

Efficient, Powerful, and Usable Worldwide -

# The Variant for Use Around the World



# The DR motor - the variant for use around the world

The new modular system for AC motors from SEW-EURODRIVE offers millions of drive combinations that can be used all over the world. Irrespective of the required energy efficiency class, all motor the whole range of DR motor options or variants are available for all efficiency levels. DR motors comply with all international standards and meet the new parts of the IEC motor standard already today.



The modular DR motor system comprises the three energy-efficient motor variants (IE1, IE2, IE3 and IE4) and offers an ideally matched brake concept (up to four different brake sizes for each motor size) as well as cost-optimized encoders integrated in the motor.

SEW-EURODRIVE designed and developed the AC motors with all the worldwide requirements for energy efficiency classes in mind. In all relevant countries, the DR motor was approved and certified without any problems. The DR motor from SEW-EURODRIVE is used

all over the world. By combining all the different design requirements, SEW-EURODRIVE built a "global motor" that saves time and optimizes processes in the areas of motor selection, ordering and logistics.

The DR motors from SEW-EURODRIVE comply with all efficiency classes and can be used worldwide. For more information, go to **www.dr-motor.de**.

# Efficiency classes **Energy efficiency classes Motors from SEW-EURODRIVE IE4 Super Premium Efficiency** DRU motors **IE3** Premium Efficiency DRP motors Also effective: - USA: EISA (2007), NEMA Premium (~ IE3) as of Dec 2010 - Canada: CSA C390 Premium (~ IE3) as of Jan 2011 - China: GB 18613 (2008); level 1 (~ IE3) - EU: ErP (2009/125/EC) as of Jan 2015 and Jan 2017 - Chile: NCh 3086 (since 2011); A (~ IE3) **IE2** High Efficiency DRE motors Also effective: USA: EISA (2007) NEMA High (~ IE2) - Canada: CSA C390 High (~ IE2) since 1997 - Australia/New Zealand: MEPS since 2006 - Brazil: ABNT / NBR 17094 since 2009 - South Korea: REELS (~IE2) since 2008 - China: GB 18613 (2008); level 2 (~ IE2) since July 2011 - India: BEE IS 12615 as of 2002, conditionally mandatory as of 2013 - EU: ErP (2009/125/EC) since June 2011 - Chile: NCh 3086; B (~ IE2) **IE1 Standard Efficiency** DRS motors Also effective: - India: BEE IS 12615 as of 2002 - China: GB 18613 (2008); level 3 (~IE1) until June 2011 - EU: ErP (2009/125/EC) until June 2011 − Chile: NCh 3086 (since 2011); C (~ IE1) < IE1 Standard Efficiency DRS motors - Chile: NCh 3086 (since 2011); D (< IE1)

Voltages and energy efficiency classes vary worldwide, but one motor can be used everywhere: the DR motor from SEW-EURODRIVE.

	Europe	Switzerland	USA	Canada	Brazil	
Line voltage (3x)	400 V	400 V	480 V	480 V 575 V	220 V 380 V 440 V	
Line voltage tolerance	± 10%	± 10%	± 10%	± 10%	± 10%	
Line frequency	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz	

# Energy efficiency laws/regulations\*

In effect	June 16, 2011	July 1, 2011	Dec 20, 2010	Jan 1, 2011	Since 2009	
Mandatory	- IE2	- IE2	- Premium (IE3) - High (IE2) From 160 kW	<ul><li>Premium (IE3)</li><li>High (IE2)</li><li>From 160 kW</li></ul>	- ~ IE2	
Voluntary	– IE3	- IE3	- Super Premium (IE4)	- Super Premium (IE4)		
Comment	Various exceptions	Exceptions	Various exceptions	Various exceptions	Exceptions, special labeling	
In the future	Jan 1, 2015	Jan 1, 2015				
Mandatory	IE3 from 7.5 kW	IE3 from 7.5 kW				
Comment	Jan 1, 2017 > 0.75 kW IE3 Mandatory Exceptions	Jan 1, 2017 > 0.75 kW IE3 Mandatory Exceptions				
Use of the "global motor"	Yes	Yes	Yes as gearmotor and as flange motor	Yes (for 480 V) as gearmotor and as flange motor	Yes, In preparation (for 440 V)	

<sup>\*</sup>Edition 12/2011

Australia New Zealand *** * * **	South Korea	China **:	India	Chile
400 V 415 V	220 V 380 V 440 V	380 V	415 V	380 V 400 V
± 5%			± 5%	± 5%
50 Hz	60 Hz	50 Hz	50 Hz	50 Hz

Since 2006	July 1, 2010	July 1, 2010	Since 2002	Since 2011
– IE2	– IE2	– Level 2 (~ IE2)		D (~ < IE1)
– IE3		- Level 1 (~ IE3)	- IE1 - IE2 - IE3	C (~ IE1) B (~ IE2) A (~ IE3)
Exceptions	Special labeling	<ul><li>From 0.55 kW</li><li>Special labeling</li></ul>	Voluntary agreement Special labeling	Exceptions, special labeling
About 2015				
– IE3				
Yes	In preparation	Yes	Yes	Yes

# The DR motor – one motor for all energy efficiency classes worldwide

The DR motor combines many different variants within one drive. For this reason, the nameplate shows 50 Hz/60 Hz information and the elements required by specific countries. This "global motor" from SEW-EURODRIVE complies with IEC 60034, NEMA MG1, CSA C22.2, ABNT, NCh 3086 requirements.

Abstract of the technical description					
Voltage	220-242 V / 380-420 V or 380-420 V / 660-725 V	254-277 V / 440-480 V or 440-480 V / V			
Frequency	50 Hz	60 Hz			
Power ratings	<ul> <li>2-pole: DRS: 0.55 kW (0.75 hp)</li></ul>				
Energy saving information	IE classification with the numerical efficiency for ma	ins operation			
Additional information on the nameplate	<ul> <li>According to US design specification NEMA MG1         <ul> <li>TEFC, TEBC, TENV depending on the type of verence.</li> <li>K.V.A. code, letter designation of the short circular of the control of</li></ul></li></ul>	ntilation  Lit apparent power  L-registered mounting location  down torque and startup current ratio  esign specification CSA C22.2, SEW-EURODRIVE  390			



UL approval:
"Recognized Component".
With UR logo and number
of UL file



For US-American energy efficiency approval



CSA approval: CSA logo



# NEW

For the Canadian energy efficiency approval



CEL – China Energy efficiency label



KEL – South Korea Energy efficiency label (in preparation with DR motor)



Energy efficiency label Brazil (in preparation with DR motor)



Energy efficiency label Chile (in preparation with DR motor)



### NEW

Energy efficiency label India (in preparation)



Selection of additional features for the modular DR motor system



Additional feature	Characteristic	SEW type designation
Brakes		BE with size designation
Manual brake release	Automatic disengaging function (BE05-32)	HR
	Lockable (BE05-122)	HF
Brake monitoring	Wear/function	DUB
Built-in encoder (DR71132)	HTL	EI7C/EI76/EI72/EI71
Shaft-centered add-on encoder	Sin/cos	ES7S/EG7S
(DR71132/DR160225)	HTL	ES7C/EG7C
	ΠL	ES7R/EG7R
	SSI	AS7Y/AG7Y
	RS-485 multi-turn	AS7W/AG7W
Shaft-centered hollow shaft encoder	Sin/cos	EH7S
(DR315)	SSI multi-turn	AH7Y
Thermal motor protection	3 PTC resistors	TF
	3 bimetallic switches	TH
Temperature detection	1 or 3x PT100	PT
	1x KTY84-130	KY
Backstop	Instead of a brake; CW or CCW direction of rotation blocked	RS
Plug connector	Integrated in terminal box	IS
	Mounted on (types from Harting)	AC / AS / AM
Forced cooling fan		V
Canopy		С
Air filter		LF
Fan	Reduction of the noise level	LN
	Metal	AL
	Heavy (additional inertia)	Z
Condensation drain holes		DH
2nd shaft end		2W
MOVIMOT® (DR71 132)		MM with size designation
MOVI-SWITCH® (DR71 100)		MSW

# International regulations concerning motor efficiency classes

1 Jan 1, 2015	Jan 1, 2017	
k directive (2009/125/EC)		
<ul><li>IE1</li><li>IE2 ≥ 7.5 I</li></ul>	- IE1 - IE2	
<ul><li>IE2 0.75</li><li>IE3 ≥ 7.5 k</li></ul>		
– IE3 0.75	5.5 kW — IE4	
W		
200 kW 200 kW 160 kW		
	with From 0.75 kW w	vith
	From 7.5 kW	From 7.5 kW with From 0.75 kW w

Edition 12/2011

# **Exceptions to the ErP directive**

- Non-S1 and S6 cyclic duration factors
- Motors labeled for inverter operation (specific information on the nameplate)
- IE2 mains motors operated with a frequency inverter as of 2015/2017 with "VSD use only" (information on the nameplate)
- All motors according to 94/9/EC (ATEX directive)

- Brakemotors (including S1 and S6 brakemotors)
- Motors with a special design for operation under the following conditions:
- Ambient temperature above 40°C
- Ambient temperature below -15°C
- Installation altitude > 1000 m (information on the nameplate)
- Motors for fire gases

### ATEX guideline note

SEW-EURODRIVE has only certified IE2 motors, i.e. EDRE motors are approved according to Directive 94/9/EC and IECEx.

Switzerland			
Supply system 3x 400 \	/ ± 10%, 50 Hz		
Date	July 1, 2011	Jan 1, 2015	Jan 1, 2017
Туре	EVO energy regulation / Er	P framework directive (2009)	/125/EC)
Energy efficiency class	es		
Prohibited	– IE1	<ul><li>IE1</li><li>IE2 ≥ 7.5 kW</li></ul>	- IE1 - IE2
Mandatory	- IE2	<ul><li>IE2 0.75 5.5 kW</li><li>IE3 ≥ 7.5 kW</li></ul>	– IE3
Voluntary	- IE3	– IE3 0.75 5.5 kW	- IE4
Power ratings (according to legal regulations)	0.75 375 kW		
Pole numbers	<ul><li>2-pole</li><li>4-pole</li><li>6-pole</li></ul>		
DR motor types (available power ratings)	DRS ≥ 0.18 200 kW DRE ≥ 0.25 200 kW DRP ≥ 0.75 160 kW		
Use of the "global motor"	Yes	Yes (0.375.5 kW) From 7.5 kW with frequency inverter	Yes (0.37 0.55 kW) From 0.75 kW with frequency inverter

# **Exceptions to the EnV directive**

- Motors labeled for inverter operation (specific information on the nameplate)
- IE2 mains-powered motors on frequency inverters as of 2015/2017 with "VSD use only" (information on the nameplate)
- Motors for use in potentially explosive atmospheres

# ATEX guideline note

SEW-EURODRIVE has only certified IE2 motors, i.e. EDRE motors are approved according to Directive 94/9/EC and IECEx

USA	
Supply system 3x 480 V	± 10%, 60 Hz
Date	Dec 20, 2010
Туре	EISA* 2007
Energy efficiency classe	s
Prohibited	<ul> <li>Standard (IE1) 0.75 375 kW (1)+(2)+(3)</li> <li>High (IE2) 0.75 150 kW (1)+(2)+(3)</li> </ul>
Mandatory (1) (2) (3)	<ul> <li>High (IE2) 160 260 kW <sup>(3)</sup></li> <li>160 375 kW <sup>(1) + (2)</sup></li> <li>Premium (IE3) 0.75 150 kW <sup>(1) + (2) + (3)</sup></li> </ul>
Voluntary	- Super Premium (IE4)
Power ratings (according to legal regulations)	0.75 375 kW 1 500 hp
Pole numbers (1) (2) (3)	<ul><li>2-pole</li><li>4-pole</li><li>6-pole</li></ul>
DR motor types (available power ratings)	DRS ≥ 0.18 225 kW  DRE ≥ 0.75 225 kW  DRP ≥ 0.75 37 kW
Use of the "global motor"	Yes  - As gearmotor  - As flange motor

<sup>1)</sup> **2-pole** <sup>2)</sup> **4-pole** <sup>3)</sup> **6-pole** Edition 12/2011

# Since December 20, 2010 Exceptions to EISA 2007

- Non-S1 cyclic duration factors
- Motors labeled for inverter operation (special information on the nameplate)
- Gearmotors
- Flange motors, permitted for High (IE2)
- NEMA design C, permitted for High (IE2)

# Mandatory

Energy-efficient motors labeled with the approval logo

 $<sup>^{\</sup>star}$  EISA = Energy Independence and Security Act

# Canada Supply system 3x 575 V ± 10%, 60 Hz $3x 480 V \pm 10\%, 60 Hz$ **Date** Jan 1, 2011 CSA C390 **Type Energy efficiency classes Prohibited** - Standard (IE1) 0.75 ... 375 kW - High (IE2) 0.75 ... 150 kW Mandatory - High (IE2) 160 ... 375 kW - Premium (IE3) 0.75 ... 150 kW **Voluntary** Super Premium (IE4) 0.75 ... 375 kW **Power ratings** (according to legal 1 ... 500 hp regulations) - 2-pole Pole numbers - 4-pole - 6-pole **DR** motor types DRS ≥ 0.18 ... 225 kW (available power DRE ≥ 0.75 ... 225 kW ratings) $DRP \ge 0.75 \dots 37 \text{ kW}$ Use of the Yes "global motor" For 480 V - As gearmotor - As flange motor - As foot-mounted motor IEC design H

Edition 12/2011

# Since January 1, 2011 Exceptions to CSA C390

- Non-S1 cyclic duration factors
- Motors labeled for inverter operation (special information on the nameplate)
- NEMA design C, permitted for High (IE2)
- IEC design H, permitted for High (IE2)
- Gearmotors and flange motors, permitted for High (IE2)

#### Mandatory

Energy-efficient motors labeled with the approval logo

Brazil	
	± 10%, 60 Hz ± 10%, 60 Hz ± 10%, 60 Hz
Date	Dec 8, 2009
Туре	NBR 17094
Energy efficiency classes	s
Prohibited	− ~ IE1
Mandatory	- ~ IE2
Voluntary	
Power ratings (according to legal regulations)	0.75 185 kW 1 250 cv
Pole numbers	<ul><li>2-pole</li><li>4-pole</li><li>6-pole</li></ul>
DR motor types (available power ratings)	DRS ≥ 0.18 0.55 kW; 200 225 kW DRE ≥ 0.75 225 kW
Use of the "global motor"	Yes (in preparation) For 440 V

# **Exceptions to NBR 17094**

- Non-S1 cyclic duration factors
- Motors labeled for inverter operation (special information on the nameplate)

# Mandatory

Energy-efficient motors labeled with the approval logo

#### Australia / New Zealand Supply system $3x 400 V \pm 5\%$ , 50 Hz $3x 415 V \pm 5\%, 50 Hz$ **Date** Australia Apr 1, 2006 / New Zealand June 1, 2006 About 2015 (date not confirmed yet) Type MEPS 2006 MEPS 2015 **Energy efficiency classes Prohibited** – IE1 - IE2 - IE2 **Mandatory** - IE3 **Voluntary** - IE3 - IE4 0.75 ... 185 kW **Power ratings** 0.75 ... 375 kW (according to legal regulations) Pole numbers - 2-pole - 4-pole - 6-pole **DR** motor types DRS $\geq 0.37 \dots 1.1 \text{ kW}$ ; (200 kW until about 2015) (available power $DRE \ge 0.75 \dots 200 \text{ kW}$ ratings) DRP ≥ 0.75 ... 160 kW Use of the Yes No "global motor"

Edition 12/2011

# **Exceptions to MEPS 2006**

- Only S2 cyclic duration factor
- Motors labeled for inverter operation (specific information on the nameplate)
- Gearmotors (without motor flange)

# **Exceptions to MEPS 2015**

No information available in the 4th quarter of 2011

# South Korea Supply system 3x 220 V, 60 Hz 3x 380 V, 60 Hz 3x 440 V, 60 Hz **Date** July 1, 2010 REELS **Type Energy efficiency classes Prohibited** - IE1 Mandatory - IE2 **Voluntary** 0.75 ... 200 kW **Power ratings** (according to legal regulations) Pole numbers - 2-pole - 4-pole - 6-pole **DR** motor types $DRS \geq 0.18 \dots 225 \text{ kW}$ (available power $DRE \ge 0.75 \dots 225 \text{ kW}$ ratings) Use of the In preparation "global motor"

Edition 12/2011

# **Exceptions to REELS**

- Only S2 cyclic duration factor
- Motors labeled for inverter operation (specific information on the nameplate)
- Mains motors operated on a frequency inverter
- MOVIMOT® (gear)motors; mounted on or close to the motor
- Motors that will be exported again
- Single-phase motors

# Mandatory

- Special designation of energy-efficient motors with prescribed label
- Special designation of exempt/not affected motors with prescribed label

People's Repu	olic of China	*.:	
Supply system 3x 380 V	50 Hz		
Date	July 1 , 2011		
Туре	GB 18613		
Energy efficiency classe	S		
Prohibited	- Level 3 (~ IE1)		
Mandatory	- Level 2 (~ IE2)		
Voluntary	- Level 1 (~ IE3)		
Power ratings (according to legal regulations)	0.55 315 kW		
Pole numbers	<ul><li>2-pole</li><li>4-pole</li><li>6-pole</li></ul>		
DR motor types (available power ratings)	DRS ≥ 0.18 200 kW  DRE ≥ 0.25 200 kW  DRP ≥ 0.75 kW		
Use of the "global motor"	Yes		

# **Exceptions to GB 18613**

- All non-S1 cyclic duration factors
- Motors labeled for inverter operation (specific information on the nameplate)
- All 60 Hz motors
- Power rating 9.2 kW, as not included in GB 18613
- Single-phase motors
- Torque motors

# Mandatory

- Special designation of energy-efficient motors with prescribed CEL label
- Additional designation of lower power ratings with CCC
- 2-pole ≤ 2.2 kW
- 4-pole ≤ 1.1 kW
- 6-pole  $\leq 0.75 \text{ kW}$
- 8-pole  $\leq 0.55 \text{ kW}$

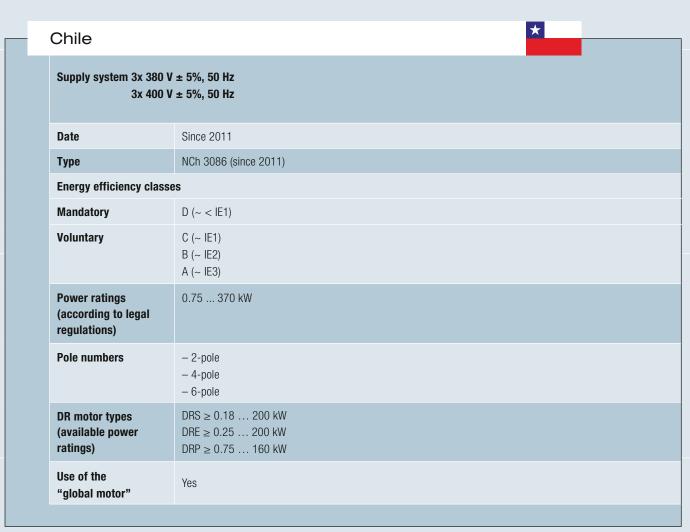
India		
Supply system 3x 41	5 V ± 5%, 50 Hz	
Date	Since 2002 (voluntary)	As of 2013 (conditionally)
Туре	BEE IS 12615	BEE IS 12615
Energy efficiency cla	sses	
Prohibited	- < IE1	- IE1
Mandatory		
Voluntary	– IE1	- IE2
Power ratings (according to legal regulations)	0.75 15 kW	
Pole numbers	<ul><li>2-pole</li><li>4-pole</li></ul>	
DR motor types (available power ratings)	DRS ≥ 0.18 200 kW DRE ≥ 0.55 200 kW DRP ≥ 0.75 160 kW	
Use of the "global motor"	Yes, in preparation  Labeling in preparation	Yes, in preparation

# **Exceptions**

None known, since compliance is voluntary

# Mandatory

Special labeling (BEE) on the nameplate



# **Exceptions**

- All non-S1 cyclic duration factors
- Frequencies other than 50 Hz

# Mandatory

- Special labeling with specific NCh labels

# How we're driving the world



# SEW-EURODRIVE is right there for you:

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