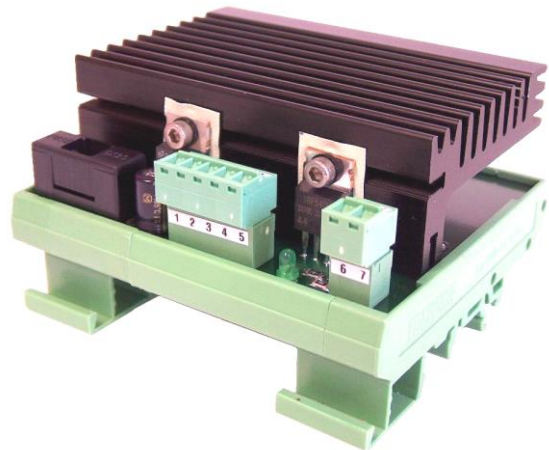


Manual

Controllable constant current source



PR0055

Last Revision: 2008-03-03

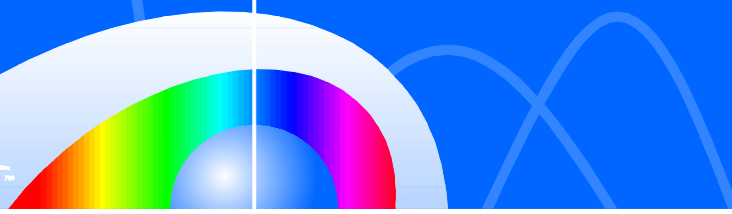
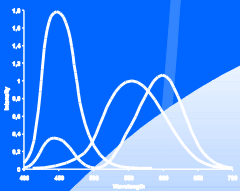


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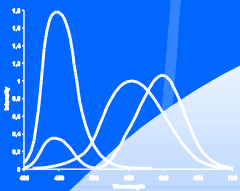
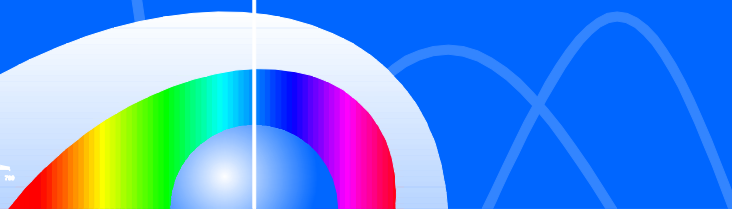
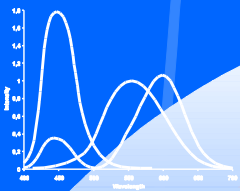


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1. General informations

The module has generally not been conceived or provided for the use as a safety-critical component in machines and installations and in particular not for utilisation in the medical sector. Using the module in these sectors is inadmissible.

This product is not authorized for use as critical component in live support or medical devices or systems.

- Please consult an expert if you are in doubt about mode of operation, safety or connection of the device.
- If any object or liquid gets into the device, please disconnect the supply voltage and let the device be checked by qualified personnel before further using it.
- Avoid strong mechanical strain of the device.
- Do not expose the device to high temperatures, strong vibrations or humidity.
- Do not place the device on unstable ground. Individuals may be injured when the device falls down.
- Please pay attention to the safety notes and instruction manual of the other devices that are connected to the module.
- In industrial facilities, please consider the regulations for the prevention of industrial accidents of the employers' liability insurance association for electric plants and equipment.
- In schools, educational facilities, hobby and self-help workshops, the utilisation of electronic products needs to be observed by skilled personnel.
- Should you have any questions on the correct tool connection or any other issue that is not sufficiently explained in the instruction manual, please do not hesitate to contact our technical information desk.

2. Description of the module

2.1. Purpose of use

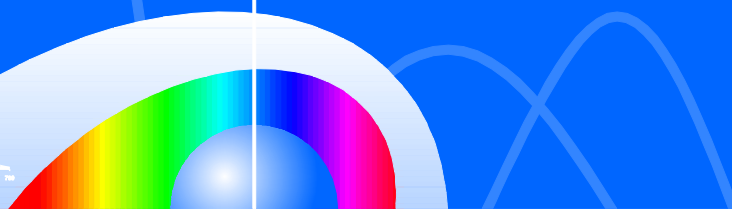
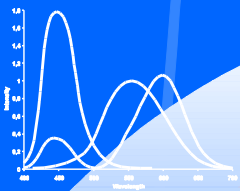
The module serves for the conversion of analogue input signals (0-10V/0-20mA/4-20mA depending on option) to output signals 0-200mA. There are also options for the usage as fixed current source without input signals.

It has been conceived for connection over connector plugs and top hat rail mounting (35mm).

2.2. Technical data

| | |
|--|---|
| Power supply | 10V....28V DC (+/-10%); protected against reverse polarity |
| Current drain | app. 30mA (without demand) |
| Configuration of module | Factory settings for different input signals |
| Input levels on negative input (4) | +/- 20V compared to 0V input (2) |
| Input difference | 10V (positive input - negative input) |
| Output current | 0 - 200mA |
| Output current with fixed 30mA output option | 29 - 30mA |
| Internal resistance load | 45 Ohm to 110 Ohm (for exactly 24V and 200mA) |
| Dissipation loss | 3W maximum |
| Status display | 1 LED, green for power supply |
| Fuse protection | 0,5A fuse link |
| Operating temperature | 10 to 60 degrees |
| Storing temperature | -30 to 70 degrees |
| Operating humidity | 35 – 85 % relative humidity (without condensation) |
| Protection class | IP 24 |
| Weight | app. 150 g |
| Dimensions | 77 x 90 x 56 (HxBxT) (depth varies depending on assembly rig) |

Table 1: Technical data



2.2.1. Annotations to the technical data

2.2.1.1. Input levels

The input level of the negative input may range between -20V and + 20V compared to the input of 0V. This ensures a higher interference resistance when it comes to errors arising from e.g. differences in the potential between control output and control input of the PR0055.

The actual control voltage corresponds to the difference between the positive input (pin 3) and the negative input (Pin 4). The linear range stretches from 0...10V or respectively 2...10V, depending on the model. For the assembly group with current input, this equals a range from 0...20mA or respectively 4...20mA.

The easiest possibility of connection is to bridge the negative input (pin 4) directly on the module to 0V (which is what pin 5 is provided for). The control voltage / current can also be fed in from the control output over a single line. But therefore, it is required that this control output has the same reference level for 0V as the PR0055. This mode of connection usually is sufficient for short connections.

For longer connections or when the control output does not have the same reference potential as the PR0055, the negative input should directly be connected to the reference potential of the control voltage over a second line (and preferably with the same wiring as the positive input). In this case, the voltage on the negative input corresponding to 0V of the PR0055 supply may amount to up to +/-20V.

2.2.1.2. Dissipation loss

The dissipation loss generated on the module depends on the load resistance, the output current as well as the operational voltage. It can simply be established using the following formula:

$$\text{Dissipation loss} = (\text{operational voltage} - \text{output current} \times \text{load resistance}) \times \text{output current}$$

When exceeding the admissible dissipation loss, the module is overly warmed, which may – in the extreme case – might lead to its destruction.

The user must ensure by all means that there is sufficient circulation of air on the cooling element. In this context, we would also like to mention the observance of the admissible operating temperature. If there are any uncertainties, the user can check if there is sufficient circulation of air by means of the cooling element's temperature. During permanent operation with the maximum load, the temperature of the cooling element must by no means exceed 90 degrees °C (measured in the proximity of BR 2 90°C – **Caution very hot – do not touch!**)

If an exceedingly high dissipation loss arises from the calculations, the wide supply voltage range of the PR0055 can be taken advantage of by decreasing the operational voltage. The operational voltage, however, needs to amount to 10V minimum!

2.2.1.3. Admissible internal resistance of the load

The indications in the table for the admissible internal resistance of the load relate to an operational voltage of exactly 24V and an output current of 200mA. For higher load resistances, a current of 200mA can no longer be released. Again, the wide supply voltage range of the PR0055 can be used by increasing the operational voltage. However, the operational voltage needs to be smaller than 28V!

Smaller load resistances result in inadmissible high dissipation losses. Please also refer to **Chapter 2.2.1.2** for this.

2.3. Schematic diagram

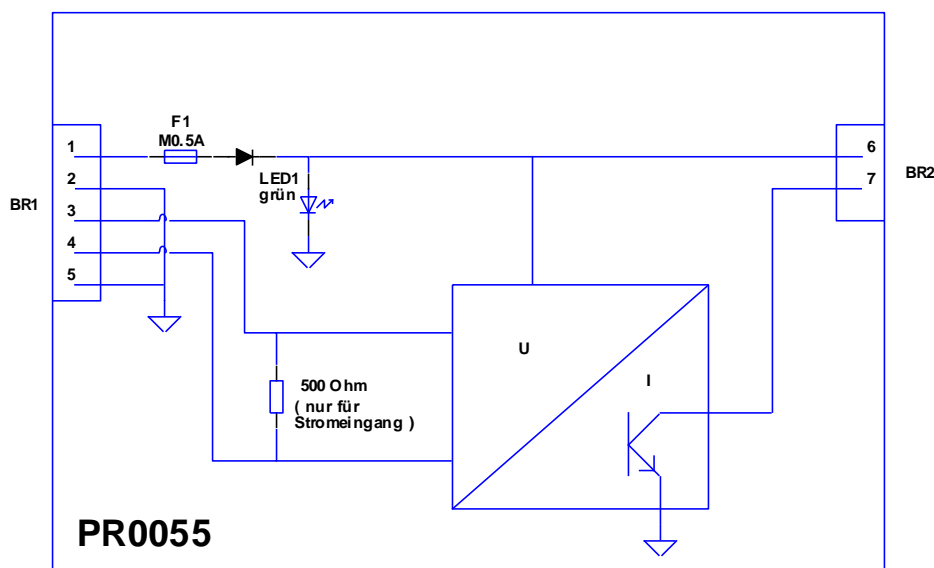
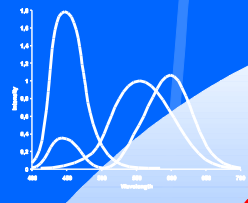


Figure 1: Schematic diagram



2.4. Pin assignment

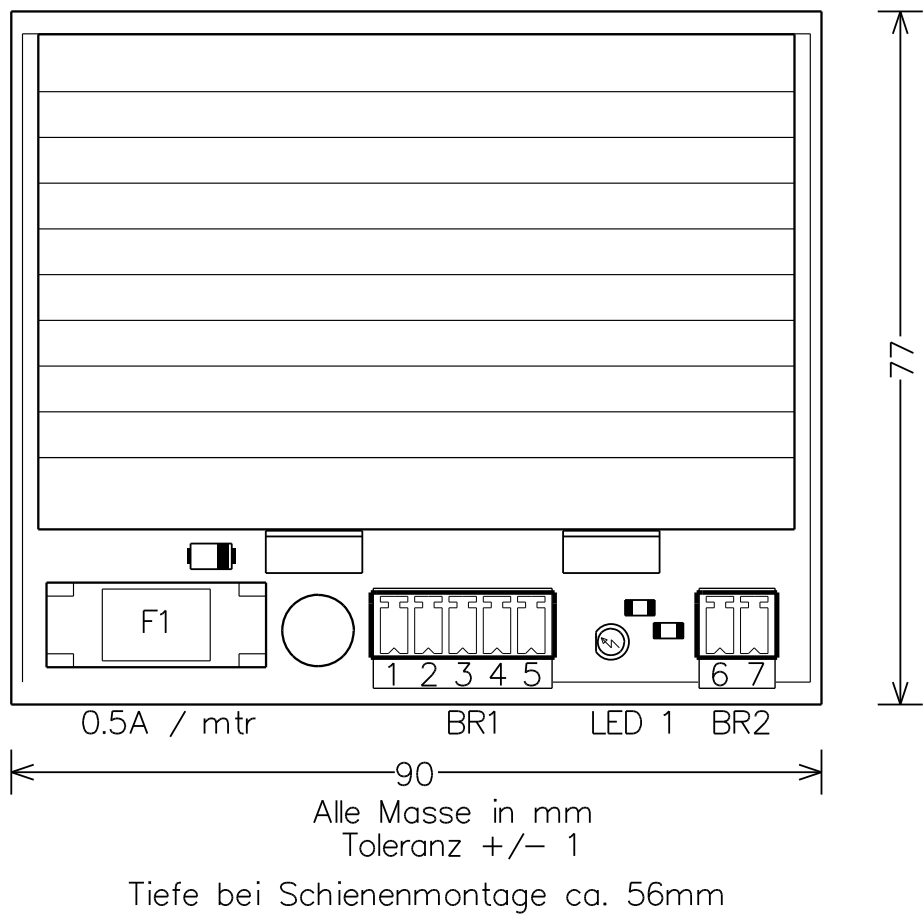


Figure 2: Layout

2.4.1. BR1 – Power supply and input

| Connecting terminal | Function |
|---------------------|--|
| 1 | 24V supply |
| 2 | 0V supply |
| 3 | positive input |
| 4 | negative input |
| 5 | 0V (internally connected to terminal 2) |

Table 2: Pin assignment BR1

2.4.2. BR2 output

| Connecting terminal | Function |
|---------------------|---|
| 6 | Current output + (on 24V, see Figure 1) |
| 7 | Current output - |

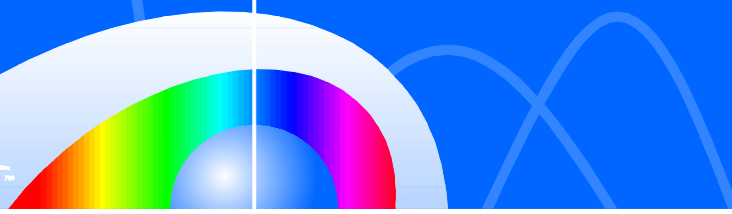
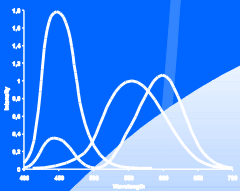
Table 3: Pin assignment output signals

2.5. Displays

The module is equipped with 1 LED (green) for the indication of the power supply.

2.6. Order codes

| Order-No | Input | Output |
|-----------------------|----------|-----------|
| PR0055/0-10V/0-200mA | 0 – 10V | 0 – 200mA |
| PR0055/0-20mA/0-200mA | 0 - 20mA | 0 - 200mA |
| PR0055/4-20mA/0-200mA | 4 – 20mA | 0 – 200mA |
| PR0055/0/0-200mA | 0 | 30mA |

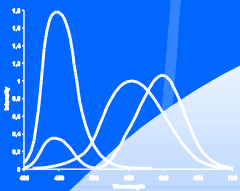


3. Assembly

Please stick to the provided plans and diagrams. The alleged connection values for the electric energy also need to be observed.

Only use appropriate tools for the assembly of the system. Individuals may be injured through the use of inappropriate tools.

When laying the electric connection lines make sure that it is shielded and sufficiently dimensioned.



4. Commissioning

4.1. Pre-commissioning check

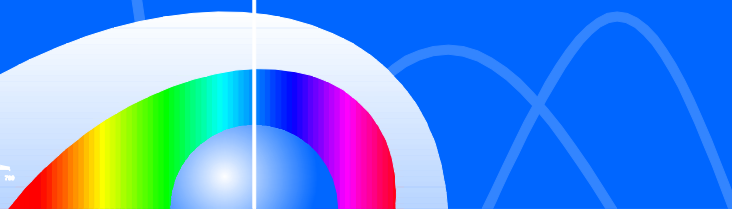
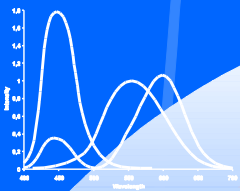
Improper connections and settings may lead to the destruction of the module. Only operated it after having checked and approved the connections and settings.

The following conditions and set parameters need to be verified:

- At the beginning of each working shift (discontinuous operation)
- Once a week (continuous operation)
- After attendance or repair workings

| Pos. | What needs to be checked? | Where? |
|------|---|--------|
| 01 | Check if connection lines are undamaged and properly connected to the module? | Module |
| 02 | Check if mechanical covers of the module have been properly assembled and not been damaged? | Module |
| 03 | Do the operational displays of the module indicate proper functioning? | Module |

Table 4: Verifications



5. Attendance

5.1. Attendance and up-keep

The personnel carrying out the attendance and up-keep workings needs to be trained and qualified for the respective workings.

5.2. Safety notes for attendance and up-keep

The operating personnel needs to be informed about the attendance and maintenance workings in good time.

Please observe that these workings are co-ordinated with the subsequent processing works.

Please report all safety-relevant changes in the performance of the system immediately.

Switch off the system and protect it against unauthorised restart.

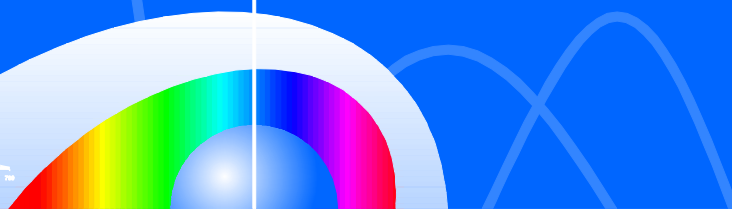
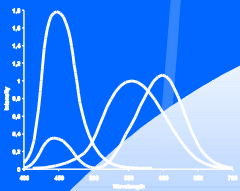
All modifications need to be documented and communicated to the operating personnel.

5.3. Attendance workings

The necessary attendance workings and intervals are listed in the following table:

| Designation | Position in system | Measures | Interval |
|--------------------------------------|--------------------|---|-----------------------------------|
| Cleansing; Detachable connections | Module | Clean module; Check all detachable connections | Annually, if required six-monthly |
| LED displays | Module | Check functioning of the relevant LED displays | Weekly |
| Electric connections | Module | Check for visible damage, contusion or abrasion | Monthly |

Table 5: Attendance intervals



6. Troubleshooting

For the optic display, the module features 7 LED, which allow for the direct recognition of errors that are due to malfunctioning

| Kind of malfunction | Possible causes | Troubleshooting |
|---|------------------------|--|
| No output current | LED is not illuminated | Check supply voltage and fuse on module, the fuse may only be replaced with the same type of fuse with the respective characteristic values. |
| No output current or wrong output current | LED illuminated | Check wiring of the inputs and ensure that it is properly polarised. Respected input signal pending? Check source of the signal if required. Please note that the PR0055 is available with different input types. |
| Output current does not reach maximum value | LED illuminated | Internal resistance of the load possibly too high, so that the maximum current with a voltage of 24V cannot be reached (see Chapter 2.2.1). |
| Cooling element is strongly heated | LED illuminated | The load resistance is too small or there is a short circuit on the output (see Chapter 2.2.1). |

Table 6: Possible errors/causes and troubleshooting

Please do not consider the module as defect and return it to us before you have checked the indicated error sources and the module is still not functioning!