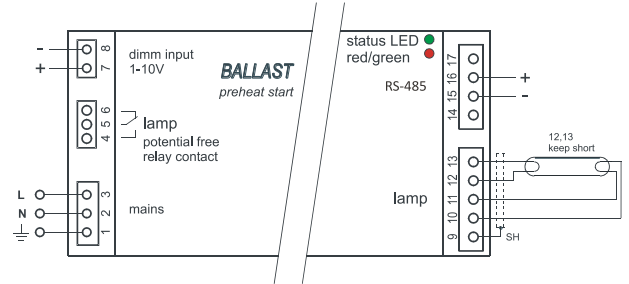


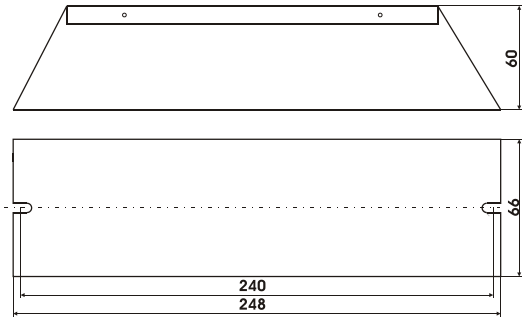
**Electronic Ballast for UVC-Lamps with adjustable Lamp Current**



**Wiring**



**Dimensions**



**Features**

- Controller based design (Cut-Off preheat start)
- Lamp current adjustable in steps
- Remote control via RS-485 interface
- Inrush current limiter
- Potential free relay contact
- Dimm input 1-10 V

**Technical Data**

|   |  |
|---|--|
| Type                                      | LT-UVC 1x(80..200)W 1,8 A ..2,9 A  |
| Supply                                    | 208/230 V AC ± 10 % 50/60 Hz   |
| Input power min. / max.                   | 90 W .. 220 W  |
| Output power single lamp                  | 80 W .. 200 W  |
| Adjustable range of lamp current          | (1,8 A / 2,0 A / 2,1 A / 2,5 A / 2,9 A) ± 10%  |
| Powerfactor                               | > 0,95   |
| Efficiency                                | > 0,9  |
| Operating frequency                       | approx. 28..70 kHz   |
| Inrush current                            | $\hat{I} < 40 \text{ A to } 30 \mu\text{s} / \hat{I} < 30 \text{ A to } 300 \mu\text{s}$ |
| Relay Contact                             | 1 changeover contact   |
| Relay Contact – Maximum switching voltage | 5 A 250 V AC / 5 A 24 V DC (resistive load)  |
| Relay Contact – Minimum switching load    | $\geq 5 \text{ V DC} / 10 \text{ mA}$  |
| Dimm input                                | Analog 1..10 V DC  |
| Dimm range                                | to minimal 60 % of lamp current  |
| Standby power dissipation                 | approx. 2 W  |
| CE-conformity                             | yes  |

**Type coding**

|   |  |
|---|--|
| C | Preheat start ballast (Cut off Technology)     |
| M | Potential free relay contact                   |
| D | Dimm input                                     |
| I | – selection lamp current<br>– RS-485 interface |

**Adjustment of lamp current**

|   |   |  |
|---|---|--|
| Adjustment by rotary switch on top of the ballast |   | Pos. 0..5: preheat start<br>Pos. 6..9: rapid start<br><br>No warranty for damages caused by incompatible lamps or wrong adjustments! |
| Lamp type   | On request  |  |
| Adjustment of lamp current parameters             | Must be carried out before voltage application, switching during operation will not be detected |  |

**Adjustment of lamp current**

| Switch | Lamp current | preheat current maximal |
|--------|--------------|-------------------------|
| 0      | 1,8 A        | 1,3 A                   |
| 1      | 1,8 A        | 2,9 A                   |
| 2      | 2,0 A        | 2,1 A                   |
| 3      | 2,1 A        | 2,9 A                   |
| 4      | 2,5 A        | 3,6 A                   |
| 5      | 2,9 A        | 3,6 A                   |
| 6      | 1,8 A        | Rapid start             |
| 7      | 2,0 A        | Rapid start             |
| 8      | 2,5 A        | Rapid start             |
| 9      | 2,9 A        | Rapid start             |

**Monitoring**

|   |   |
|---|---|
| Mains Control                               | Switch off at permanent under – or over voltage |
| Temperature                                 | Switch off at permanent over temperature        |
| Lamp presence                               | No start if no lamp is connected                |
| Deactivated lamp, rectifier effect of lamps | Switch off                                      |
| Shortage on the lamp line                   | Switch off                                      |
| End of life lamp                            | Switch off                                      |

**General indications**

|                              |  |
|------------------------------|--|
| Operation                    | LED green – works normal   |
| Failure                      | LED red – failure, no operation  |
| Potential free contact (PFK) | Relay on – works normal<br>Relay off – failure or ballast does not start (Standby) |

**State indications operation/failure**

| Ballast status                                 | PFK | LED green               | LED red                 | Description   | Cause   |
|--|-----|-------------------------|-------------------------|---|---|
| No start condition                             | Off | Perma-<br>nent<br>blink | Perma-<br>nent<br>blink | Ballast waits for start   | - Under- or over voltage mains<br>- Over temperature<br>- No lamp connected                                   |
| Ballast start / preheating                     | Off | blinking                | On                      | Lamp preheating   |   |
| Ballast start / procedure                      | Off | Off                     | On                      | Lamp starts   |   |
| Ballast works trouble free                     | On  | On                      | Off                     | Normal mode   |   |
| Failure Temperature                            | Off | Off                     | 1x<br>blinking          | Cut off at over temperature<br>Ambient temperature too high<br>Temperature at tc too high | - Wrong installation<br>- No heat dissipation , surface of housing too small                                  |
| Under voltage mains                            | Off | Off                     | 2x<br>blinking          | Switch off at wrong mains   | - Mains voltage under limit   |
| Over voltage mains                             | Off | Off                     | 3x<br>blinking          | Switch off at wrong mains   | - Mains voltage over limit  |
| Failure lamp voltage                           | Off | Off                     | 4x<br>blinking          | Switch off<br>Lamp voltage out of tolerance   | - Wrong lamp type in use<br>- End of lamp life<br>- Rectifier effect of lamp<br>- Start with deactivated lamp |
| Failure over current<br>half bridge            | Off | Off                     | 5x<br>blinking          | Switch off by over current<br>half bridge<br>(abnormal operation)                         | - Wrong lamp wiring<br>- Shortage on lamp lines<br>- Start without lamps                                      |
| Failure Preheating<br>over current half bridge | Off | Off                     | 6x<br>blinking          | Switch off by over current<br>half bridge<br>(abnormal operation)                         | - Wrong lamp electrode<br>- Shortage lamp electrode   |

**Mounting instructions**

|                          |                                     |
|--------------------------|-------------------------------------|
| Designed for             | Installations in switch cabinet     |
| International protection | IP20                                |
| Dimension of case        | (248 x 66 x 60) mm                  |
| Spacing fixing holes     | 240 mm                              |
| Installation position    | Vertical, mains terminal below      |
| Ambient temperature      | ta = 0..40 °C                       |
| Temperature at tc-point  | tc = 55 °C maximum case temperature |

**Cabling**

|                                 |            |
|---------------------------------|------------|
| Max. length of lamp cables      | < 5 m      |
| Max. capacitance of lamp cables | < 150 pF/m |
| Screened lamp cables permitted  | yes        |

**Terminal blocks**

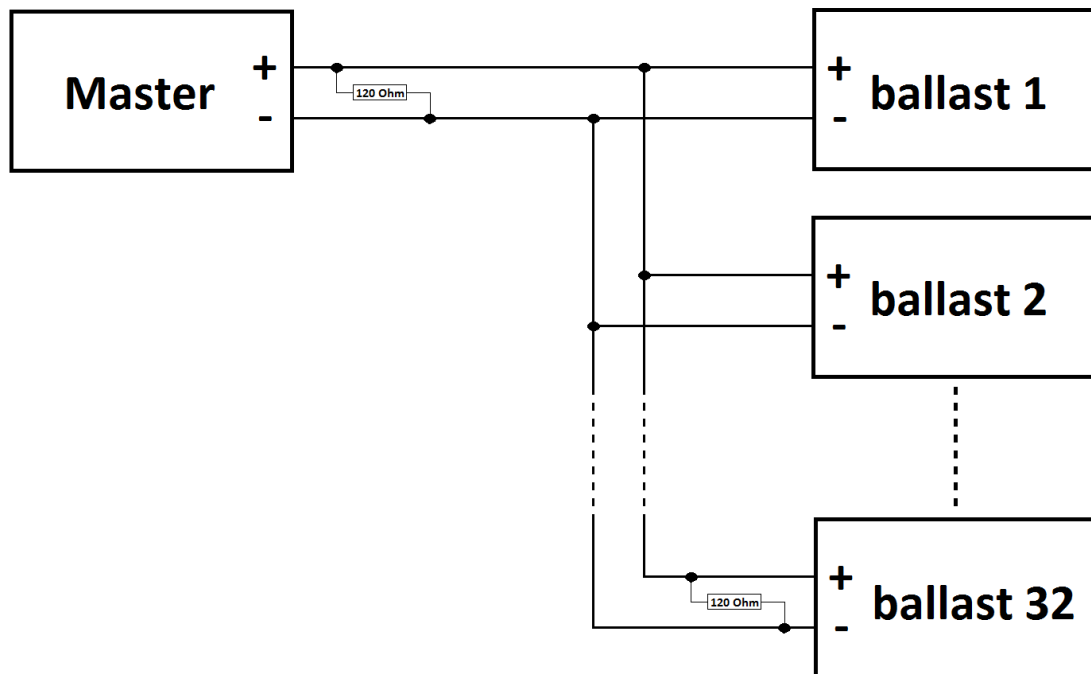
|                      |  |
|----------------------|--|
| Mains                | Cross section: 0,5–2,5 mm <sup>2</sup> (solid)                       |
|                      | Cross section: 0,5–1,5 mm <sup>2</sup> (fine-stranded with ferrule)  |
| Lamp                 | Cross section: 0,5–2,5 mm <sup>2</sup> (solid)                       |
|                      | Cross section: 0,5–1,5 mm <sup>2</sup> (fine-stranded with ferrule)  |
| Relay contact (PFK): | Cross section: 0,5–2,5 mm <sup>2</sup> (solid)                       |
|                      | Cross section: 0,5–1,5 mm <sup>2</sup> (fine-stranded with ferrule)  |
| Dimm input:          | Cross section: 0,2–1,5 mm <sup>2</sup> (solid)                       |
|                      | Cross section: 0,25–1,0 mm <sup>2</sup> (fine-stranded with ferrule) |
| RS-485 interface     | Cross section: 0,2–1,5 mm <sup>2</sup> (solid)                       |
|                      | Cross section: 0,25–1,0 mm <sup>2</sup> (fine-stranded with ferrule) |

**Communication parameters**

|           |      |
|-----------|------|
| Baud rate | 9600 |
| Date bit  | 8    |
| Stop bit  | 1    |
| Parity    | none |

**Wiring RS-485 interface**

|                          |  |
|--------------------------|--|
| Maximum number of slaves | 32   |
| Bus termination          | 120 Ohm resistor at both ends of the network |



**Addressing**

| Ballast-address | DIP-switch |   |   |   |   |
|-----------------|------------|---|---|---|---|
|                 | 1          | 2 | 3 | 4 | 5 |
| 1               | 0          | 0 | 0 | 0 | 0 |
| 2               | 1          | 0 | 0 | 0 | 0 |
| 3               | 0          | 1 | 0 | 0 | 0 |
| 4               | 1          | 1 | 0 | 0 | 0 |
| 5               | 0          | 0 | 1 | 0 | 0 |
| 6               | 1          | 0 | 1 | 0 | 0 |
| 7               | 0          | 1 | 1 | 0 | 0 |
| 8               | 1          | 1 | 1 | 0 | 0 |
| 9               | 0          | 0 | 0 | 1 | 0 |
| 10              | 1          | 0 | 0 | 1 | 0 |
| 11              | 0          | 1 | 0 | 1 | 0 |
| 12              | 1          | 1 | 0 | 1 | 0 |
| 13              | 0          | 0 | 1 | 1 | 0 |
| 14              | 1          | 0 | 1 | 1 | 0 |
| 15              | 0          | 1 | 1 | 1 | 0 |
| 16              | 1          | 1 | 1 | 1 | 0 |
| 17              | 0          | 0 | 0 | 0 | 1 |
| 18              | 1          | 0 | 0 | 0 | 1 |
| 19              | 0          | 1 | 0 | 0 | 1 |
| 20              | 1          | 1 | 0 | 0 | 1 |
| 21              | 0          | 0 | 1 | 0 | 1 |
| 22              | 1          | 0 | 1 | 0 | 1 |
| 23              | 0          | 1 | 1 | 0 | 1 |
| 24              | 1          | 1 | 1 | 0 | 1 |
| 25              | 0          | 0 | 0 | 1 | 1 |
| 26              | 1          | 0 | 0 | 1 | 1 |
| 27              | 0          | 1 | 0 | 1 | 1 |
| 28              | 1          | 1 | 0 | 1 | 1 |
| 29              | 0          | 0 | 1 | 1 | 1 |
| 30              | 1          | 0 | 1 | 1 | 1 |
| 31              | 0          | 1 | 1 | 1 | 1 |
| 32              | 1          | 1 | 1 | 1 | 1 |

**Function code**

| Function code | MODBUS function              | Register    |
|---------------|------------------------------|-------------|
| 01            | Read Boolean variables       | 1 - 3       |
| 03            | Read Numeric variables       | 4001 - 4014 |
| 05            | Set Single Boolean variables | 1 - 3       |
| 06            | Set Single Numeric variables | 4009        |

**Data**

| Register | Address | Name  | Description   | Data type |
|----------|---------|---|---|-----------|
| 1        | 0x00    | Power   | 0 = ON (ballast works)<br>1 = OFF (ballast in standby)  | Boolean   |
| 2        | 0x01    | Dimm analog/digital                           | 0 = Analog via 1-10 V input<br>1 = Digital via RS-485 interface   | Boolean   |
| 3        | 0x02    | RESET<br>Operating time counter/Start counter | 0 = Operating<br>1 = Set counter to 0   | Boolean   |
| 4001     | 0x00    | Ballast address                               | Displays the set ballast address (1 – 32)   | Word      |
| 4002     | 0x01    | Ballast type                                  | 1 = LT-UVC1x(40..150)W-C/D/M/I 0,8..1,5A<br>2 = LT-UVC1x(80..200)W-C/D/M/I 1,2..2,1A<br>3 = LT-UVC1x(80..200)W-C/D/M/I 1,8..2,9A<br>4 = LT-UVC1x(200..400)W-C/D/M/I 1,8..2,9A<br>5 = LT-UVC1x(200..400)W-C/D/M/I 3,2..4,8A<br>6 = LT-UVC1x480W-C/D/M/I 4,8A | Word      |
| 4003     | 0x02    | Switch position                               | Displays the adjustment of lamp current (0 – 9)   | Word      |

|      |      |                                 |   |      |
|------|------|---------------------------------|---|------|
| 4004 | 0x03 | State                           | 1 = Ballast start<br>2 = Lamp preheating<br>3 = Ballast works<br>4 = Ballast waits for start<br>5 = Reserved<br>6 = Failure – Temperature<br>7 = Failure – Under voltage mains<br>8 = Failure – Over voltage mains<br>9 = Failure – Lamp voltage<br>10 = Failure – Over current<br>11 = Failure – Over current Preheating | Word |
| 4005 | 0x04 | Operating time counter - Minute | Displays the operating time in minutes (0 - 60 min.)<br>- counter only works in state 3 -   | Word |
| 4006 | 0x05 | Operating time counter - Hour   | Displays the operating time in hours (0 - 65535 h)<br>- counter only works in state 3 -   | Word |
| 4007 | 0x06 | Start counter                   | Displays the number of lamp starts (0 - 65535)  | Word |
| 4008 | 0x07 | Dimm actual value               | Displays the current dimm value in % (0 – 100 %)  | Word |
| 4009 | 0x08 | Dimm point value (Digital)      | Displays the set dimm value via RS-485 interface in % (0 – 100 %)<br>- does not reflect the dimm value of the analog input -  | Word |
| 4010 | 0x09 | Dimm timer (delay)              | Displays the time until the dimming is ready in seconds (after lamps ignition the dimm function is blocked for 5 min.)  | Word |
| 4011 | 0x0A | Ballast temperature             | Displays the temperature of the ballast in °C (ballast switch off at approx. 80 °C )<br>- does not reflect the temperature at the case(tc-point) -  | Word |
| 4012 | 0x0B | Main voltage                    | 1 = Mains voltage under limit ( $U_{\text{Netz}} < 187 \text{ V}$ )<br>2 = Typical tolerance ( $187 \text{ V} < U_{\text{Netz}} < 253 \text{ V}$ )<br>3 = Mains voltage over limit ( $U_{\text{Netz}} > 253 \text{ V}$ )  | Word |
| 4013 | 0x0C | Lamp voltage                    | Displays the lamp voltage in V ( $\pm 10\%$ )   | Word |
| 4014 | 0x0D | Lamp current                    | Displays the lamp current in mA ( $\pm 10\%$ )  | Word |

**Checksum**

|                       |        |
|-----------------------|--------|
| Calculation algorithm | CRC 16 |
| Generator polynomial  | 0x8005 |
| CRC-start value       | 0xFFFF |

**Error control**

| Error code | Description                        |
|------------|------------------------------------|
| 0x01       | Using an unsupported function code |
| 0x02       | Using an invalid memory address    |