DRS/DRE/DRP/DRN
Common Connection Diagrams

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1 Overview

This document details common connection diagrams for DRS/DRE/DRP/DRN motors. This is not a replacement for the Operating Instructions. Always refer to the Operating Instructions for safety and installation information. Additional information for DR.. motors and “BE” brakes can be found at www.seweurodrive.com under the Technical Notes tab.

In many wiring diagrams, the brake voltage is tapped directly from the motor's terminal block. This design is advantageous because it does not require a separate voltage supply and extra wiring for the brake. The brake releases automatically when power is applied to the motor.

The brake may be wired to the motor terminal block if all of the following conditions are true:
- The motor is single speed
- The motor receives power directly across the line (without an inverter)
- The brake voltage is equal to either the low or high motor voltage

The brake must be powered separately if one or more of the following conditions are true:
- The brake voltage does not equal the low or high motor voltage
- The motor is powered by an inverter
- The application requires electronic soft start
2 Important Notes

2.1 Safety notes

Refer to the Operating Instructions for safety and installation information. The latest version can be found at www.seweurodrive.com.

Installation, startup and service work may be performed only by trained personnel observing applicable accident prevention regulations and operating instructions.

2.2 Motor nameplate – DRS/DRE/DRP

Refer to the motor nameplate for the motor data. Some of the important fields related to the connection are listed below.

![Motor Nameplate Diagram]


[2] **Connection Type** - Lists the basic type of connection indicating the type of internal motor windings, Δ, ΔΔ, Y, YY. Example: R76. This value may also be followed by a series of letters and/or numbers.

[3] **Brake Voltage** - Lists the brake voltage required to operate the brake. Example: 460V.

[4] **Brake Control** - Lists the brake control type. Example: BG, BGE, BSR, etc. These maybe followed by additional characters.
2.3 Motor nameplate – DRN

Refer to the motor nameplate for information that describes the motor data. Some of the important fields related to the connection are listed below.

![Motor nameplate image]

**[1]** **Unit serial number** – Enter this information in the blank fields of the SO# (Serial Number) Data application located on the USA website. From the resultant information displayed, find the **Connection Type** (R76, R72, or R13) of the motor.

**[2]** **Motor Voltage** – The connection voltage(s) and the winding configuration (Y, YY, Δ, ΔΔ).

**[3]** **Brake Voltage** – Lists the brake voltage required to operate the brake.

**[4]** **Brake Control** – Lists the brake control type. Example: BG, BGE, BSR, etc. These maybe followed by additional characters. This designation will be needed to determine the correct brake wiring diagram in the following sections of this guide.
2.4 Brake Control

SEW brakes are available for either normal or rapid starting. In addition, they may be wired for either normal or rapid stopping.

2.4.1 Normal Starting (BG)

The BG rectifier provides normal starting, which is sufficient for most applications with low or infrequent cycling.

2.4.2 Rapid Starting (BGE)

Rapid starting is usually desired for high-cycling applications. Rapid starting requires the brake coil to energize as quickly as possible to release the brake pad and to allow the motor to rotate. The internal circuitry of a BGE rectifier provides a stronger magnetic field than a BG rectifier during the first 120ms. Therefore, a BGE releases the brake faster than a BG.

2.4.3 Rapid Stopping

Rapid stopping, also known as rapid reaction, requires the brake coil to de-energize as quickly as possible so that the brake pad/springs can engage to stop the motor. By providing a circuit of least resistance, the brake energy is able to flow quickly to de-energize the coil.

There are three ways to achieve rapid stopping:

1. An auxiliary contact. The customer has to supply additional wiring and a motor starter that contains an extra contact.

2. An SR relay. Available from SEW, the SR relay mounts directly to the motor’s conduit box and receives power from the motor terminals. It reacts automatically when it senses zero motor current. It also saves money because there is no need for an extra contact or extra wiring.

3. A UR relay. Available from SEW, the UR relay mounts directly to the motor’s conduit box. It reacts automatically when it senses zero voltage. However, it requires a separate voltage supply. Therefore, it cannot be connected to the motor terminals.

Although an SR relay resembles and functions like a UR relay, they are not interchangeable! Incorrectly wiring a UR relay by attaching it to motor terminals in a hoisting application may yield a considerably large stopping distance. Since a UR relay senses voltage, it detects positive voltage (instead of zero voltage) in the downward direction when the motor acts as a generator. Hence, the UR relay does not function properly.

2.4.4 Rapid Starting & Rapid Stopping (BSR or BUR)

In many applications, the customer desires both rapid starting and rapid stopping. SEW offers the following:

BSR control system – a combination of the BGE rectifier and SR relay

BUR control system – a combination of the BGE rectifier and UR relay
2.5 Wire and ring terminal specifications

2.5.1 BG or BGE

When connecting the supply power from the motor terminal block to the brake rectifier, follow the specifications below.

Connecting wire should be AWG14, MTW, 600V, 105°C temperature rating and black color.

The recommended ring terminals are manufactured by Thomas & Betts or equivalent. Follow the manufacturer's recommendations for installation procedures.

<table>
<thead>
<tr>
<th>DR Motor Frame Size</th>
<th>Wire Length</th>
<th>Thomas &amp; Betts Ring Terminal</th>
<th>Thomas &amp; Betts Crimp Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR.71-100</td>
<td></td>
<td>RB14-8</td>
<td></td>
</tr>
<tr>
<td>DR.112-132</td>
<td></td>
<td>RB14-10</td>
<td></td>
</tr>
<tr>
<td>DR.160</td>
<td>10</td>
<td>RB 14-14</td>
<td></td>
</tr>
<tr>
<td>DR.180-225</td>
<td>12</td>
<td>RB 14-516</td>
<td></td>
</tr>
</tbody>
</table>

2.5.2 BSR (R76 only)

When connecting the jumper wire between the 2-pole terminal block for the SR relay and the motor terminal block, follow the specifications below.

Connecting wire is to be MTW, 600V, 105°C temperature rating and black color. Maximum length 8", trimmed to fit.

The recommended ring terminals are manufactured by Thomas & Betts or equivalent. Follow the manufacturer's recommendations for installation procedures.

<table>
<thead>
<tr>
<th>DR Motor Frame Size</th>
<th>AWG</th>
<th>Thomas &amp; Betts Ring Terminal</th>
<th>Thomas &amp; Betts Crimp Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR.71-100</td>
<td>14</td>
<td>RB14-8</td>
<td></td>
</tr>
<tr>
<td>DR.112-132</td>
<td>14</td>
<td>RB14-10</td>
<td></td>
</tr>
<tr>
<td>DR.160</td>
<td>12</td>
<td>RB 10-14</td>
<td></td>
</tr>
</tbody>
</table>
3 R76 Connection

Single Speed, Dual Voltage
Example Voltage: 230V Y Y / 460V Y

**Low Voltage**

![Low Voltage Diagram](image)

**High Voltage**

![High Voltage Diagram](image)

Example: 230V

Example: 460V

**Arrangement of terminal links for Y Y connection**

- [1] Terminal link
- [2] Terminalstud
- [3] Flange nut

**No terminal links required for Y connection**

- [4] Terminal board
- [5] Voltage supply (Customer connection)

**VOLTAGE CHANGE**

Three wires must be relocated and terminal links added to change from high to low voltage.

The wires designated U3 (T7), V3 (T8) and W3 (T9) must be reconnected and terminal links added as shown in the diagram.

Changing from low to high voltage is carried out in reverse order.

In both cases, the supply voltage is connected to U1 (T1), V1 (T2) and W1 (T3). The direction of rotation is changed by exchanging two wires.
3.1 BG or BGE

3.1.1 Motor = low / Brake = low

Brake Control = BG or BGE
Example = 230V YY / 460 Y
Motor = 230V YY
Brake = 230V

Normal Reaction (Stopping):

Rapid Reaction (Stopping):

[1] Motor terminal board
[2] Brake coil
[3] Customer-supplied contacts
[4] Brake supply voltage

BU – blue
RD – red
WH – white
3.1.2 Motor = high / Brake = low

Brake Control = BG or BGE

Example = 230V Y Y / 460 Y

Motor = 460V Y
Brake = 230V

Normal Reaction (Stopping):

Rapid Reaction (Stopping):

[1] Motor terminal board
[2] Brake coil
[3] Customer-supplied contacts
[4] Brake supply voltage

BU – blue  RD – red  WH – white
3.1.3 Motor = high / Brake = high

Brake Control = BG or BGE
Example = 230V Y / 460 Y
Motor = 460V Y
Brake = 460V

Normal Reaction (Stopping):

Rapid Reaction (Stopping):

[1] Motor terminal board
[2] Brake coil
[3] Customer supplied contacts
[4] Brake supply voltage

BU – blue  RD – red  WH – white
3.2  BSR

3.2.1  Motor = low / Brake = low

Brake Control = BSR

Example = 230V \( \uparrow \uparrow \uparrow / 460 \uparrow \uparrow \uparrow \\
Motor = 230V \( \uparrow \uparrow \uparrow \\
Brake = 230V

*) See section 2.5.2


BU - blue  RD - red  WH - white
3.2.2 Motor = high / Brake = low

Brake Control = BSR
Example = 230V ☐ ☐ / 460 ☐
Motor = 460V ☐
Brake = 230V

Example: 460V

See section 2.5.2

[1] Motor terminal board
[2] Brake coil
[4] Brake supply voltage
[5] Auxiliary terminal strip
[6] Wire end from stator winding

BU - blue  RD - red  WH - white
3.2.3 Motor = high / Brake = high

Brake Control = BSR
Example = 230V ⋆ ⋆ / 460 ⋆
Motor = 460V ⋆
Brake = 460V

*) See section 2.5.2

[1] Motor terminal board
[2] Brake coil
[4] Brake supply voltage
[5] Auxiliary terminal strip
[6] Wire end from stator winding

BU - blue   RD - red   WH - white
4 R72 Connection

Single Speed, Dual Voltage
Example Voltage: 230V ΔΔ / 460V Δ

Low voltage

High voltage

Example: 230V

Example: 460V

[1] Terminal link
[2] Terminal stud
[3] Flange nut
4.1 BG or BGE

4.1.1 Motor = high / Brake = low

Brake Control = BG or BGE
Example = 230V ΔΔ / 460 Δ
Motor = 460V Δ
Brake = 230V

Normal Reaction (Stopping):

![Normal Reaction Diagram]

Rapid Reaction (Stopping):

![Rapid Reaction Diagram]

[1] Motor terminal board
[2] Brake coil
[3] Customer-supplied contacts
[4] Brake supply voltage

BU – blue
RD – red
WH – white
4.1.2 Motor = high / Brake = high

Brake Control = BG or BGE

Example = 230V ∆∆ / 460 Δ

Motor = 460V ∆
Brake = 460V

Normal Reaction (Stopping):

Rapid Reaction (Stopping):

[1] Motor terminal board
[2] Brake coil
[3] Customer-supplied contacts
[4] Brake supply voltage

BU – blue
RD – red
WH – white
4.2 BSR

4.2.1 Motor = high / Brake = low

Brake Control = BSR
Example = 230V ΔΔ / 460 Δ
Motor = 460V Δ
Brake = 230V

Example: 460V

[1] Motor terminal board
[2] Brake coil

BU – blue  RD – red  WH – white
4.2.2 Motor = high / Brake = high

Brake Control = BSR

Example = 230V ΔΔ / 460 Δ

Motor = 460V Δ
Brake = 460V

Example: 460V

[1] Motor terminal board
[2] Brake coil

BU – blue  RD – red  WH – white
5 R13 Connection

Single Speed, Dual Voltage

Example voltages:

<table>
<thead>
<tr>
<th>Low voltage Δ</th>
<th>High voltage Γ</th>
</tr>
</thead>
<tbody>
<tr>
<td>208V</td>
<td>360V</td>
</tr>
<tr>
<td>220V</td>
<td>380V</td>
</tr>
<tr>
<td>230V</td>
<td>400V</td>
</tr>
<tr>
<td>266V</td>
<td>460V</td>
</tr>
<tr>
<td>330V</td>
<td>575V</td>
</tr>
</tbody>
</table>

[1] Terminal link
[2] Terminal stud
[3] Flange nut
5.1 BG or BGE

5.1.1 Motor = low / Brake = low

Brake Control = BG or BGE
Example = 230V Δ / 400V Γ
Motor = 230V Δ
Brake = 230V

Normal Reaction (Stopping):

Rapid Reaction (Stopping):


BU – blue  RD – red  WH – white
5.1.2 Motor = high / Brake = low

Brake Control = BG or BGE
Example = 330V Δ / 575V Ｇ
Motor = 575V Ｇ
Brake = 330V

Normal Reaction (Stopping):

[Diagram showing connection diagram for normal reaction]

Rapid Reaction (Stopping):

[Diagram showing connection diagram for rapid reaction]


BU – blue  RD – red  WH – white
5.1.3 Motor = high / Brake = high

Brake Control = BG or BGE
Example = 266V Δ / 460V Υ
Motor = 460V Υ
Brake = 460V

Normal Reaction (Stopping):

| [1] | Motor terminal board |
| [2] | Brake coil |
| [3] | Customer supplied contacts |
| [4] | Brake supply voltage |

BU – blue  RD – red  WH – white
5.2 BSR

5.2.1 Motor = low / Brake = low

Brake Control = BSR
Example = 230V Δ / 400V Υ
Motor = 230V Δ
Brake = 230V

[1] Motor terminal board
[2] Brake Coil

BU – blue
RD – red
WH – white
5.2.2 Motor = high / Brake = low

Brake Control = BSR
Example = 330V Δ / 575V Υ
Motor = 575V Υ
Brake = 330V

[1] Motor terminal board
[2] Brake Coil

BU – blue    RD – red    WH – white
5.2.3 Motor = high / Brake = high

Brake Control = BSR
Example = 266V Δ / 460V Υ
Motor = 460V Υ
Brake = 460V

[1] Motor terminal board
[2] Brake Coil

BU – blue      RD – red      WH – white
6 BSG / BUR

Brake control system BSG

Brake control system BUR

Connecting to the terminal board of the motor is not permitted.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[1]</td>
<td>Brake coil</td>
</tr>
<tr>
<td></td>
<td>BK = UR15 (150-500V)</td>
</tr>
<tr>
<td>[4]</td>
<td>Brake voltage supply</td>
</tr>
</tbody>
</table>

BU - blue   RD - red   WH - white
BK - black   BN - brown