



More than **sensors + automation**

# Checklist Power controller

## 1 Customer information

|                                 |                           |
|---------------------------------|---------------------------|
| 1.1 Company name: _____         | 1.2 Contact person: _____ |
| 1.3 Street/ House number: _____ | 1.4 Email address: _____  |
| 1.5 Location: _____             | 1.6 Phone: _____          |

## 2 General

Application: \_\_\_\_\_

## 3 Size

3.1 Nominal current (A):  20  32  50  100  150  200  250 Load current \_\_\_\_\_ A

3.2 Nominal voltage (V):  24  42  115  200  230  265  400  460  500 Power \_\_\_\_\_ kW

The voltage range of the power controllers TYA 202 and TYA 203 must be after the line voltage!

## 4 Load connection

Single-phase     Star     Neutral point connected to neutral

Delta     Open delta (six-wire circuit)

## 5 Load type

| Load type  | Resistive load  | IR emitters   | MOSI element (Kanthal-Super)  | SIC element   | Transformer in short-circuit operation, welded transformer |
|--|---|---|---|---|--|
| Operating modes<br>Burst-firing operation                  | X   | At medium-wave or long-wave emitters  | Soft-start with phase-angle control, then toggling to burst-firing operation  | Fast cycle time<br>Caution!<br>Elements can be overload   | with Alpha start   |
| Phase-angle control  |   | At short-wave emitters<br>Depends on application, if flickering of lamps will be accepted                 | X   | Gentle operation, extend service-life of heating elements   | X  |
| Soft-start   | -   | Yes<br>Depends on cold or warm rate of the emitter  | Yes   | Yes   | Yes  |
| Control of partial load failure at parallel connected load | I <sup>2</sup> version necessary  | I <sup>2</sup> version necessary  |   |   |  |
| Current limiting   | -   | -   | Yes<br>I <sup>2</sup> version necessary   | -   | Yes<br>I <sup>2</sup> version necessary                    |
| Control mode   | U <sup>2</sup>  | U <sup>2</sup>  | U <sup>2</sup>  | P   | I  |
| Special features   | Economy circuit adequate at three-phase mode, phase to phase voltage, attend phase-phase! |   | R-Control<br>P version necessary  |   |  |
| Circuit type   | Phase-phase<br>phase-zero<br>star three-wire<br>delta three-wire<br>or six-wire           | Phase-phase<br>phase-zero<br>rare star three-wire<br>or four-wire<br>rare delta three-wire<br>or six-wire | Depends on heating elements<br>phase-phase<br>phase-zero<br>star three-wire or four-wire<br>delta three-wire or six-wire<br>control with or without transformer | Depends on heating elements<br>phase-phase<br>phase-zero<br>star four-wire<br>delta three-wire or six-wire<br>control with or without transformer | Phase-phase<br>phase-zero                                  |

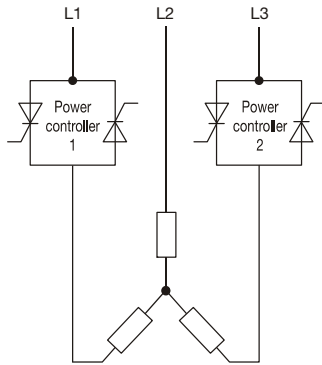
## 6 Input signal/communication

0/4 to 20 mA     0 to 10 V    Fieldbus:  PROFIBUS-DP     PROFINET     \_\_\_\_\_

Potentiometer     Ethercat     RS485

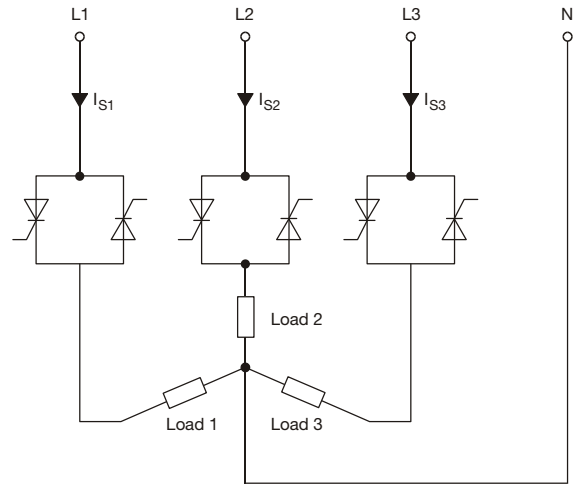
**Note for load connection**

**Star configuration (economy circuit)**



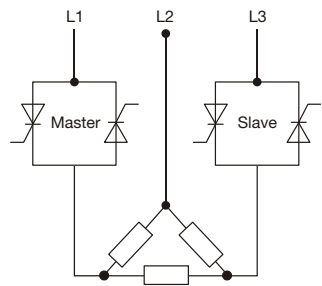
Only in burst-firing mode

**Star configuration with zero point**



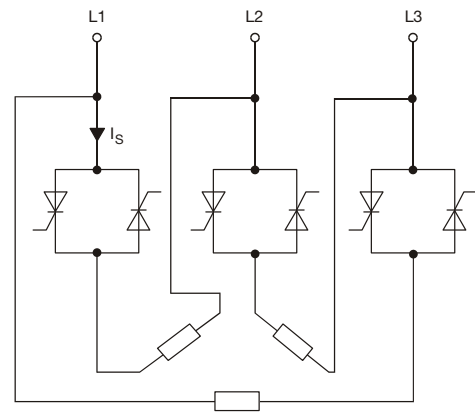
Three single power controller, every operating mode possible

**Delta configuration**



Only in burst-firing mode

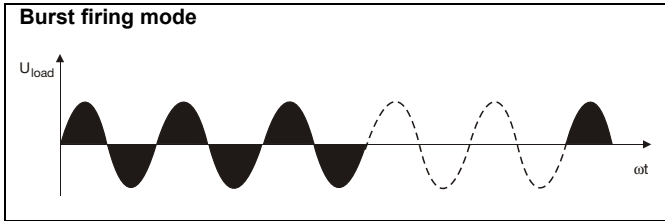
**Open delta configuration**



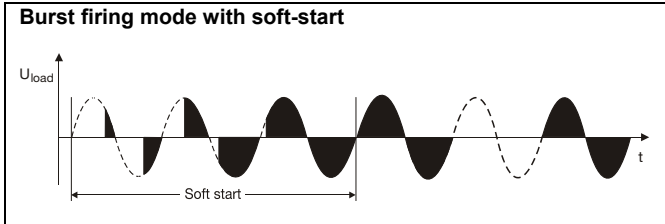
Three single power controller, every operating mode possible  
The load must be connected with 6 wires.

The voltage range of the power controllers TYA 202 and TYA 203 must be after the line voltage!

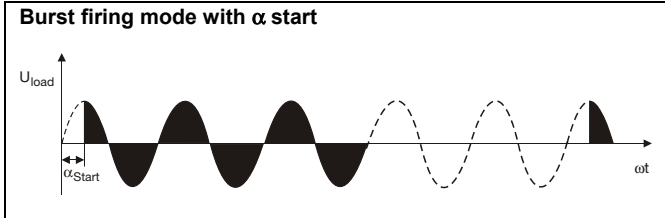
**Note operating mode**



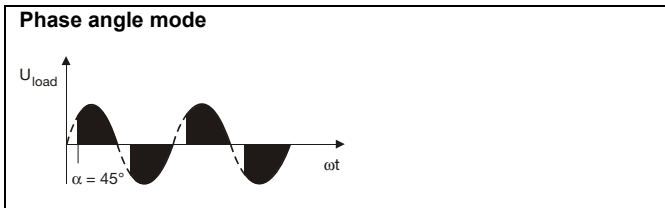
- + No harmonics at power line
- + For inertial loads
- Not qualified for short-wave IR emitters and lightning
- Subordinate control loop not possible
- U control does not limit the peak voltage
- I control does not limit peak current



- + Prevents current peaks at transformers and short-wave IR emitters during power on time
- Generates harmonics and reactive power during soft-start  
(Current limiting possible, U control limits the peak voltage, I control limits peak current)



- + Prevents current peaks in transformer loads
- Current limiting not possible
- U control does not limit the peak voltage
- I control does not limit peak current



- + Accurate control of the output power
- + No mechanical stress on the load
- + Optimal for short-wave IR emitters and lightning

**Note subordinate control loop**

| Control type   | Features  | Application   |
|----------------|---|---|
| U              | The load voltage is provided proportional to the input signal.  | Applications where the voltage output must be limited.  |
| I              | The load current is provided proportional to the input signal.  | Soldering, welding, usually resistive load set at the secondary terminals on transformer and display without current control causes a short circuit |
| U <sup>2</sup> | The output is provided via the load voltage proportional to the input signal.<br>Changes in load current will not be considered.<br>It is based on a <b>constant</b> load resistance.<br>When load with positive temperature coefficient, the output power decreases with increasing resistance.<br>$P = U^2/R$       | Resistive user, IR emitters, wolfram, molybdenum, platinum (MoSi heating elements with current limiting)  |
| I <sup>2</sup> | The output is provided via the load current proportional to the input signal.<br>Changes in load voltage will not be considered.<br>It is based on a <b>constant</b> load resistance.<br>When load with negative temperature coefficient, the output power decreases with decreasing resistance.<br>$P = I^2 \cdot R$ | Graphite, glas melting  |
| P              | The output is provided proportional to the input signal.<br>Load current and load voltage are determined and adjust the output power.<br>$P = U \cdot I$  | SIC heating elements, heating elements with powerful temperature coefficient (MoSi heating elements mit R control)                                  |