCL-08AI.P53, Pt-500, -50-850°C<br>UCL-08AI.P11, Pt-1000, -50-100°C<br>UCL-08AI.P12, Pt-1000, -50-300°C<br>UCL-08AI.P13, Pt-1000, -50-850°C | UCL-08AI.J1, Fe-CuNi, -50-1200°C<br>UCL-08AI.K1, NiCr-Ni, -50-1350°C<br>UCL-08AI.K2, NiCr-Ni, 0-600°C<br>UCL-08AI.R1, PtRh-Pt10%, -50-1750°C<br>UCL-08AI.S1, PtRh-Pt13%, -50-1750°C<br>UCL-08AI.T1, Cu-Cu-Ni 0-300°C |
| **INPUTS** | | | |
| Analogue inputs | 8 multiplexed analogue channels. | 8 multiplexed analogue channels. | 8 multiplexed analogue channels. |
| **INPUT CONFIGURATION** | Differential, +/- | 2 or 3 wire | Differential, +/-. |
| **INPUT RANGES** | | | |

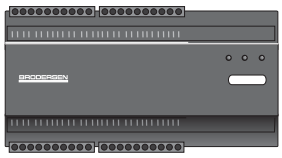
| Type no. | Voltage | Current |
|---|---|---|
| ...D1 | 0-10V | 0-20mA |
| ...D2 | - | 0-20mA |
| ...D3 | 0-5V | - |
| ...D4 | -5V - +5V | - |
| ...D5 | -10V - +10V | - |
| ...D6 | - | 0-20mA |

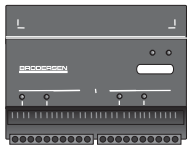
| Sensor type | | | Range |
|---|---|---|---|
| Pt-100 | Pt-500 | Pt-1000 | |
| P1 | P51 | P11 | -50-100°C |
| P2 | P52 | P12 | -50-300°C |
| P3 | P53 | P13 | -50-850°C |

| Type no. | Sensor type | Range |
|---|---|---|
| ...J1 | Fe-CuNi | -50-1200°C |
| ...K1 | NiCr-Ni | -50-1350°C |
| ...K2 | NiCr-Ni | 0-600°C |
| ...R1 | PtRh-Pt10% | -50-1750°C |
| ...S1 | PtRh-Pt13% | -50-1750°C |
| ...T1 | Cu-Cu-Ni | 0-300°C |

| | | | |
|---|---|---|---|
| **RESOLUTION** | 12bit | 12bit | 12 bit. |
| **INPUT IMPEDANCE** | | | |
| Voltage | 100kOhm. | | |
| Current | D1: 500Ohm/D2/D6: 100Ohm. | | |
| **CONVERSION** | Max. 0.4ms per channel. | Max. 60ms per channel/max. 0.5s. | Max. 60ms per channel/max. 0.5s. |
| **UPDATE TIME** | | | |
| All channels | Max.: 0.5ms + 8 x local scan interval (typical 8 x 5ms). | Max. 8 x 60ms | All channels: Max. 8 x 60ms. |
| **MEASURING ACCURACY** | | | |
| Voltage | ± 0.2% ± 4LSB (typical 0.05%±1LSB). | Better than 0.5% of FSR. | Better than ± 0.5% of FSR. |
| Current | ± 0.2% ± 4LSB (typical 0.1%±1LSB). | | |
| **LINEARITY** | Better than ± 1 LSB. | Better than ± 0.1% of FSR. | Better than ± 0.1% of FSR. |
| **TEMPERATURE STABILITY** | Better than ± 25ppm/ C (typical). | Better than ± 100ppm/ C (typical). | Better than ± 100 ppm/°C (typical). |
| **ISOLATION** | 500V DC (input to electronics). | 500V DC (input to electronics). | 500V DC (input to electronics). |
| **INDICATORS** | One for each channel (red).<br>I/O: Indicating local bus configuration is OK.<br>System: Indicating general local I/O system is OK | One for each channel (red).<br>I/O: Indicating local bus configuration is OK.<br>System: Indicating general local I/O system is OK. | One for each channel (red).<br>I/O: Indicating local bus configuration is OK.<br>System: Indicating general local I/O system is OK. |
| **CURRENT CONSUMPTION** | Max. 180 mA. | Max. 200 mA. | Max. 200mA. |
| **ERROR DETECTION** | | | |
| Over range detection | | | |
| Under range detection | | | |

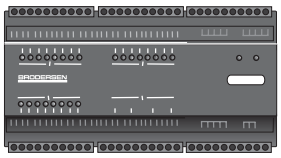
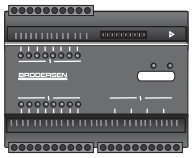
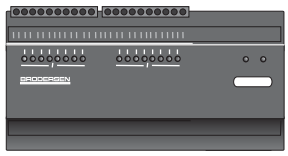
# Expansion Modules
# Analogue I/O





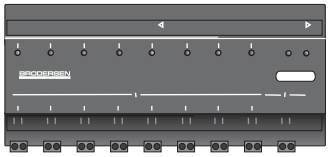
| UCL-08AI.XP | TYPE | UCL-04AO.DX |
|---|---|---|
| 8 Channel 3 or 4 wire Pt-100 expansion module for standardized temperature sensors. High accuracy and resolution. Optional delivered with built-in power supply for I/O expansion local bus modules. | DESCRIPTION | 4 channel analogue output expansion module for standardized process signals. |
| | VERSION/ORDERING CODES | |
| | Type | UCL-04AO.D1, 0-10V/0-20mA<br>UCL-04AO.D2, 0-10V/4-20mA<br>UCL-04AO.D3, 0-5V/0-20mA<br>UCL-04AO.D4, -5V - +5V/0-20mA<br>UCL-04AO.D5, -10V - +10V/0-20mA |
| UCL-08AI.3P, Pt-100 3-wire<br>UCL-08AI.4P, Pt-100 4-wire | OUTPUTS | |
| | Analogue outputs | 4 channels. |
| | INPUT CONFIGURATION | Seperate terminal for voltage (sink/source) and current output (sink) for each channel |
| | INPUT RANGES | Type no. / Voltage / Current<br>...D1 / 0-10V / 0-20mA<br>...D2 / 0-10V / 4-20mA<br>...D3 / 0-5V / 0-20mA<br>...D4 / -5V - +5V / 0-20mA<br>...D5 / -10V - +10V / 0-20mA |
| 8 multiplexed analogue channels. | | |
| 4 wire (2 or 3 wire). | | |
| | RESOLUTION | 12bit |
| 3 ranges selectable:<br>-50 - +100°C<br>-50 - +300°C<br>-50 - +850°C | VOLTAGE OUTPUT | |
| | Impedance | Max. 200mOhm |
| | Current | Max. 5mA |
| | Setting time | Typical 20µs (within 0.1% FSR) |
| | Slew rate | Typical 5V/µs |
| | ACCURACY | |
| | Gain | ±0.3% of FSR (typical 0.1%) |
| 14 bit for full range. | Offset | ±0.3% of FSR (typical 0.1%) |
| | TEMPERATURE STABILITY | Voltage: Better than ±30ppm/C |
| | CURRENT OUTPUT | |
| | Impedance | Min. 5Mohm |
| Max. 60ms per channel/max. 0.5s. | External supply voltage | 10-30V DC |
| | External load impedance | 12V: Max. 400Ohm/24V: Max. 800Ohm |
| | Setting time | Typical 100µs (within 0.1% of FSR) |
| | Slew rate | Typical 2mA/µs |
| | ACCURACY | |
| Better than 0.5% of FSR. | Gain | ±0.7% of FSR (typical 0.2%) |
| | Offset | ±0.5% of FSR (typical 0.2%) |
| | TEMPERATURE STABILITY | Current: Better than ±80ppm/C |
| Better than ± 0.1% of FSR. | | |
| | UPDATE TIME | All channels: 1ms + 4 x local scan interval (typical 4 x 5 ms) |
| Better than ± 100ppm/ C (typical). | | |
| None. | ISOLATION | 500V DC (input to electronics). |
| Scan: Indicating that inputs are scanned.<br>I/O: Indicating local bus configuration is OK.<br>System: Indicating general local I/O system is OK. | INDICATORS | One for each channel (red).<br>I/O: Indicating local bus configuration is OK.<br>System: Indicating general local I/O system is OK. |
| Max. 200 mA. | CURRENT CONSUMPTION | Max. 300 mA. |
| Cable breake etc. +10% FS<br>Short circuit etc. -10% FS | | |

# Expansion Modules
# Combined Digital/Analogue I/O

| TYPE | UCL-28IO.DX | UCL-20IO.DX | UCL-16CIS.PX |
|---|---|---|---|
| **DESCRIPTION** | Expansion module with 16 digital inputs, 8 digital outputs and 4 analogue inputs for standardized process signals. Each of the analogue inputs are galvanically separated from the other analogue inputs.<br>The first 4 digital inputs can be used as counter inputs (up to 100 Hz). The module is equipped with a built-in micro processor taking care of the analogue inputs as well as the counter inputs.<br>The UCL-28 can be delivered with a built-in isolated 24V DC loop supply (optional) for e.g. 4-20mA current loop. | Expansion module with 8 digital inputs, 8 digital outputs and 4 analogue inputs for standardized process signals. Each of the analogue inputs are galvanically sepa-rated from the other analogue inputs. | Local expansion module with 16 32 bit (2x16 bit words) counters.<br>For each counter a RESET function is provided. |
| **VERSION/ORDERING CODES** | | | |
| Type | UCL-28IO.D1, 0-10V/0-20mA<br>UCL-28IO.D2, 4-20mA<br>UCL-28IO.D3, 0-5V<br>UCL-28IO.D6, 0-20mA<br>UCL-28IO.D7, 0-2V<br>/Optional: Built-in 12/24V DC loop supply | UCL-20IO.D1, 0-10V/0-20mA<br>UCL-20IO.D2, 4-20mA<br>UCL-20IO.D3, 0-5V<br>UCL-20IO.D6, 0-20mA | UCL-16CIS.P1,<br>UCL-16CIS.P2,<br>UCL-16CIS.P5, |
| **DIGITAL INPUTS** | | | |
| Digital inputs | 16 (uni polar)<br>All equipped with optocouplers<br>10-30V DC activated<br>Max. 3V DC deactivated.<br>12V DC: Typical 3 mA.<br>24V DC: Typical 6 mA. | 8 (uni polar)<br>All equipped with optocouplers<br>10-30V DC activated<br>Max. 3V DC deactivated.<br>12V DC: Typical 3 mA.<br>24V DC: Typical 6 mA. | 16 (uni polar)<br>All equipped with optocouplers<br>10-30V DC activated<br>Max. 3V DC deactivated.<br>12V DC: Typical 3 mA.<br>24V DC: Typical 6 mA. |
| Pulsed inputs | 4 (Digital inputs 0, 1, 2, 3). | | 16. |
| Max. counting frequency | 100 Hz (5ms pulse/5ms pause). | | 100 Hz (5ms pulse/5ms pause). |
| Counter values | 0 to 4095 (12 bit resolution). | | 0 to 4095 (12 bit resolution). |
| **OUTPUTS** | | | |
| Digital outputs | 8 PNP open collector.<br>All equipped with optocouplers. | 8 PNP open collector.<br>All equipped with optocouplers. | |
| External voltage | 10-30V DC. | 10-30V DC. | |
| Voltage drop | Max. 1.5V (output activated). | Max. 1.5V (output activated). | |
| Current | Max. 0.5A | Max. 0.5A | |
| Peak current | Max. 5A in 1 second. | Max. 5A in 1 second. | |
| Leakage current (off) | Max. 0.5mA | Max. 0.5mA | |
| Output delay | Max. 1ms | Max. 1ms | |
| **ANALOGUE INTPUTS** | 4 multiplexed analogue channels.<br>Differential (+/-), flying capacitor type 12 bit resolution. | 4 multiplexed analogue channels.<br>Differential (+/-), flying capacitor type 12 bit resolution. | |
| Sampling rate | 100ms. | 100ms. | |
| Mesuring ranges | UCL-28IO.D1, 0-10V/0-20mA<br>UCL-28IO.D2, 4-20mA<br>UCL-28IO.D3, 0-5V<br>UCL-28IO.D6, 0-20mA | UCL-20IO.D1, 0-10V/0-20mA<br>UCL-20IO.D2, 4-20mA<br>UCL-20IO.D3, 0-5V<br>UCL-20IO.D6, 0-20mA | |
| Accuracy<br>25°C:<br>-10°-55°C: | ±0.2% ±6LSB (typical0.05%±3LSB)<br>±0.3% ± 8LSB (typical 0.1% ± 4LSB). | ±0.2% ±6LSB (typical0.05%±3LSB)<br>±0.3% ± 8LSB (typical 0.1% ± 4LSB). | |
| **ISOLATION** | | | |
| Analogue | 500V (input to input). | 500V (input to input). | |
| Digital | 1 kV (input or output, input to input). | 1 kV (input or output, input to input). | |
| **INDICATORS** | One for each digital input (red).<br>One for each digital output (yellow). | One for each digital input (red).<br>One for each digital output (yellow). | One for each digital input (red) indicating active input.<br>System: Indicating RTU OK (green).<br>I/O: Indicating I/O and local bus OK (green). |
| **CURRENT CONSUMPTION** | Max. 80mA (12V DC) | Max. 80mA (12V DC) | UCR-16DIO: max. 105mA.<br>UCR-32DI: max. 90mA<br>UCR-28IO: max. 100mA<br>IEC class II, 3.75kV (mains supply versions)<br>Safety earth required. |

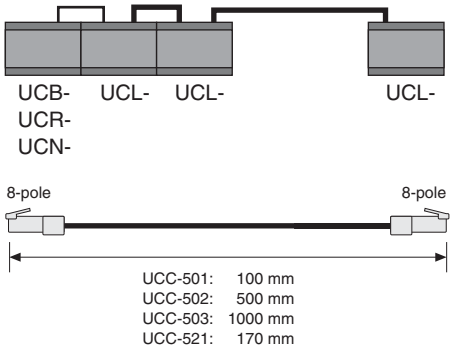
# Expansion Modules
# Monitored AC Output I/O / Cables



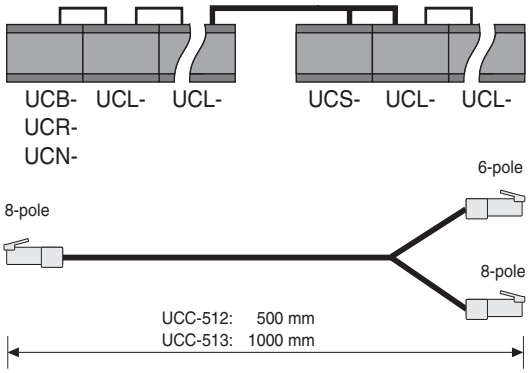
| TYPE | UCL-8LCO |
|---|---|
| DESCRIPTION | Expansion module with 8 galvanic isolated outputs for switching AC voltage.<br>Current through the outputs are measured. |
| VERSION/ORDERING CODES | |
| Type | UCL-8LCO.V1, 10-15V AC<br>UCL-8LCO.V2, 42V AC<br>UCL-8LCO.V3, 230V AC |
| DIGITAL INPUTS | Only virtual inputs exists. They are internally connected to alarms from the current measuring circuits. |
| OUTPUTS | |
| Digital outputs (port A) | 3 AC type output configuration is available; one for each voltage. |
| Ratings | Type V3: 230V/100W<br>Type V2: 42V/40-60W<br>Type V1: 10-15V/50W |
| Isolation | Output- Output: 500V<br>Output-Electronics: 3.75kV |
| Protection | Internal fuses are provided in sockets. |
| Switching freq. | Max. 2Hz |
| Output delay | $T_{OFF - ON}$ 2-25ms<br>$T_{ON - OFF}$ 2-25ms |
| Output controls | Zero-crossing output is available. |
| VOLTAGE SYNC. INPUT (PORT B) | |
| Input voltage | Max. 275V AC |
| Input load | Typical: 1W |
| INDICATORS | One for each digital output (yellow):<br>LED off - output not active.<br>LED on - output active and current within the limits.<br>LED flashing - outupt active and high or low alarm.<br><br>Two green LEDs indicating module status:<br>System LED on - Module OK<br>I/O LED on - local bus OK |
| CURRENT CONSUMPTION | 140mA (at 12V DC). |

## CABLES & POWER SUPPLIES

**Cables for Expansion Modules**

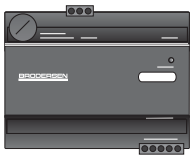



**Cables for Additional Power Supplies**



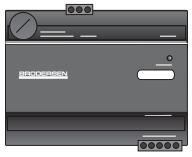

**Additional Power Supplies**

Power supplies used when the current consumption of all UCL expansion modules exceed the max. load of the UCB/UCR/UCN module.



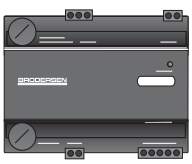
**UCS-53 Power Supply**

| | |
|---|---|
| Type: | UCS-53.924 (input 10,5-58V DC) |
| Output A: | 12V DC, max 1,3A. |
| Output B: | 12VDC max. 0,2A for auxillery use. |



**UCS-54 Power Supply**

| | |
|---|---|
| Type: | UCS-54.115 (input 90-132V AC)<br>UCS-54.230 (input 180-265V AC) |
| Output A: | 12V DC, max 2,0A for UCL modules. |
| Output B: | 12VDC max. 0,2A for auxillery use. |



**UCS-59 UPS Power Supply**

| | |
|---|---|
| Type: | UCS-59.110 (90-132V AC)<br>UCS-59.230 (180-265V AC) |
| Output: | 12V DC, max 1,8A for UCL modules. |
| Battery: | Type 12V load battery.<br>Type like Varta CF12 series. |
| Fail Indicators: | Relay output for mains fail and low battery. |

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