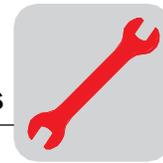


**DRS/DRE/DRP/DRN**  
**Common Connection Diagrams**



<b>1</b>	<b>OVERVIEW .....</b>	<b>3</b>
<b>2</b>	<b>IMPORTANT NOTES .....</b>	<b>4</b>
2.1	Safety notes .....	4
2.2	Motor nameplate – DRS/DRE/DRP .....	4
2.3	Motor nameplate – DRN .....	5
2.4	Brake Control .....	6
2.4.1	Normal Starting (BG) .....	6
2.4.2	Rapid Starting (BGE) .....	6
2.4.3	Rapid Stopping.....	6
2.4.4	Rapid Starting & Rapid Stopping (BSR or BUR) .....	6
2.5	Wire and ring terminal specifications .....	7
2.5.1	BG or BGE .....	7
2.5.2	BSR (R76 only) .....	7
<b>3</b>	<b>R76 CONNECTION .....</b>	<b>8</b>
3.1	BG or BGE .....	9
3.1.1	Motor = low / Brake = low .....	9
3.1.2	Motor = high / Brake = low .....	10
3.1.3	Motor = high / Brake = high.....	11
3.2	BSR.....	12
3.2.1	Motor = low / Brake = low .....	12
3.2.2	Motor = high / Brake = low .....	13
3.2.3	Motor = high / Brake = high.....	14
<b>4</b>	<b>R72 CONNECTION .....</b>	<b>15</b>
4.1	BG or BGE .....	16
4.1.1	Motor = high / Brake = low .....	16
4.1.2	Motor = high / Brake = high.....	17
4.2	BSR.....	18
4.2.1	Motor = high / Brake = low .....	18
4.2.2	Motor = high / Brake = high.....	19
<b>5</b>	<b>R13 CONNECTION .....</b>	<b>20</b>
5.1	BG or BGE .....	21
5.1.1	Motor = low / Brake = low .....	21
5.1.2	Motor = high / Brake = low .....	22
5.1.3	Motor = high / Brake = high.....	23
5.2	BSR.....	24
5.2.1	Motor = low / Brake = low .....	24
5.2.2	Motor = high / Brake = low .....	25
5.2.3	Motor = high / Brake = high.....	26
<b>6</b>	<b>BSG / BUR .....</b>	<b>27</b>





## 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](http://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



## Important Notes

## 2 Important Notes

### 2.1 Safety notes

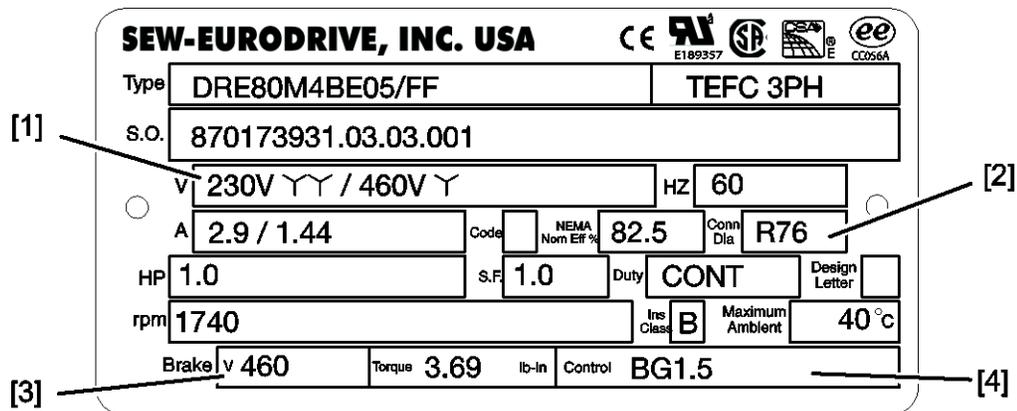


Refer to the Operating Instructions for safety and installation information. The latest version can be found at [www.seweurodrive.com](http://www.seweurodrive.com).

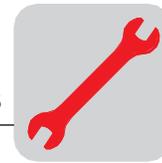
Installation, startup and service work may be performed only by trained personnel observing applicable accident prevention regulations and operating instructions.

### 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.



- [1] **Motor Voltage** - Lists the motor voltage and configuration. Example: 230V YY, 460V Y.
- [2] **Connection Type** - Lists the basic type of connection indicating the type of internal motor windings,  $\Delta$ ,  $\Delta\Delta$ , 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.

SEW-EURODRIVE		E189357 CC08&A		CE		MCI170003		SP US	
SEW-EURODRIVE INC, USA						EnergyVerified			
K47 DRN90L4/BE2HR									
[1]	87.7417860001.0001.17.60			Inverter duty VPWM		3ph.IEC60034			
	Hz 60	rpm 1767/60	V 230/460 YY/Y						[2]
	hp 2.0 S1	A 6.0/3.0		Nom.Eff% 86.5 IE3					
	Duty Cont.S1	P.F. 0.7	S.F. 1.15	IP 54	TEFC				
	Th.Cl. 155 (F)	Design NEMA A		K.VA-Code M					
	CT 300-1800 rpm			ML 88					
	i 29.32 lb-in 2120	MtgPos M1B		Vbr 230 AC				[3]	
	CLP220 Miner.Oil/ 0.8 l			lb-in 177					
	lb 101.014	AMB °C -20..40	188 573 1EN		BG1.5				[4]

- [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.



## Important Notes

---

### 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.



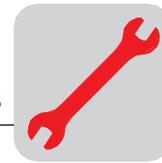
Although an SR relay resembles and functions like a UR relay, they are not interchangeable! Incorrectly wiring a UR relay by attaching it to motor terminals in a hoisting application may yield a considerably large stopping distance. Since a UR relay senses voltage, it detects positive voltage (instead 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.

DR Motor Frame Size	Wire Length	Thomas & Betts Ring Terminal	Thomas & Betts Crimp Tool
DR.71-100		RB14-8	WT2000
DR.112-132		RB14-10	
DR.160	10	RB 14-14	
DR.180-225	12	RB 14-516	

### 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.

DR Motor Frame Size	AWG	Thomas & Betts Ring Terminal	Thomas & Betts Crimp Tool
DR.71-100	14	RB14-8	WT2000
DR.112-132	14	RB14-10	
DR.160	12	RB 10-14	

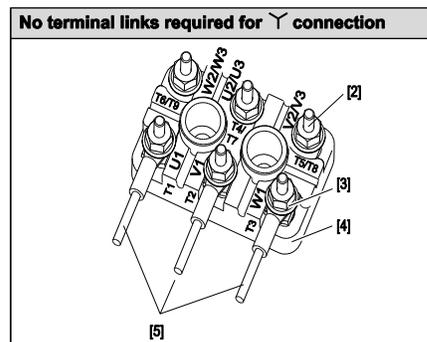
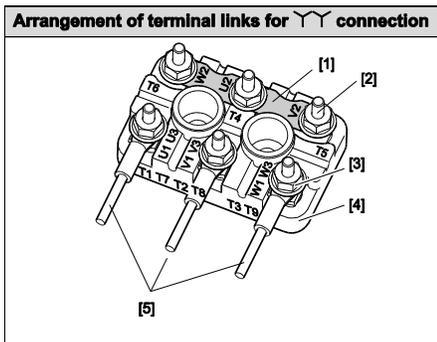
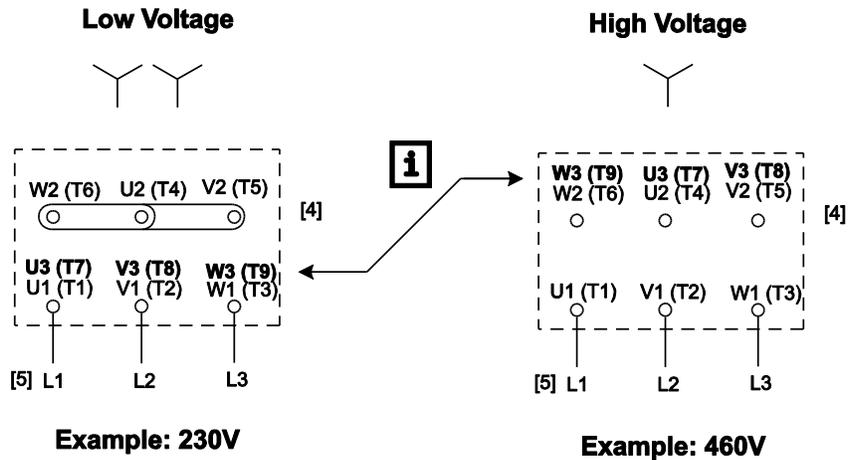


R76

### 3 R76 Connection

Single Speed, Dual Voltage

Example Voltage: 230V  $\text{Y}\text{Y}$  / 460V  $\text{Y}$



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

- [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

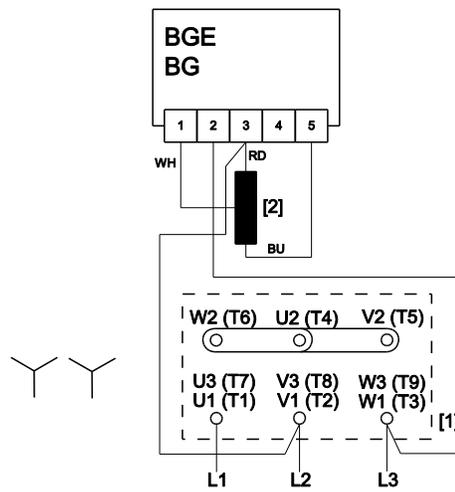
Brake Control = BG or BGE

Example = 230V YY / 460 Y

Motor = 230V YY

Brake = 230V

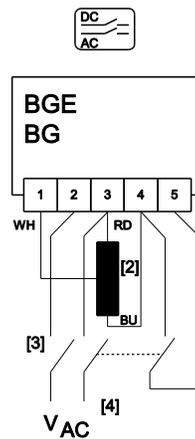
#### Normal Reaction (Stopping):



Example: 230V

R76H\_US

#### Rapid Reaction (Stopping):



69 001 XX 06 01 00

[1] Motor terminal board

[3] Customer-supplied contacts

[2] Brake coil

[4] Brake supply voltage

BU – blue

RD – red

WH – white



# R76

## 3.1.2 Motor = high / Brake = low

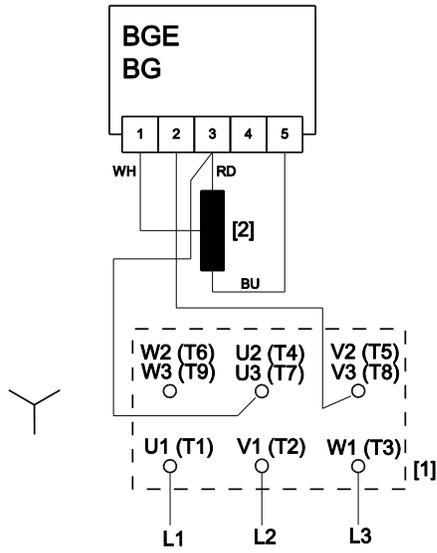
Brake Control = BG or BGE

Example = 230V YY / 460 Y

Motor = 460V Y

Brake = 230V

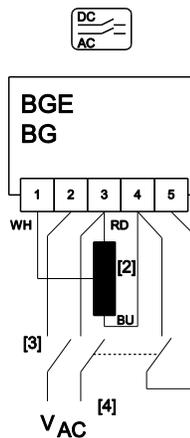
### Normal Reaction (Stopping):



Example: 460V

R76\_US

### Rapid Reaction (Stopping):



69 001 XX 06 01 00

[1] Motor terminal board

[3] Customer-supplied contacts

[2] Brake coil

[4] Brake supply voltage

BU – blue

RD – red

WH – white



### 3.1.3 Motor = high / Brake = high

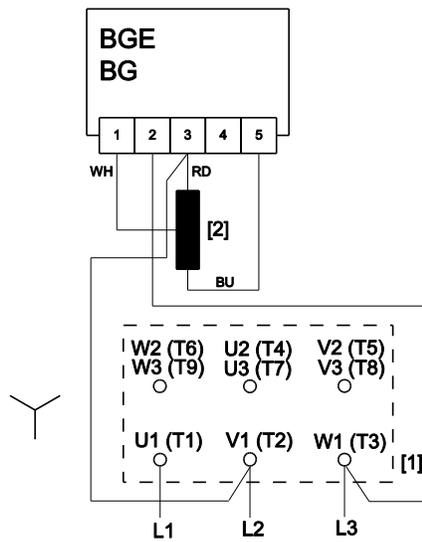
Brake Control = BG or BGE

Example = 230V YY / 460 Y

Motor = 460V Y

Brake = 460V

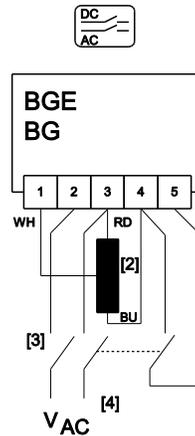
#### Normal Reaction (Stopping):



Example: 460V

R76J\_US

#### Rapid Reaction (Stopping):



69 001 XX 06 01 00

[1] Motor terminal board

[3] Customer supplied contacts

[2] Brake coil

[4] Brake supply voltage

BU – blue

RD – red

WH – white





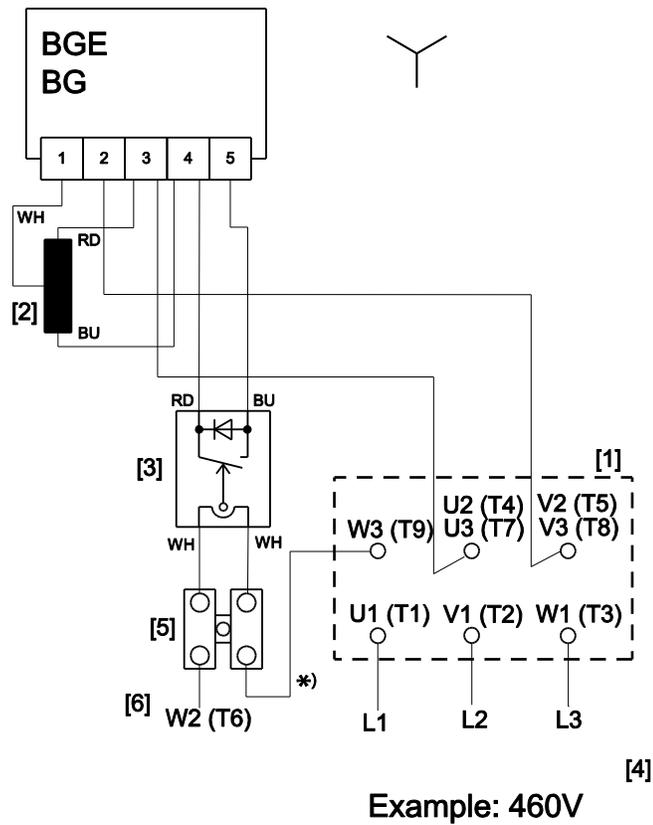
### 3.2.2 Motor = high / Brake = low

Brake Control = BSR

Example = 230V YY / 460 Y

Motor = 460V Y

Brake = 230V



R76D1\_US

\*) See section 2.5.2

[1] Motor terminal board

[4] Brake supply voltage

[2] Brake coil

[5] Auxiliary terminal strip

[3] SR11 / SR15 current relay

[6] Wire end from stator winding

BU - blue

RD - red

WH - white

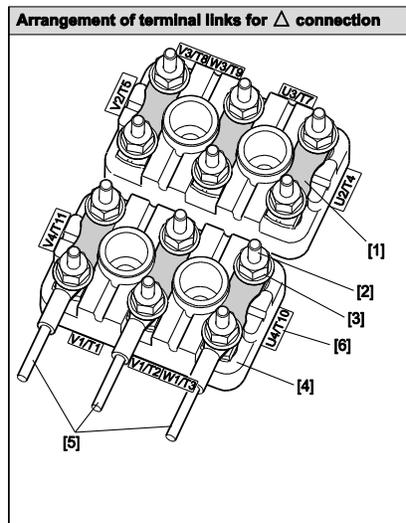
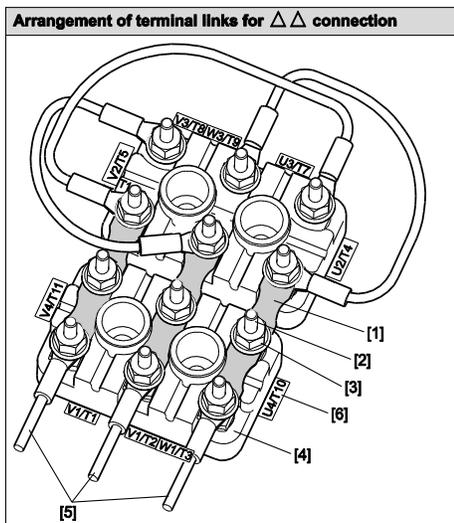
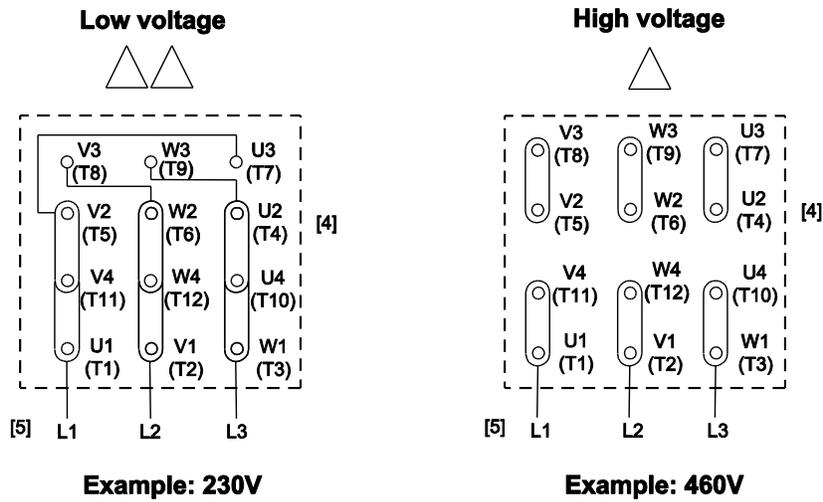




## 4 R72 Connection

Single Speed, Dual Voltage

Example Voltage: 230V  $\Delta\Delta$  / 460V  $\Delta$



R72\_US

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

- [4] Terminal board
- [5] Motor voltage supply
- [6] Wiring designation plate



# R72

## 4.1 BG or BGE

### 4.1.1 Motor = high / Brake = low

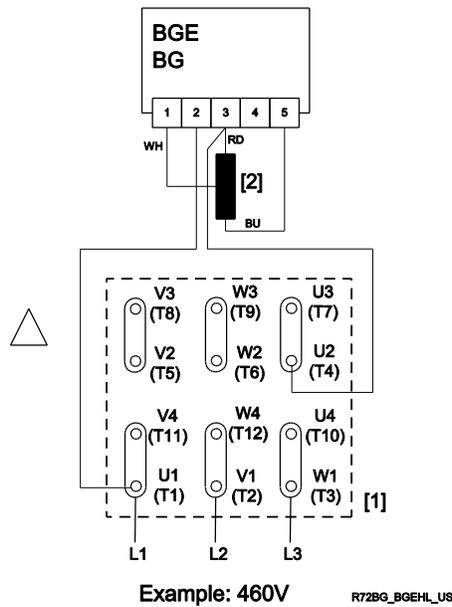
Brake Control = BG or BGE

Example = 230V ΔΔ / 460 Δ

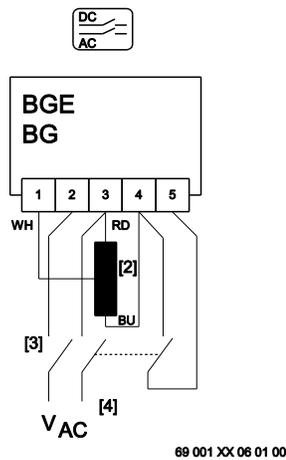
Motor = 460V Δ

Brake = 230V

#### Normal Reaction (Stopping):



#### Rapid Reaction (Stopping):



[1] Motor terminal board

[2] Brake coil

[3] Customer-supplied contacts

[4] Brake supply voltage

BU – blue

RD – red

WH – white



### 4.1.2 Motor = high / Brake = high

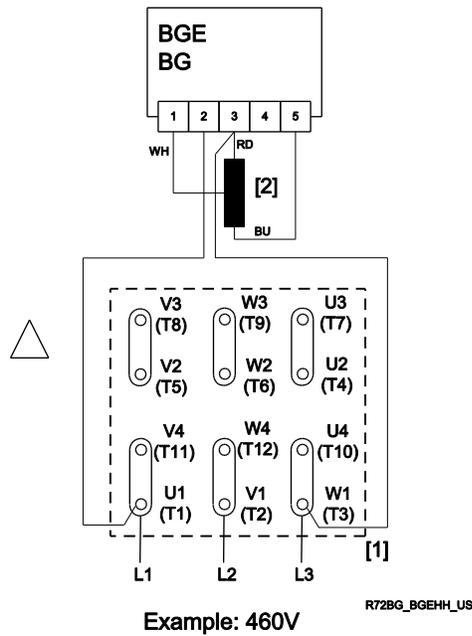
Brake Control = BG or BGE

Example = 230V ΔΔ / 460 Δ

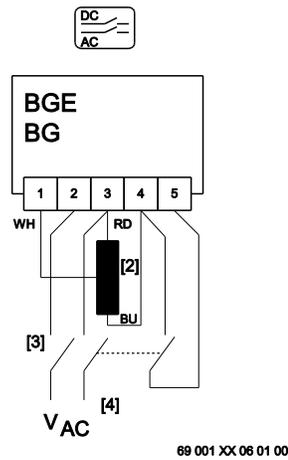
Motor = 460V Δ

Brake = 460V

#### Normal Reaction (Stopping):



#### Rapid Reaction (Stopping):



[1] Motor terminal board

[3] Customer-supplied contacts

[2] Brake coil

[4] Brake supply voltage

BU – blue

RD – red

WH – white



R72

## 4.2 BSR

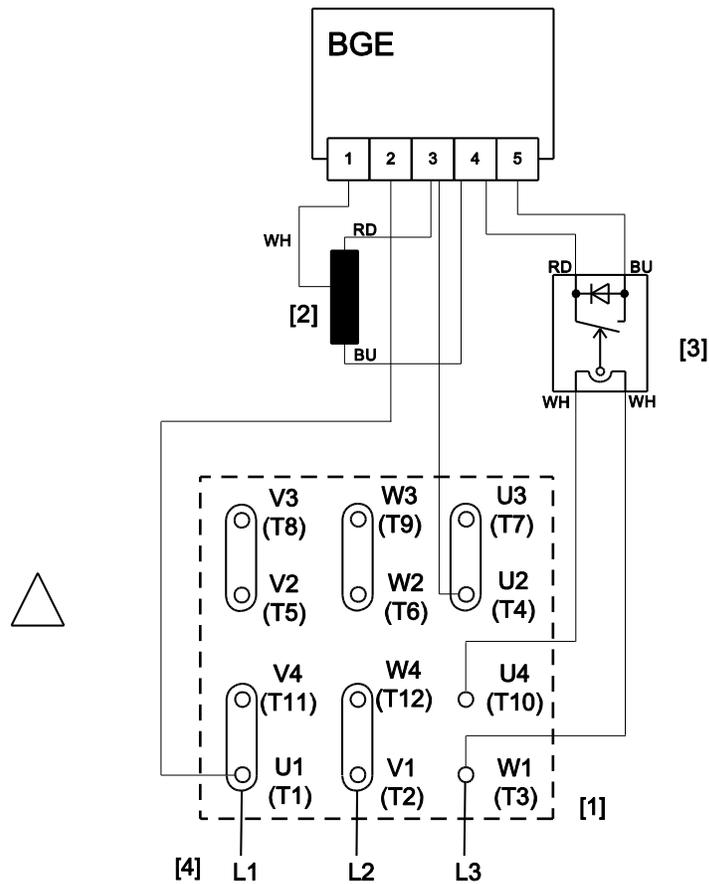
### 4.2.1 Motor = high / Brake = low

Brake Control = BSR

Example = 230V ΔΔ / 460 Δ

Motor = 460V Δ

Brake = 230V



Example: 460V

R72BSR\_HL\_US

- [1] Motor terminal board
- [2] Brake coil
- [3] SR11 / SR15 current relay
- [4] Motor supply voltage

BU – blue

RD – red

WH – white



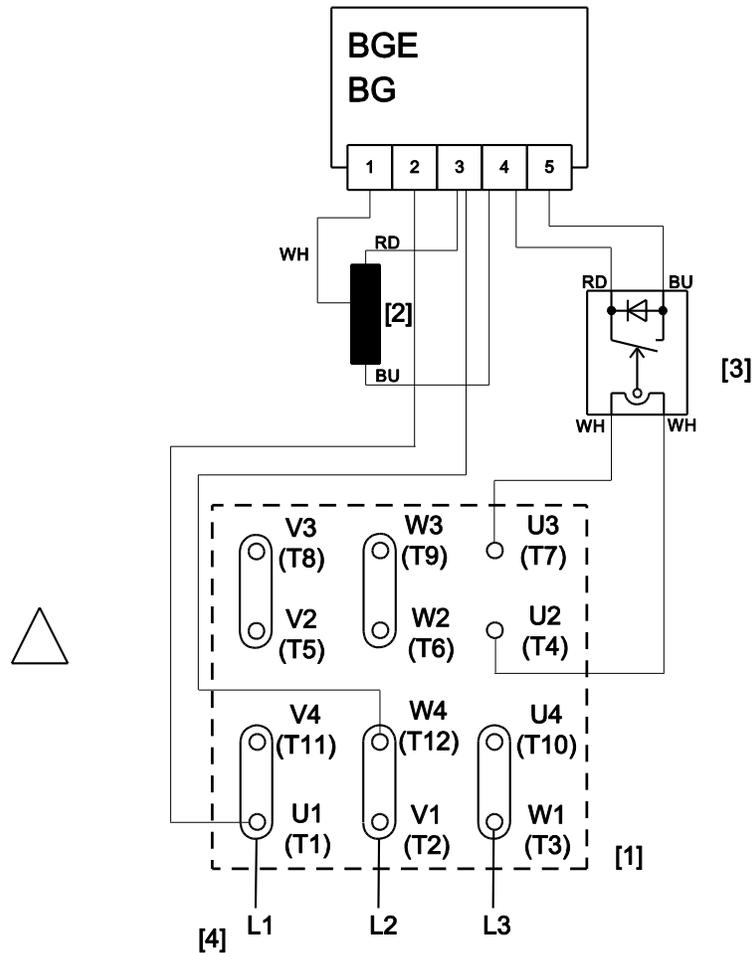
#### 4.2.2 Motor = high / Brake = high

Brake Control = BSR

Example = 230V  $\Delta\Delta$  / 460  $\Delta$

Motor = 460V  $\Delta$

Brake = 460V



Example: 460V

R72BSR\_HH\_US

- [1] Motor terminal board
- [2] Brake coil
- [3] SR11 / SR15 current relay
- [4] Motor supply voltage

BU – blue

RD – red

WH – white



# R13

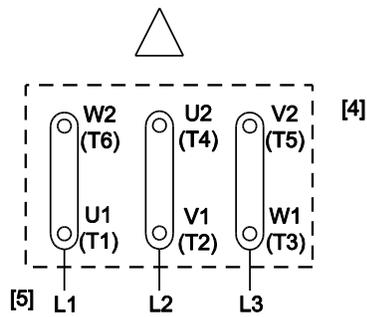
## 5 R13 Connection

Single Speed, Dual Voltage

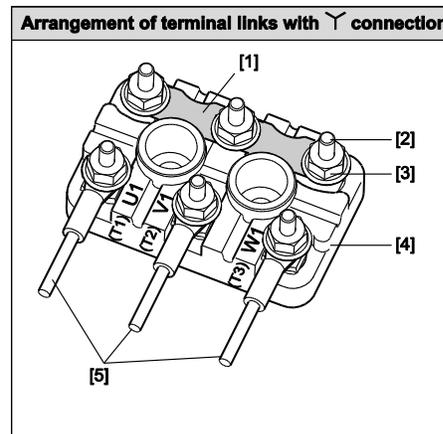
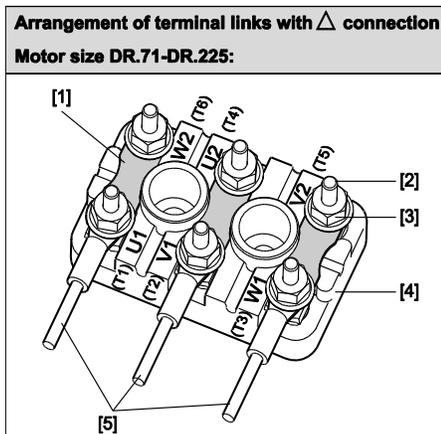
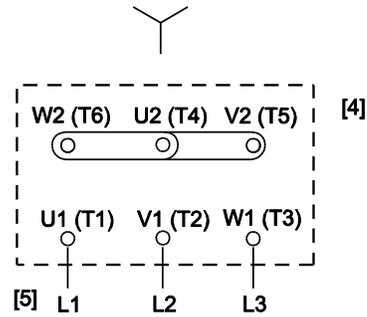
Example voltages:

Low voltage $\Delta$	High voltage $\Upsilon$
208V	360V
220V	380V
230V	400V
266V	460V
330V	575V

### Low voltage



### High voltage



R13\_US

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

- [4] Terminal board
- [5] Motor voltage supply



## 5.1 BG or BGE

### 5.1.1 Motor = low / Brake = low

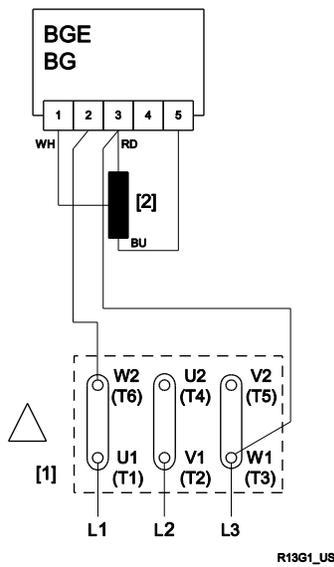
Brake Control = BG or BGE

Example = 230V Δ / 400V Y

Motor = 230V Δ

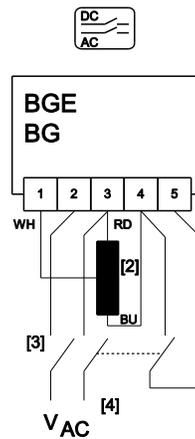
Brake = 230V

#### Normal Reaction (Stopping):



R13G1\_US

#### Rapid Reaction (Stopping):



69 001 XX 06 01 00

[1] Motor terminal board

[3] Customer supplied contacts

[2] Brake coil

[4] Brake supply voltage

BU – blue

RD – red

WH – white



# R13

## 5.1.2 Motor = high / Brake = low

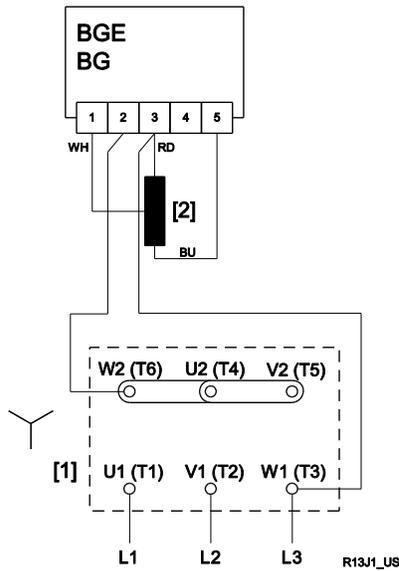
Brake Control = BG or BGE

Example = 330V Δ / 575V Y

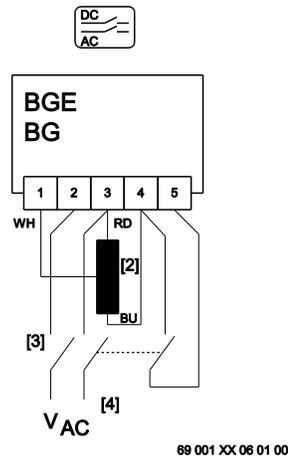
Motor = 575V Y

Brake = 330V

### Normal Reaction (Stopping):



### Rapid Reaction (Stopping):



[1] Motor terminal board

[3] Customer supplied contacts

[2] Brake coil

[4] Brake supply voltage

BU – blue

RD – red

WH – white



### 5.1.3 Motor = high / Brake = high

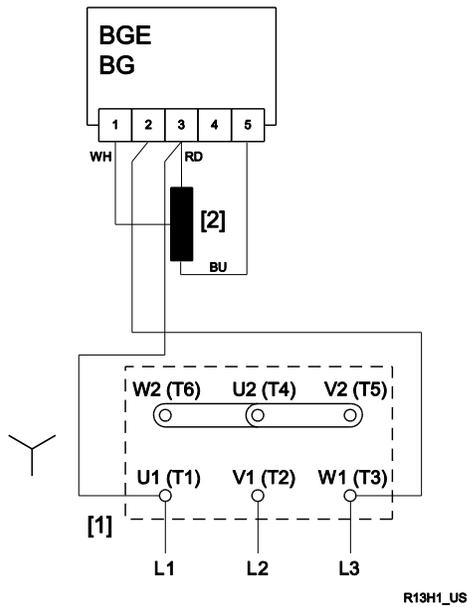
Brake Control = BG or BGE

Example = 266V Δ / 460V Y

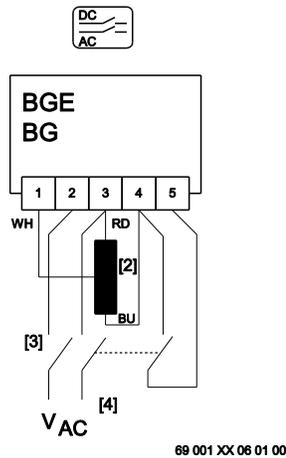
Motor = 460V Y

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



# R13

## 5.2 BSR

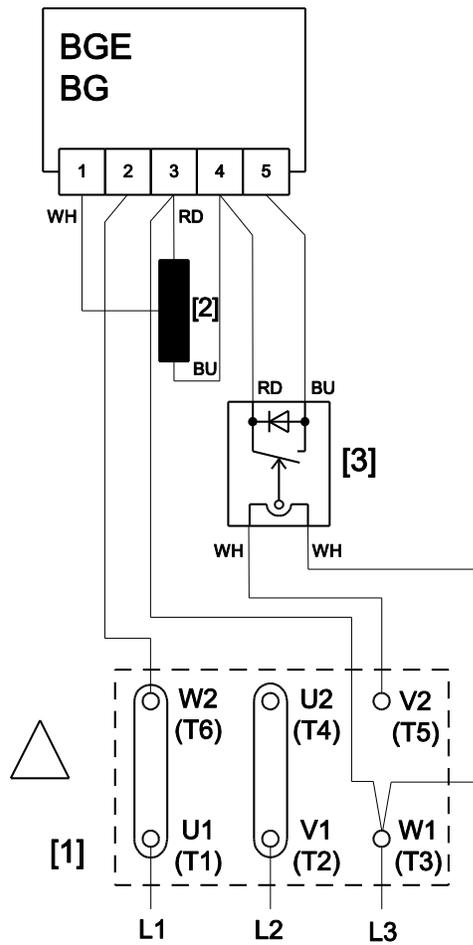
### 5.2.1 Motor = low / Brake = low

Brake Control = BSR

Example = 230V Δ / 400V Y

Motor = 230V Δ

Brake = 230V



R13B1\_US

- [1] Motor terminal board
- [2] Brake Coil
- [3] SR11 / SR15 current relay

BU – blue

RD – red

WH – white



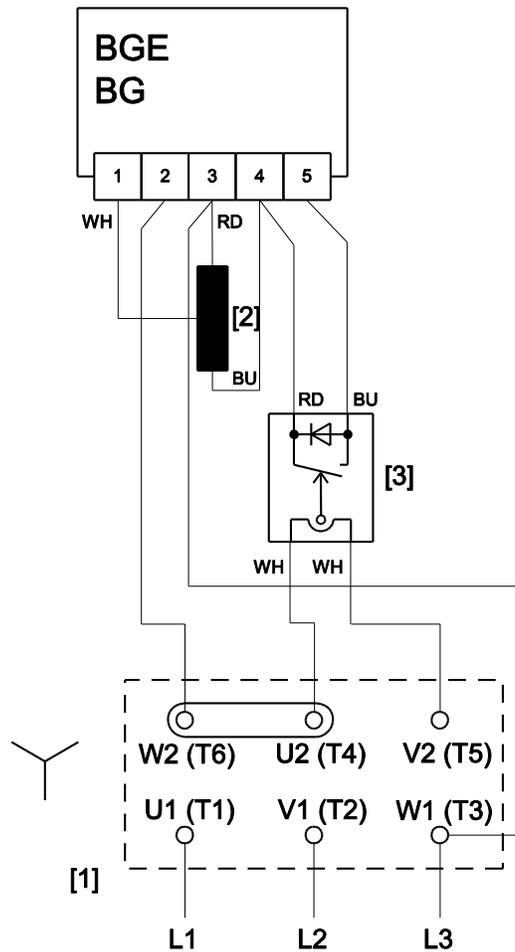
## 5.2.2 Motor = high / Brake = low

Brake Control = BSR

Example = 330V  $\Delta$  / 575V  $\Upsilon$

Motor = 575V  $\Upsilon$

Brake = 330V



R13E1\_US

- [1] Motor terminal board
- [2] Brake Coil
- [3] SR11 / SR15 current relay

BU – blue

RD – red

WH – white



# R13

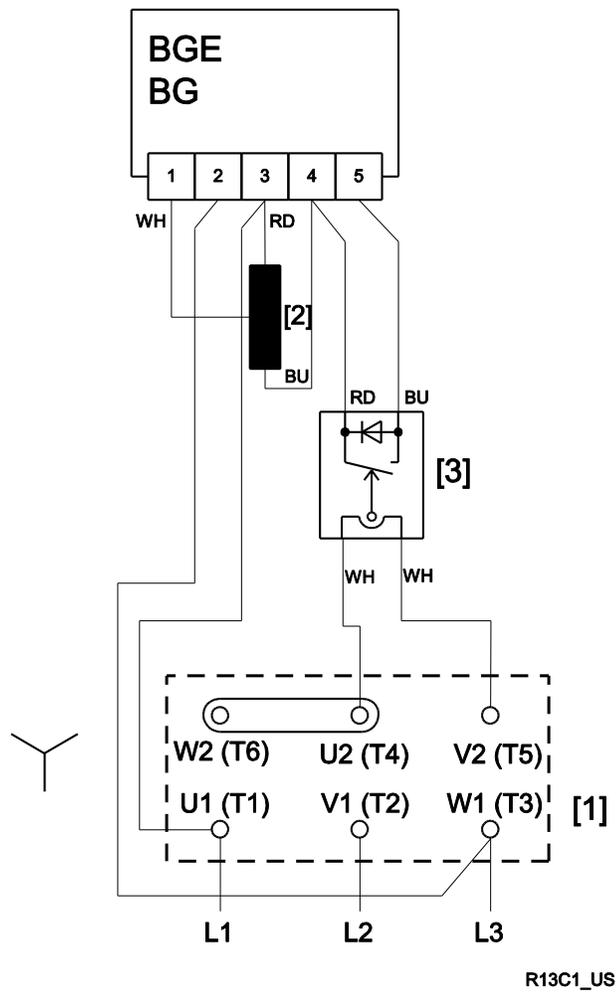
## 5.2.3 Motor = high / Brake = high

Brake Control = BSR

Example = 266V Δ / 460V Y

Motor = 460V Y

Brake = 460V



- [1] Motor terminal board
- [2] Brake Coil
- [3] SR11 / SR15 current relay

BU – blue

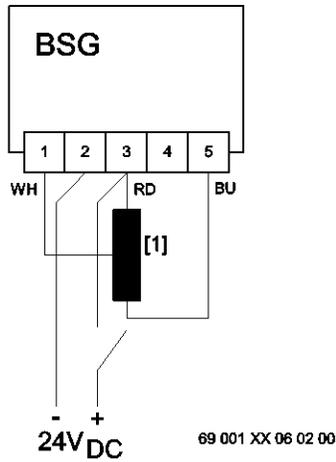
RD – red

WH – white



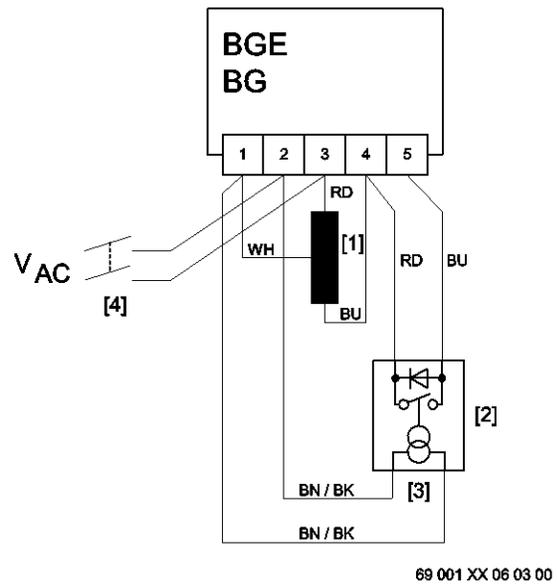
## 6 BSG / BUR

**Brake control system BSG**



**Brake control system BUR**

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



[1]	Brake coil
[2]	Voltage relay UR11/15
[3]	BN = UR11 (42-115V)
	BK = UR15 (150-500V)
[4]	Brake voltage supply

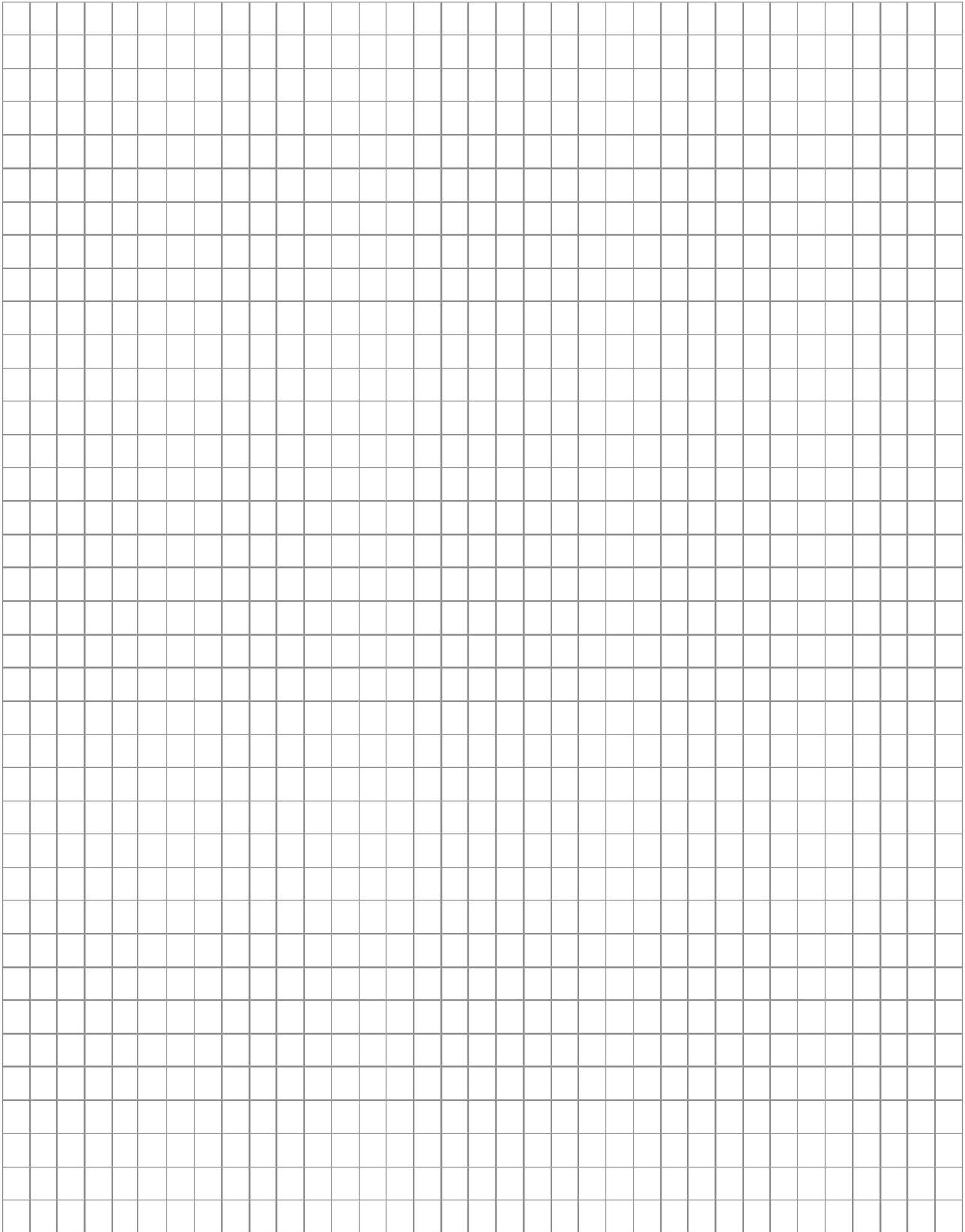
BU - blue

RD - red

WH - white

BK - black

BN - brown





Food and Beverage

Material Handling

Hoists/Cranes

Wastewater

Automotive

Packaging

Bottling

Mining

Parcel

and more.

**SEW  
EURODRIVE**

USA - Midwest  
SEW-EURODRIVE, Inc.  
Troy, OH 45373  
Tel. (937) 335-0036  
Fax (937) 332-0038  
cstroy@seweurodrive.com

USA - Northeast  
SEW-EURODRIVE, Inc.  
Bridgeport, NJ 08014  
Tel. (856) 467-2277  
Fax (856) 845-3179  
csbridgeport@seweurodrive.com

USA - Southeast  
SEW-EURODRIVE, Inc.  
Lyman, SC 29365  
Tel. (864) 439-7537  
Fax (864) 439-7830  
cslyman@seweurodrive.com

USA - Southwest  
SEW-EURODRIVE, Inc.  
Desoto, TX 75115  
Tel. (214) 330-4824  
Fax (214) 330-4724  
csdallas@seweurodrive.com

USA - Western  
SEW-EURODRIVE, Inc.  
Hayward, CA 94544  
Tel. (510) 487-3560  
Fax (510) 487-6433  
cshayward@seweurodrive.com

Mexico  
SEW-EURODRIVE Sales and  
Distribution SA de CV  
Queretaro, Mexico  
Tel. (011) 52-442-103-0300  
Fax (011) 52-442-103-0301  
scmexico@seweurodrive.com.mx

Canada - East  
SEW-EURODRIVE, Co.  
of Canada Ltd.  
Bramalea, Ontario  
Tel. (905) 791-1553  
Fax (905) 791-2999  
marketing@sew-eurodrive.ca

Canada - West  
SEW-EURODRIVE, Co.  
of Canada Ltd.  
Delta, B.C.  
Tel. (604) 946-5535  
Fax (604) 946-2513  
marketing@sew-eurodrive.ca

Canada - Northeast  
SEW-EURODRIVE, Co.  
of Canada Ltd.  
LaSalle, Quebec  
Tel. (514) 367-1124  
Fax (514) 367-3677  
marketing@sew-eurodrive.ca

Industrial Gears  
SEW-EURODRIVE, Inc.  
Wellford, SC 29385  
Tel. (864) 439-8792  
Fax (864) 661-1167  
igorders@seweurodrive.com