RE 25 818/08.03
Replaces: 03.03

Pressure relief valve, pilot operated, Type DB(W)...W65

Nominal sizes 10 and 25
Series 1X, 4X
Max. operating pressure 350 bar
Max. flow 400 L/min

Overview of contents

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</table>

Features

- For subplate mounting
  Porting pattern to DIN 24 340 form E,
  ISO 6264 -AR-06-2-A (NS 10),
  ISO 6264 -AR-08-2-A (NS 25)
  and CETOP-RP 121 H,
  Subplates to catalogue sheet RE 45 065
  (separate order)

- For threaded connections
- As a cartridge valve
- 4 adjustment elements:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- 5 pressure stages
- Solenoid operated unloading via a built-on directional valve
  (only with threaded connections)

Note:
Design tested pressure relief valves to pressure component directive 97/23/EG (abbreviated to DGRL in any further text) type DB 20 K../..E, series 1X, for ordering details see page 3.
Ordering details

Pressure relief valve = DB
Without directional valve = No code
With built-on directional valve = W

NS  Subplate Ordering details  Threaded Cartridge
mounting  „G“  „K“
10 = 10  = 10 (G 1/2)  = 10  = W 1)
25 = 15 (G 3/4)  = 20  = 20 (G 1)  = 20

![Diagram] Normally closed = A 2)

![Diagram] Normally open = B 2)

For subplate mounting  = –
For threaded connections  = G
As a cartridge valve (cartridge)  = K

Adjustment element
Rotary knob  = 1
Sleeve with hexagon and protective cap  = 2
Lockable rotary knob with scale  = 3 3)
Rotary knob with scale  = 7
Series 10 to 19 (only version "K")  = 1X
(10 to 19: unchanged installation and connection dimensions)
Series 40 to 49  = 4X
(40 to 49: unchanged installation and connection dimensions)
Settable pressure up to 50 bar  = 50
Settable pressure up to 100 bar  = 100
Settable pressure up to 200 bar  = 200
Settable pressure up to 315 bar  = 315
Settable pressure up to 350 bar (only version DB)  = 350

Pilot oil supply and pilot oil drain
Internal pilot oil supply and pilot oil drain  = – 5)
External pilot oil supply, internal pilot oil drain  Also see  = X
Internal pilot oil supply, external pilot oil drain  symbols  = Y
External pilot oil supply and pilot oil drain  on page 4  = XY

Further details  in clear text

Design tested:
No code= Without
E = Safety valve with
design testing
to DGRL 97/23/EG
W65 = Vertical cartridge
(ordering details
are not required for
cartridge valve "K")

No code = NBR seals
V = FKM seals
(other seals on request)

⚠️ Attention!
The compatibility of the
seals and pressure fluid
has to be taken into account!

Electrical connection 2)
K4 2) = Without plug-in connector
Individual connection with
component plug DIN EN 175 301-803
N 2) = With hand override
N9 2) = With protected hand override
G24 2) = 24 V DC
W230 2) = 230 V AC 50/60 Hz
No code = Without directional valve
6E 2) = With directional valve N5 6
No code = U 4) = Lowest circulation pressure
See characteristic curves on page 7

1) Only for valve with threaded connections
2) Only version DBW..G..
3) H-key to Material No. R900008158
   is included within the scope of supply
4) Version "U" is not suitable for a
cross-relief function!
5) Hyphen „-“ only required for DBW..G..
   without stating details regarding X, Y, XY, and U.
6) Plug-in connectors must be ordered separately
   (see page 6).

⚠️ Attention!
When ordering spare cartridges for subplate mounting or
threaded connection housings NS 10 and 25 always
order type DB 20 K.-1X/..XY!
Design tested safety valves are only available for
type DB 20 K.-1X/..YE!

Preferred types, see page 12,
are readily available!
Ordering details for design tested pressure relief valves type DB..K../..E, series 1X

Design tested to directive 97/23/EG (pressure component directive)

<table>
<thead>
<tr>
<th>NS</th>
<th>Designation</th>
<th>Component identification</th>
<th>Max. permissible flow $q_{\text{max}}$ in L/min</th>
<th>Set response over pressure $p$ in bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>DB 20 K 1−1X/ 2 Y 3 E</td>
<td>TÜV.SV.−1001.14,A.F.G.p</td>
<td>70</td>
<td>30 to 60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>61 to 110</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>150</td>
<td>111 to 210</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>211 to 315</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>316 to 350</td>
</tr>
</tbody>
</table>

1. Adjustment element hand wheel
   (sealed pressure adjuster, unloading or adjustments in the lower settable range is possible!)
   = 1

2. Adjustment element with sealed protective cap
   (no adjustment or unloading is possible)
   = 2

   The pressure details contained within the type code are to be entered by the customer e.g. = 150
   Pressure adjustments ≥ 30 bar and in 5 bar steps are possible.

3. NBR seals
   = No code
   FKM seals
   = V

Details are completed by the factory

Safety guidelines for design tested safety valves type DB..K../..E, series 1X to the pressure component directive DGRL 97/23/EG

- Before ordering a design tested pressure relief valve, checks have to be carried out to ensure that at the required response pressure $p$, the maximum permissible flow $q_{\text{max}}$ (= numerical value in the place of the “G” within the component identification) of the safety valve is greater than the maximum possible flow from the system. The appropriate regulations must be taken into account!

- In accordance to DGRL 97/23/EG the system pressure must not increase, due to the flow, by more than 10% of the set response pressure (see component identification).
  - The maximum permissible flow stated within the component identification must not be exceeded.
  - The return lines from safety valves must vent in a safe manner. Fluid must not be able to gather in a venting system (see the AD2000 -A2 information sheet).

Application notes must be taken into account!

- The response value stated within the component identification is set in the manufacturing plant with a flow of 2 L/min.
- The maximum permissible flow stated within the component identification is valid for:
  - Pilot oil return “external” (= Y in the order code) without back pressure in the pilot oil return line Y, the permissible back pressure in the return line (port T) < 10 bar
  - The removal of the seal from a safety valve invalidates the DGRL approval
  - Cavities (see page 11): Drilling „XY” without port X
- The requirements of the pressure component directive and the AD2000-A2 information sheet must be taken into account!
Function, section

Types DB and DBW valves are pilot operated pressure relief valves of cartridge design. They are used for limiting (DB) or limiting and solenoid operated unloading (DBW only with threaded connections) of an operating pressure.

The valves basically consists of the housing (1) and a pressure control valve cartridge (2).

The pressure present in port P acts on the spool (3). At the same time pressure is applied to poppet (6) via orifice drillings (4 and 5). When the pressure port P exceeds the force set on the spring (7), the poppet (6) opens against the spring (7).

Pressure fluid can now flow from port P via the orifice drillings (4 and 5) into the spring chamber (8). From here the fluid is led internally, with type DB...-4X/... , via control passages (9 and 10) or externally, with type DB...-4X/...Y... , via control passages (9 and 11) to the tank.

Due to the balanced condition at the poppet (3) pressure fluid flows from port P to port T, while maintaining the set operating pressure.

A pressure gauge connection (12) allows the operating pressure to be monitored.

The pressure relief valve can be unloaded or switched over to another pressure value (second pressure stage) via port “X” (13).

Pressure relief valve type DBW (only threaded connections)

In principle, the function of this valve corresponds to that of the valve type DB.

Unloading of the main poppet is achieved by controlling the built-on directional valve.

Symbols

<table>
<thead>
<tr>
<th>Type DB...–...</th>
<th>Type DB...X...</th>
<th>Type DB...Y...</th>
<th>Type DB...XY...</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type DBW...–...</th>
<th>Type DBW...X...</th>
<th>Type DBW...Y...</th>
<th>Type DBW...XY...</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normally closed</th>
<th>Normally closed</th>
<th>Normally closed</th>
<th>Normally closed</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image9" alt="Diagram" /></td>
<td><img src="image10" alt="Diagram" /></td>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normally open</th>
<th>Normally open</th>
<th>Normally open</th>
<th>Normally open</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
<td><img src="image15" alt="Diagram" /></td>
<td><img src="image16" alt="Diagram" /></td>
</tr>
</tbody>
</table>
### Technical data

(For applications outside these parameters, please consult us!)

#### General

<table>
<thead>
<tr>
<th>Installation</th>
<th>Optional</th>
</tr>
</thead>
</table>

#### Ambient temperature range

<table>
<thead>
<tr>
<th>Type DB.. °C</th>
<th>–30 to +80 (NBR seals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type DBW..G.. °C</td>
<td>–30 to +50 (NBR seals)</td>
</tr>
</tbody>
</table>

| Type DBW..G.. °C | –15 to +50 (FKM seals) |

#### The minimum housing material strength

Housing materials are to be so selected that adequate safety is ensured for all conceivable operating pressures (e.g. with reference to the compressive strength, thread strength and tightening torques).

#### Weight

<table>
<thead>
<tr>
<th>Weight</th>
<th>NS 10</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subplate mounting kg</td>
<td>1.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Threaded connections Type DB.. kg</td>
<td>2.95</td>
<td>2.95</td>
</tr>
<tr>
<td>Type DBW.. kg</td>
<td>4.25</td>
<td>4.25</td>
</tr>
<tr>
<td>Cartridge valve (cartridge) kg</td>
<td>–</td>
<td>0.35</td>
</tr>
</tbody>
</table>

#### Directional valve technical data

See catalogue sheet RE 23 178

#### Hydraulic

(Measured with HLP 46, \( \vartheta_{\text{oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C} \))

| Max. operating pressure, Ports P, X bar | 350 |
| Port T bar | 315 |

| Max. back pressure: Port Y Type DB.. bar | 250 |
| Port Y (DBW..G../..Y) or port T (DBW..G../..) bar | 210 for a DC solenoid |
| | 160 for an AC solenoid |

| Settable pressure Min. bar | Dependent on \( q_v \), see characteristic curves on page 5 |
| Max. bar | Up to 50, Up to 100, Up to 200, Up to 315; (Up to 350 only version DB) |

| Maximum flow | NS 10 | 25 |
| Subplate mounting L/min | 200 | 400 |
| Threaded connections L/min | 150 (G 3/4); 300 (G 1) |

| Pressure fluid | Mineral oil (HL, HLP) to DIN 51 524 \(^1\); Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) \(^1\); HEPG (polyglycole) \(^2\); HEES (synthetic ester) \(^2\); other seals on request |

| Pressure fluid temperature range °C | –30 to +80 (NBR seals) |
| | –15 to +80 (FKM seals) |

| Viscosity range mm\(^2\)/s | 10 to 800 |

| ISO code cleanliness class | Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 class 20/18/15 \(^3\) |

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\(^1\) Suitable for NBR and FKM seals

\(^2\) Only suitable for FKM seals

\(^3\) The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.
**Deviating technical data** for design tested pressure relief valves ¹)

### Hydraulic

<table>
<thead>
<tr>
<th></th>
<th>Port Y</th>
<th>Port T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum back pressure</td>
<td>bar</td>
<td>bar</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum flow</td>
<td>See tables on page 3</td>
<td></td>
</tr>
<tr>
<td>Pressure fluid</td>
<td>Mineral oil (HL, HLP) to DIN 51 524 and DIN 51 525</td>
<td></td>
</tr>
<tr>
<td>Pressure fluid temperature range</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– 20 to + 60 (for NBR seals)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– 15 to + 60 (for FKM seals)</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity range</td>
<td>mm²/s</td>
<td>12 to 230</td>
</tr>
</tbody>
</table>

¹) For applications outside these parameters, please consult us!

### General guidelines

- The unloading function (directional valve function with DBW) must **not** be used for safety functions!
- With type DBW..4X/... the lowest settable pressure is set (circulation pressure) if the current fails or if there is a cable break. With type DBW..A..4X/... the pressure relief function is activated if the current fails or if there is a cable break.
- Any hydraulic back pressure in port T with an internal pilot oil drain (type DB/DBW../.. or port Y with an external pilot oil drain (type DB/DBW../..Y) are added 1:1 to the response pressure set at the pilot control of the valve.

**Example:**

The valve pressure setting resulting from the spring loading (Pos. 7 on page 4) in the pilot control valve/adjustment unit \( p_{spring} = 200 \) bar

Hydraulic back pressure in port T with internal pilot oil drain \( p_{hydraulic} = 50 \) bar

\[ p_{spring} + p_{hydraulic} = 250 \] bar

### Ordering details: plug-in connectors to DIN EN 175 301-803 and ISO 4400 for component plug "K4"

<table>
<thead>
<tr>
<th>Valve side</th>
<th>Colour</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Grey</td>
<td>R900074683</td>
</tr>
<tr>
<td>a/b</td>
<td>Black</td>
<td>R900057292</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R900313933</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R900310995</td>
</tr>
</tbody>
</table>
**Characteristic curves** (measured with HLP 46, $\vartheta_{\text{oil}} = 40^\circ \text{C} \pm 5^\circ \text{C})

These characteristic curves were measured with external pilot oil drain at zero pressure. With an internal pilot oil drain, the input pressure increases by the output pressure present in port T.

1) The characteristic curves are valid for an output pressure = zero over the entire flow range!

1 NS 10
2 NS 15 / NS 20
3 NS 20
Unit dimensions: subplate mounting (dimensions in mm)

1 Name plate
2 Port X for remote control (optional)
3 Port Y for external pilot oil drain
4 Adjustment element “1”
5 Adjustment element “2”
6 Adjustment element “3”
7 Adjustment element “7”
8 Locknut 22A/F
9 Hexagon 10A/F
10 Hexagon 30A/F
11 Space required to remove the key
12 Locating pin
13 Valve fixing holes
14 Pressure gauge connection
15 Identical seal rings for ports P and T
16 Seal ring for port X

Subplates to catalogue sheet RE 45 064 and valve fixing screws must be ordered separately.

Subplates
- G 545/01 (G 3/8)
- G 546/01 (G 1/2)
- G 565/01 (G 3/4)

Valve fixing screws
M12 x 50 DIN 912-10.9, \( M_A = 130 \) Nm

1° It is not permissible to use the stated subplates with design tested valves!
Unit dimensions: subplate mounting (dimensions in mm)

1 Name plate
2 Port X for remote control (optional)
3 Port Y for external pilot oil drain
4 Adjustment element “1”
5 Adjustment element “2”
6 Adjustment element “3”
7 Adjustment element “7”
8 Locknut 22A/F
9 Hexagon 10A/F
10 Hexagon 30A/F
   Tightening torque \( M_a = 50 \text{ Nm} \)
11 Space required to remove the key
12 Locating pin
13 Valve fixing screws
14 Pressure gauge connection
15 Identical seal rings for ports P and T
16 Seal ring for port X

Subplates to catalogue sheet RE 45 064 and valve fixing screws must be ordered separately.

Subplates
- G 408/01 (G 3/4) \(^1\)
- G 409/01 (G 1) \(^1\)

Valve fixing screws
- M16 x 50 DIN 912-10.9, \( M_a = 310 \text{ Nm} \)

\(^1\) It is not permissible to use the stated subplates with design tested valves!

Required surface finish of the mating piece
Unit dimensions: threaded connections (dimensions in mm)

<table>
<thead>
<tr>
<th>Valve type</th>
<th>D1</th>
<th>Ø D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB.10.G</td>
<td>G 1/2</td>
<td>34</td>
</tr>
<tr>
<td>DB.15.G</td>
<td>G 3/4</td>
<td>42</td>
</tr>
<tr>
<td>DB.20.G</td>
<td>G 1</td>
<td>47</td>
</tr>
</tbody>
</table>

1 Name plate
2 Port X (G 1/4; 12) for remote control
3 Port Y (G 1/4; 12) for external pilot oil drain
4 Adjustment element "1"
5 Adjustment element "2"
6 Adjustment element "3"
7 Adjustment element "7"
8 Locknut 22A/F
9 Hexagon 10A/F
10 Hexagon 30A/F
tightening torque $M_a = 50$ Nm
11 Space required to remove the key
13 Valve fixing holes
17 Set screws not required for version with internal pilot oil drain
18 Directional valve NS 6 (for dimensions see catalogue sheet RE 23 178)
19 Plug-in connector without circuitry 1)
20 Plug-in connector with circuitry 1)
21 Dim. for solenoid without hand overide „N”
22 Dim. for solenoid with hand override „N”
23 Dim. for hand override „N9”
   – The hand override can only be operated up to a tank pressure of approx. 50 bar.
   Avoid damage to the hand override pin bore!
24 Housing for version with built-on directional valve (DBW..G..)
25 Space required to remove the plug-in connector
26 Valve mounting surface port A is not drilled
27 Space required to remove the coil
28 Dim. for valve with a DC voltage
29 Dim. ( ) for a valve with an AC voltage

1) Must be ordered separately, see page 6
Unit dimensions: cartridge valve types DB 20 K...XY and Y (dimensions in mm)

Cartridge valve mounting cavity
Version “XY” and design tested valves DB 20 K../..Y.E (without X port)

33 Drilling X, Y and T optional about the circumference with type DB 20 K.-1X/..XY.
34 Depth of fit
35 Drilling Ø 2.5 only when required
36 Drilling P, optional
37 Port „X“ for design tested valves type DB 20 K../..Y.E must not be drilled, is without function!

1) Maximum dimensions
2) Deleted with type DB 20 K.-1X/..Y.

Cartridge valve mounting cavity
Version “Y” (internal pilot oil supply and pilot oil drain)

Y = √R₂ 8
Z = √R₂ 16
### Preferred types (readily available)

<table>
<thead>
<tr>
<th>Type</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB 20 K2-1X/50XY</td>
<td>R900470296</td>
</tr>
<tr>
<td>DB 20 K2-1X/100XY</td>
<td>R900470297</td>
</tr>
<tr>
<td>DB 20 K2-1X/200XY</td>
<td>R900470298</td>
</tr>
<tr>
<td>DB 20 K2-1X/315XY</td>
<td>R900493939</td>
</tr>
<tr>
<td>DB 10 G2-4X/50W65</td>
<td>R900403149</td>
</tr>
<tr>
<td>DB 10 G2-4X/100W65</td>
<td>R900405532</td>
</tr>
<tr>
<td>DB 10 G2-4X/200W65</td>
<td>R900404262</td>
</tr>
<tr>
<td>DB 10 G2-4X/315W65</td>
<td>R900441994</td>
</tr>
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<td>DB 10-2-4X/50W65</td>
<td>R900517879</td>
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<td>DB 10-2-4X/100W65</td>
<td>R900593404</td>
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<td>DB 10-2-4X/200W65</td>
<td>R90068564</td>
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<td>DB 10-2-4X/315W65</td>
<td>R900592765</td>
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<td>DB 10-2-4X/350W65</td>
<td>R900597122</td>
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<td>DB 20 G2-4X/50W65</td>
<td>R900479678</td>
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<td>DB 20 G2-4X/100W65</td>
<td>R900407106</td>
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<td>DB 20 G2-4X/200W65</td>
<td>R900401564</td>
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<td>DB 20 G2-4X/315W65</td>
<td>R900423704</td>
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<td>DB 20 G2-4X/350W65</td>
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<td>DB 20-2-4X/315XW65</td>
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<td>DB 20-2-4X/350W65</td>
<td>R900593586</td>
</tr>
</tbody>
</table>

Further preferred types and standard units can be found in the EPS (Standard Price list).