Rexroth
Bosch Group

Pressure relief valve, direct operated

TYPE DBD, DBD...-E according to RE 25402

RE 25402-EVT
Edition: 2011-12
Replaces: 12.10
Material no.: R901292431
English

Setting instructions

The data specified above serve to describe the product. If there is also information on the use, it is only to be regarded as application examples and proposals. Catalog information does not constitute warranted properties. The information given does not release the user from the obligation of own judgment and verification. Our products are subject to a natural process of wear and aging.

The cover page shows an example configuration. The product supplied may therefore differ from the photo shown.

Contents

1 About this documentation

1.1 Validity of the documentation

These setting instructions apply to the pressure relief valve type DBD, component series 1X, sizes 6 to 30.
This documentation aims at commissioning personnel and service engineers.
This documentation contains important information for the safe and appropriate setting of the pressure relief valve type DBD.

1.2 Qualification of personnel

The activities described in this documentation require basic knowledge of hydraulics as well as knowledge of the related terms.
In order to ensure safe use, these activities may only be carried out by a corresponding expert or an instructed person under the direction and supervision of an expert.
Experts are those who can recognize potential hazards and apply the appropriate safety measures due to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules and have the necessary expert knowledge. Expert knowledge means for example for hydraulic products:

- Reading and completely understanding hydraulic schemes,
- In particular completely understanding the correlations regarding the safety equipment and
- Having knowledge of the function and set-up of hydraulic components.

1.3 Necessary and amending documentation

► The pressure setting at the pressure relief valve must not be changed until you have been provided with the 🕮 documentation marked with the book symbol and you have understood and observed it.

Table 1: Necessary and amending documentation

	Title	Document number	Document type
🕮	Pressure relief valve, direct operated	RE 25402	Data sheet
🕮	Safety valves direct operated	RE 25010-B	Operating instructions
🕮	General operating instructions for hydraulic power units and assemblies	RE 07009-B	Operating instructions
🕮	Assembly, commissioning and maintenance of industrial valves	RE 07300	Data sheet

1.4 Representation of information

Consistent safety instructions, symbols, terms and abbreviations are used so that you can quickly and safely work with your product using this documentation. For a better understanding, they are explained in the following sections.

1.4.1 Safety instructions

The measures described for the prevention of dangers must be observed.

Safety instructions are set out as follows:

⚠ SIGNAL WORD

Type and source of danger

Consequences in case of non-compliance

- ▶ Measures for the prevention of dangers
- ▶ <Enumeration>

- **Warning sign:** Draws attention to the danger
- **Signal word:** Identifies the degree of danger
- **Type and source of danger:** Specifies the type and source of danger
- **Consequences:** Describes the consequences in case of non-compliance
- **Precautions:** Specifies how the danger can be prevented

Table 2: Risk classes according to ANSI Z535.6-2006

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a dangerous situation which will cause death or severe personal injuries if not avoided.
⚠ WARNING	Indicates a dangerous situation which may cause death or severe personal injuries if not avoided.
⚠ CAUTION	Indicates a dangerous situation which may cause minor or medium personal injuries if not avoided.
NOTICE	Damage to property: The product or the environment could be damaged.

1.4.2 Symbols

The following symbols indicate notices which are not safety-relevant but increase the comprehensibility of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product cannot be used and/or operated optimally.
▶	Individual, independent action
1. 2. 3.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.

1.4.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations

Abbreviation	Meaning
DBD	Pressure relief valve, direct operated
DBD...E	Type-tested pressure relief valve, direct operated

2 Setting the pressure relief valve

For setting the system pressure in your hydraulic system, safe procedures are necessary. You must therefore follow the instructions in the following sections.

2.1 Prerequisites for the safe pressure setting

Before starting settings at the pressure valve, the following prerequisites have to be satisfied:

- The valid hydraulic scheme must be available. The scheme must contain information on the setting of the system pressure.
- Familiarize with the scheme and check whether:
  - There is a pressure gauge or pressure measurement directly at port "P".
  - Depressurized outflow is guaranteed at port "T".
  - Values for the pressure setting have been specified.
- Keep the necessary tools and measuring equipment (e.g. pressure gauge) ready.
- The system pressure at port "P" of the pressure relief valve must be permanently measured during the pressure setting.
- At port "T" of the pressure relief valve, depressurized outflow of the entire oil volume must be guaranteed.
- During setting, the pressure change must be monitored.

How to proceed

1. Determine the admissible pressure settings.
2. Check the pressure setting at the valve.
3. Set the pressure at the valve.

2.2 Determining the admissible pressure settings

The admissible values for the pressure setting can be seen from the type designation. The type designation is impressed into the valve. The following figure shows the information relevant for the pressure setting. A detailed explanation of the type designation is contained under "Ordering code" in data sheet RE 25402.

Upon delivery, the pressure relief valve is either pre-set to 0 bar or to a certain pressure (pressure setting).

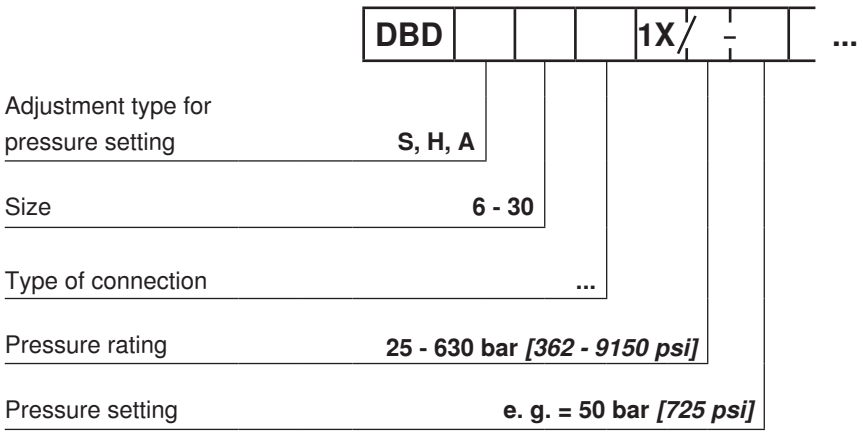


Fig. 1: Type designation - information on the pressure setting

Pressure rating The pressure rating specifies the maximum pressure that can be set. The pressure adjustment range lies between 0 bar and the specified pressure rating value.

Pressure setting If a value is specified for the pressure setting, the pressure relief valve has been "pre-set" upon delivery. The pressure relief valve is set to the specified value.

2.2.1 Pressure relief valves at manifolds or power units

Pressure relief valves mounted at manifolds or power units may have a pre-set pressure. In this case, the pressure setting can not be seen from the type designation but from the hydraulic scheme and the adjustment spindle position.

Observe the following to check whether a pressure setting has been made:

- Apart from the DBD symbol, the hydraulic scheme also contains the following information: "Set to".
- Check the position of the adjustment spindle according to chapter 2.4.2 "Checking the pressure setting at the valve".
  If dimension "L" is less than specified in table 5 "Pressure relief valve - Depressurized setting", the valve has already been preset to a certain pressure.

2.2.2 Type tested safety valves, type DBD...1X/...E

Type tested safety valves according to EC directive 97/23/EC (Pressure Equipment Directive) have a tested pressure setting. With the correct valve selection, they keep the system pressure at the set value. The pressure setting can be seen from the type designation. Using the following figure, you can identify the set pressure. A detailed explanation of the type designation is contained in the "Ordering code: Type tested safety valves type DBD" in data sheet RE 25402.

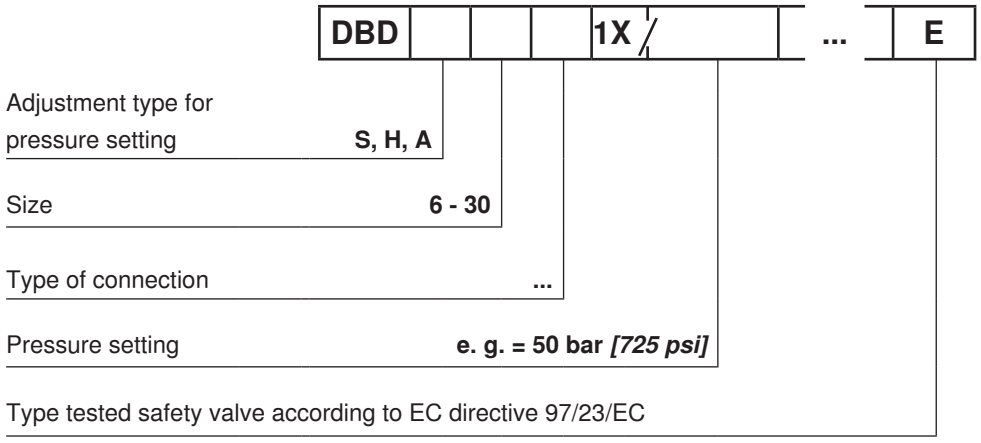


Fig. 2: Type designation - information on the pressure setting of type tested safety valves

Pressure setting The specified value is the tested pressure setting. In case of safety valves with adjustment type "H" (manual), this value must not be exceeded.

Safety valve Type DBDS ... 1X/ ..E

Safety valves with adjustment type "S" are set to a fixed system pressure. They are protected against adjustment by means of lead seal and non-removable protective cap. At these valves, no pressure setting must be made.

If the protective cap is destroyed or the lead seal is removed, the warranty for the safety function will become void.

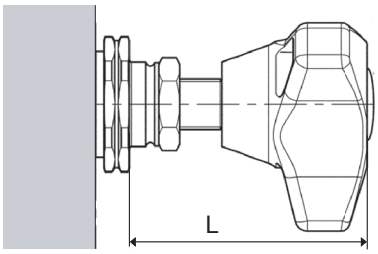
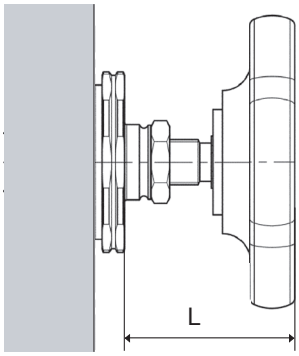
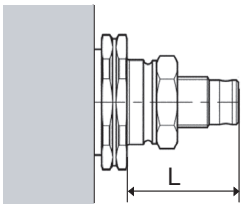
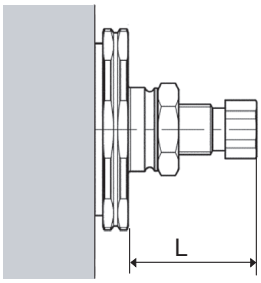
Safety valve Type DBDH ... 1X/ ..E

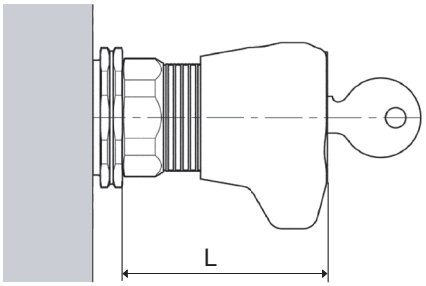
Safety valves with adjustment type "H" are set to the maximum system pressure. The pressure setting may only be reduced or increased to the value indicated on the name plate.

2.3 Pressure relief valve in a pressure-relieved condition

The following table shows the dimension "L" at the pressure relief valve with the different adjustment types with shown pressure setting 0 bar.

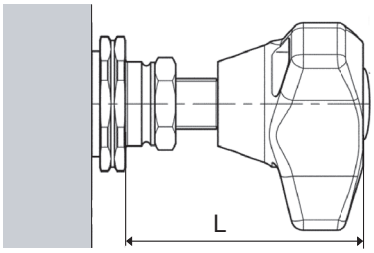
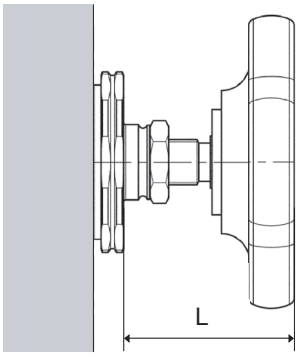
Table 5: Pressure relief valve - Depressurized setting

Pressure relief valve, direct operated	Dimension "L" max. in mm [inch]	Type
	**57** ***[2.24]***	**DBD H with rotary knob, sizes 6 - 25**
	**47** ***[1.85]***	**DBD H with hand wheel, size 30**
	**30** ***[1.18]***	**DBD S with internal hexagon and protective cap, sizes 6 - 20**
	**32** ***[1.26]***	**DBD S with external hexagon and protective cap, sizes 25 and 30**

Pressure relief valve, direct operated	Dimension "L" max. in mm [inch]	Type
	To the end of the scale ring	DBD A with lockable rotary knob, sizes 6 - 20

2.3.1 Safety valve type DBDH ... 1X/ .. E

Table 6: Safety valve - Depressurized setting

Pressure relief valve, direct operated	Dimension "L" max. in mm [inch]	Type
	63 *[2.48]*	DBDH ... 1X/ .. E with rotary knob, sizes 6, 10, 20
	54 *[2.13]*	DBDH ... 1X/ .. E with hand wheel, size 30

2.4 Setting the pressure

⚠ WARNING

Pressurized valve!!
Risk of injury due to oil leakage or parts flying around at the valve in case of incorrect setting by the user.

- ▶ Do not use electrically or pneumatically driven tools.
- ▶ Follow the actions described in these instructions in the correct order.
- ▶ Stop the adjustment works immediately:
  - – If the valve does not behave as expected
  - – If it is hard to rotate the setting screw
  - – If there is leakage at the setting screw of the valve or at other parts
- ▶ Secure external loads.
- ▶ Afterwards, depressurize the system.
- ▶ Find the fault and in case of defect replace the valve used by a new one.

The pressure is set by turning the adjustment spindle. The adjustment elements are shown under "Unit dimensions: Cartridge valve" in data sheet RE 25402.

2.4.1 Tools, tightening torque of the lock nut

Only use manual tools without extension for the pressure setting. **Electrically or pneumatically driven tools must not be used!**

Depending on the adjustment type and size, you need the following tools:
- Manual torque wrench
- Open-end wrench SW 19
- Allen wrench SW 4
- Open-end wrench SW 13
- Open-end wrench SW 30

Tightening torque of the lock nut

The lock nut must be tightened applying a tightening torque of $M_A = 10^{+5}$ Nm with all adjustment types and sizes.

2.4.2 Checking the pressure setting at the valve

You can check the pressure setting at the pressure relief valve using dimension "L".

- ▶ Check the "L" dimension at your pressure relief valve.
  If the value is lower than specified in table 5 in chapter 2.3 "Pressure relief valve in a pressure-relieved condition", a certain pressure has already been set at the valve.

2.4.3 Increasing the pressure

The pressure at the pressure relief valve is increased by clockwise rotation.

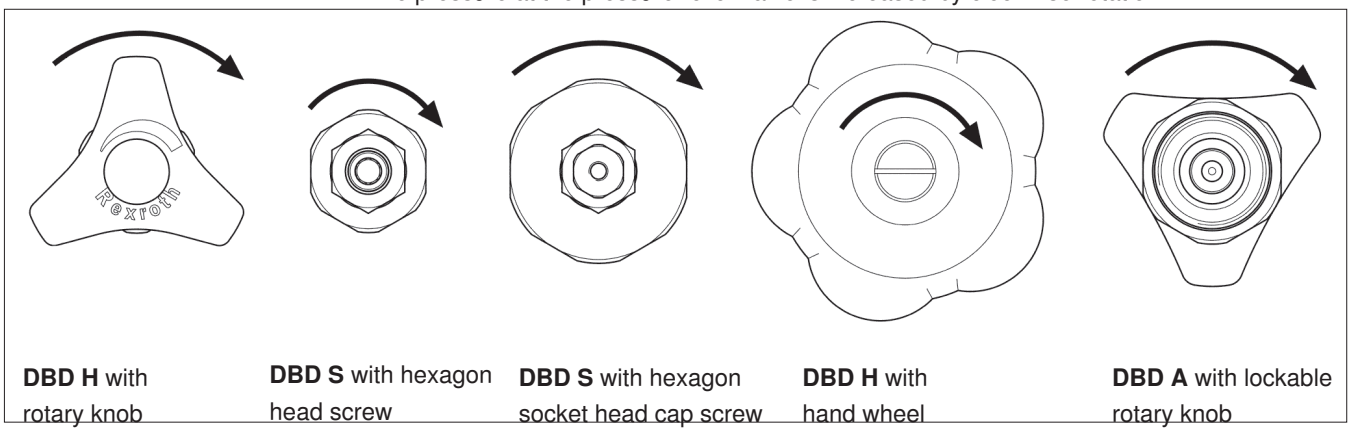


Fig. 3: Direction of rotation for pressure increase (clockwise)

DBD H - valve with hand wheel or rotary knob without locking function

1. Loosen the lock nut at the pressure relief valve.
2. Slowly turn the hand wheel clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
3. Fix the setting by tightening the lock nut by means of a manual torque wrench.

The pressure has been set.

DBD S - valve with hexagon head or hexagon socket head cap screw

1. Loosen the lock nut at the pressure relief valve.
2. Slowly turn the hexagon head screw or hexagon socket head cap screw clockwise using a suitable wrench until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
3. Fix the setting by tightening the lock nut by means of a manual torque wrench.

The pressure has been set.

DBD A - valve with lockable rotary knob

1. Loosen the lock nut at the pressure relief valve.
2. Firstly turn the key at the rotary knob of the pressure relief valve clockwise in order to enable the adjustment of the pressure setting.
3. Slowly turn the rotary knob clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
4. Turn the key at the pressure relief valve counterclockwise again.
5. Fix the setting by tightening the lock nut by means of a manual torque wrench.
6. Remove the key from the rotary knob of the pressure relief valve and keep it in a safe place.

The pressure has been set.

2.4.4 Reducing the pressure

⚠ WARNING

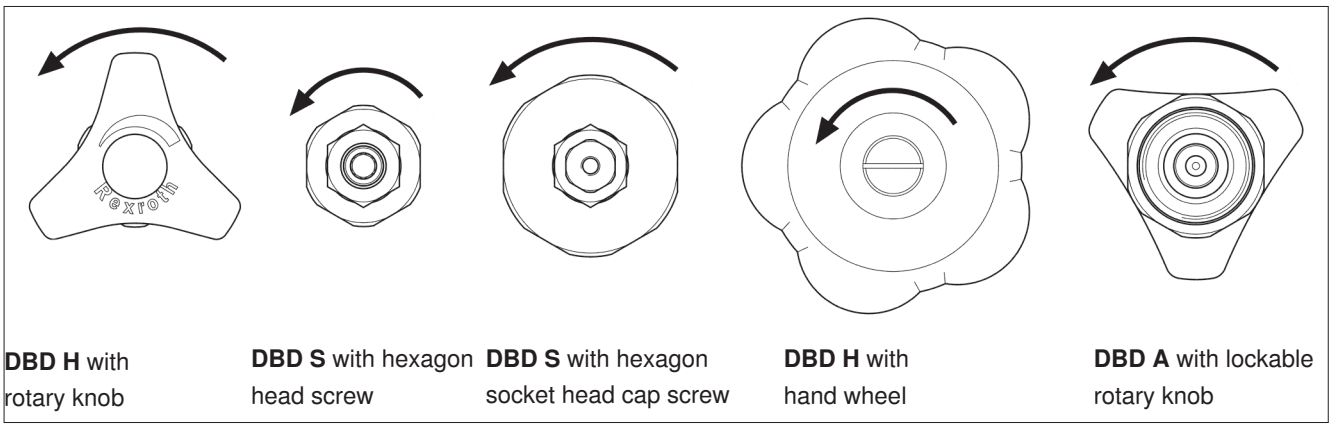
Pressurized valve! Risk of injury in case of incorrect setting if the adjustment is screwed out against the internal stop!

Risk of injury from leaking oil or components.

- ▶ It must be possible to rotate the adjustment smoothly.
- ▶ Only screw the adjustment device out of the valve to the maximum value of dimension "L". For the maximum value, please refer to table 5 in chapter 2.3 "Pressure relief valve in a pressure-relieved condition".
- ▶ Also observe the safety instruction on page 10.

How to proceed

1. Reduce the pressure to approx. 90 % of the required setting.
2. Increase the pressure to the required setting.



DBD H with rotary knob | **DBD S** with hexagon head screw | **DBD S** with hexagon socket head cap screw | **DBD H** with hand wheel | **DBD A** with lockable rotary knob

Fig. 4: Direction of rotation for pressure reduction (counterclockwise)

DBD H - valve with hand wheel or rotary knob without locking function

1. Loosen the lock nut at the pressure relief valve.
2. Slowly turn out the hand wheel counterclockwise until the pressure has been reduced to approx. 90 % of the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
3. Slowly turn in the hand wheel clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
4. Fix the setting by tightening the lock nut by means of a manual torque wrench.

   The pressure has been set.

DBD S - valve with hexagon head or hexagon socket head cap screw

1. Loosen the lock nut at the pressure relief valve.
2. Slowly turn the hexagon head screw or the hexagon socket head cap screw counterclockwise using a suitable wrench until the pressure has been reduced to approx. 90 % of the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.

3. Slowly turn the hexagon head screw or hexagon socket head cap screw clockwise using a suitable wrench until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
4. Fix the setting by tightening the lock nut by means of a manual torque wrench.

   The pressure has been set.

DBD A - Valve with lockable rotary knob

1. Loosen the lock nut at the pressure relief valve.
2. Firstly turn the key at the rotary knob of the pressure relief valve clockwise in order to enable the adjustment of the pressure setting.
3. Slowly turn out the rotary knob counterclockwise until the pressure has been reduced to approx. 90 % of the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
4. Slowly turn in the rotary knob clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
5. Fix the setting by tightening the lock nut by means of a manual torque wrench.
6. Turn the key at the pressure relief valve counterclockwise again.
7. Remove the key from the rotary knob of the pressure relief valve and keep it in a safe place.

   The pressure has been set.

2.5 Setting type tested safety valves

2.5.1 Reducing the pressure

⚠ WARNING

Pressurized valve! Risk of injury in case of incorrect setting if the adjustment is screwed out against the internal stop!
Risk of injury from leaking oil or components.
- ▶ It must be possible to rotate the adjustment smoothly.
- ▶ Only screw the adjustment device out of the valve to the maximum value of dimension "L". For the maximum value, please refer to table 5 in chapter 2.3 "Pressure relief valve in a pressure-relieved condition".
- ▶ Also observe the safety instruction on page 10.

The pressure setting at type tested safety valves of type "H" with hand wheel or rotary knob may only be reduced to a value less than that indicated on the type key.

DBDH E - Valve with hand wheel or rotary knob

1. Loosen the lock nut at the safety valve.
2. Slowly turn out the hand wheel counterclockwise until the pressure has been reduced to approx. 90 % of the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
3. Slowly turn in the hand wheel clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
4. Fix the setting by tightening the lock nut by means of a manual torque wrench.

   The pressure has been set.

2.5.2 Increasing the pressure

The pressure setting at type tested safety valves of type "H" with hand wheel or rotary knob may maximally be increased to the value indicated in the type key.

DBDH E - Valve with hand wheel or rotary knob

1. Loosen the lock nut at the safety valve.
2. Slowly turn the hand wheel clockwise until the pressure has been increased to the desired value. While doing so, observe the pressure gauge at the measuring equipment in the "P" line.
3. Fix the setting by tightening the lock nut by means of a manual torque wrench.

   The pressure has been set.

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