Motor Size & Efficiency			Brake Size and Torque									
Frame Size	IE1	IE3		BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150	BRE250	BRE400	BRE800
			Nm	5	10	20	40	60	100	150	250	400	800
			lb-in	44	89	177	354	531	885	1328	2213	3540	7080
			lb-ft	3.7	7.4	14.8	29.5	44.3	73.8	111	184	295	590
63	S/L	SP/LP		●	○*, †								
71	S/L	SP/LP		●	○*								
80	S	SP		●	○	○*							
80	L	LP		○	●	○*							
90	S	SP			○	●	○*						
90	L	LP			○	●	○*						
100	L	LP				●#	○#	○*, †					
100	LA	AP				○#	●#	○*, †					
112	M	MP				○	○	●					
132	S	SP						●	○	○*			
132	M	MP						○	●	○*			
132	MA	-						○	○	●*			
160	M	MP							○	●	○		
160	L	LP							○	○	●		
180	MX	-								○	●		
180	LX	-								○	●		
180	-	MP									●	○*, †	
180	-	LP									●	○*, †	
225	-	RP									○	●	
225	-	SP									○	●	
225	-	MP										○	●
250	-	WP										○	●
Weight		kg		2	3	5.5	7	10	16	22	32	50	53
		lb		4.4	6.6	12.1	15.4	22	35	49	71	110	117
Inertia		$kg\text{-}m^2 \times 10^{-3}$		0.015	0.045	0.153	0.45	0.86	1.22	2.85	6.65	19.5	39
		$lb\text{-}ft^2 \times 10^{-3}$		0.356	1.068	3.63	10.68	20.4	29.0	67.6	158	463	926

● Standard offering
○ Optional offering
* IP66 brake not possible
† Manual brake release option not possible
\# Spanner nut adjustment not available

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Brake Selection

Note:

The brake torque is measured with a mean friction radius of the brake pad surface with a circumferential speed of 1m/sec (197 fpm).

For different applications and operating conditions, brake torque can vary from +40/-20% compared to the rated brake torque.

Hoisting (lifting/lowering) applications must have the brake wired for fast response (DC-switching).

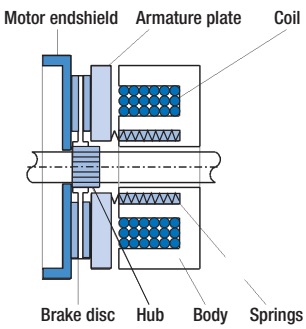
In new condition, the brake will have a reduced torque of up to 30%. In order to achieve full rated brake torque, a short run-in period is required. The run in time will vary depending on system loads.

The brake rotor or brake pad must be protected against foreign matter, oil and grease. Contaminants of this type can greatly influence wear and reduce breaking torque.

Brake Torque Adjustment (ADJ)

Build

Brake torque adjustments are possible by changing the brake spring combinations or by removing springs.



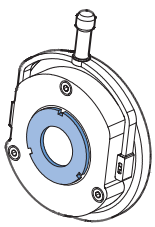
Brake Size	7 Springs		5 Springs		3 Springs	
	[Nm]	[lb-ft]	[Nm]	[lb-ft]	[Nm]	[lb-ft]
BRE5	5	3.7	3.5	2.6	2	1.5
BRE10	10	7.4	7	5.2	4	3.0
BRE20	20	14.8	14	10.3	8	5.9
BRE40	40	29.5	28	20.7	17	12.5
BRE60	60	44.3	43	31.7	26	19.2
BRE100	100	73.8	70	51.6	42	31.0
BRE150	150	111	107	78.9	65	47.9

When adjusting the brake torque, start by removing the outer springs at opposite corners to prevent uneven brake wear.

On brake sizes 5 – 150 Nm (3.7 – 111 lb-ft) full brake torque is achieved with all (7) springs. The brake springs are placed in such a manner where there are (3) inner and (4) outer springs.

In addition, brake sizes from 5 – 40 Nm (3.7 – 30 lb-ft) are typically supplied with a threaded adjustment nut or spanner nut. Additional fine torque adjustment can be made by unscrewing the spanner nut a number of turns or “clicks” with a spanner wrench.

Spanner Nut Adjustment



Brake Size	Torque Reduction[1]		Max Turns	Minimum Torque[2]	
	[Nm]	[lb-ft]		[Nm]	[lb-ft]
BRE5	0.2	0.15	6	0.8	0.59
BRE10	0.2	0.15	12	1.6	1.18
BRE20	0.3	0.22	12	4.4	3.25
BRE40	1.0	0.74	9.0	8.0	5.90

1) With the minimum number of springs and maximum number of turns to the spanner nut
2) Per each turn of the spanner nut

Working brake and Holding brake

A working brake implements friction work in regular operation when the motor power is turned off, i.e. performs a braking function. This brake stops a moving load or application frequently and regularly, not only as an occasional or special case. **Any non-inverter application needing braking requires a working brake.**

A holding brake **does not** implement any friction work in regular operation, but only serves to secure an already stopped load or application. This brake is typically used with a frequency inverter and is engaged once the frequency inverter has already brought the application to a stop. A holding brake may perform a braking function in the event of an emergency stop or power loss but must be sized according to the maximum permissible work per cycle for that brake.

Examples for Holding brake and Working brake

Working brake

The geared motor is directly supplied by the line voltage supply. To slow down the application when the motor is powered off at speed, the mechanical spring-loaded brake must generate a braking torque and thus performs friction work.

Holding brake

A frequency inverter controls the acceleration and deceleration of the application. The mechanical spring-loaded brake is only applied after the application has come to a standstill. The brake is therefore only used for “holding” the application (parked position). It does not perform any friction work. Only in the event of an emergency stop or power failure is friction work done while moving.

Brake Times and Electrical Selection

Brake timing performance is critical in selecting the optimal brake system. NORD brakes provide exceptional performance in terms of the release (start) times and engagement (stop) times. Use the following guidelines in order to select the correct brake control components and connections.

1) Determine if the brake needs to be wired directly from the motor terminal block or powered by a separate source.
   - If you are using an AC vector drive, soft-start, or a two-speed motor you will need to supply the rectifier from a seperate power source
   - If the motor is powered direct across-the-line, the rectifier power can be supplied from the motor’s terminal block
2) What type of performance is required?
   - Is the standard brake performance OK?
   - Is a higher performance required for fast brake release or very fast brake stopping?
3) Determine the brake supply voltage and check rectifier compatibility

When Fast or Very Fast Stopping is Recommended

Any applications that require quick stops and positive action at stand-still, as well as all vertically mounted applications.

Recommended Applications

- Conveyors and inclined conveyors
- Hoists and lifts
- Bulk material handling equipment (bucket elevators, idler conveyors)

When Fast-Release is Recommended (Overexcitation)

Any application that is very high-cycling with frequent starts and stops. These applications require the brake to release very quickly in order to avoid excessive heat build-up in the AC motor and brake coil.

Recommended Applications

- Index conveyors
- Diverters
- Storage and retrieval crane systems

Brake Selection

Power Source	Brake Release (start)	Brake Engagement (stop)	Braking Method	Rectifier
Motor Terminal Block	Standard	Standard (AC switching)	10	GVE/GHE/GUE
	Standard	Fast (DC switching)	15	GVE/GHE/GUE
	Standard	Very Fast (Reduced power holding)	40	GPE/PMG
	Fast (Overexcitation)	Standard (AC switching	30	GPE/PMG
	Fast (Overexcitation)	Fast (DC switching)	35	GPE/PMG
Separate Power Source	Standard	Standard (AC switching)	20	GVE/GHE/GUE
	Standard	Fast (DC switching)	25	GVE/GHE/GUE
	Standard	Very Fast (Reduced power holding)	55	GPU/PMG
	Fast (Overexcitation)	Standard (AC switching)	45	GPU/PMG
	Fast (Overexcitation)	Fast (DC switching)	50	GPU/PMG

Braking methods referenced in connection diagrams on pages 76.

Rectifier Styles

GV - Full wave rectifier (bridge)
GH - Half wave rectifier
GU - Combination rectifier; can be connected full or half wave
GPE - Hybrid rectifier; full wave then switches to half wave
PMG - Hybrid rectifier; full wave then switches to half wave
GPU - Hybrid rectifier; full wave then switches to half wave, has integrated DC switching via voltage sensing

Brake Options

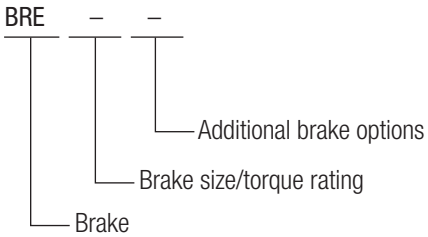
Brake Options

Abbreviation	Description	Modify	Build	Page
ADJ	Torque adjustment		●	54
FHL	Locking hand release lever	●		58
HL	Hand release lever	●		58
HLH	Hand release lever with hole		●	58
IP66	IP66 brake enclosure		●	58
IR	Current sensing relay	●		60
MIK	Micro-switch		●	59
NRB1	Quiet brake release		●	59
NRB2	Quite brake motor operation		●	59
RG	Corrosion protected brake		●	58
SR	Dust and corrosion protected brake		●	58

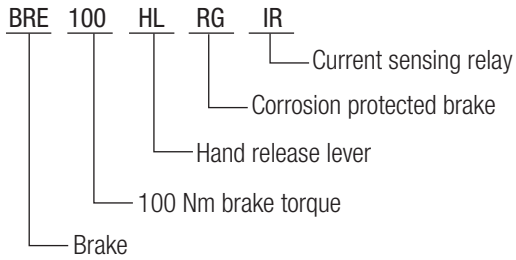
Rectifier Options

Abbreviation	Description	Page
GHE	Half wave rectifiers	68
GPE	Push hybrid rectifiers - external DC switching	70
GPU	Push hybrid rectifiers - integrated DC switching	71
GUE	Dual rectifier - full/half wave	69
GVE	Full wave rectifiers	67
PMG	Push hybrid rectifier - integrated DC switching	72
MSG	Roba®-Switch external DC switching	73

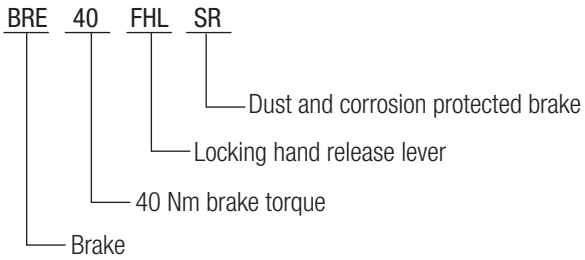
Brake Nomenclature



Ordering Examples



Brake, 100 Nm with a hand release lever, corrosion protected brake, and a current sensing relay



Brake, 40 Nm with a locking hand release lever, and dust and corrosion protected brake

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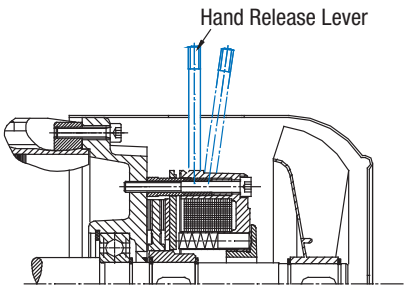
Brake Options

Hand Release Lever (HL) — Modify

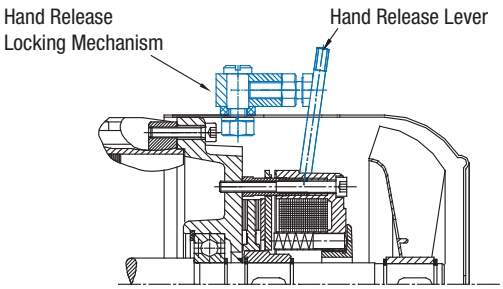
The hand release option allows the brake to be manually released without requiring that the brake be energized with voltage. The lever has a spring return that allows the brake to be hand released and returned automatically to its set position. The hand release lever can be unscrewed for easy removal.

Locking Hand Release Lever (FHL) — Modify

This option allows the brake to be manually released and locked off without requiring voltage to the brake. The lock mechanism prevents the spring from returning the brake to a closed state without manual action by the user. The hand release lever can be unscrewed for easy removal.



Hand Release Lever (HL)

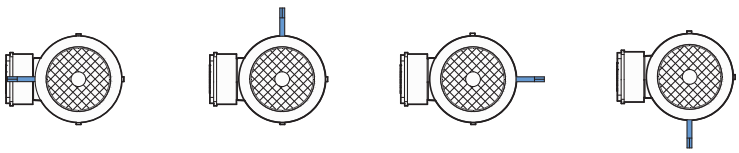


Locking Hand Release Lever (FHL)

Hand Release Lever With Hole (HLH)

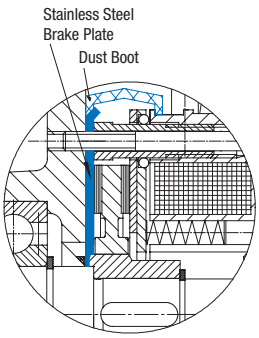
Hand release levers can be provided with a 5.5 mm through hole. The hole can be used for attaching external pulling devices such as a cord to release the brake at a distance. This option is available for brake sizes BRE5 to BRE60.

Hand release lever location is required for HL, FHL, and HLH options.



Position 1 | Position 2 | Position 3 | Position 4

Corrosion Protected Brake (RG) — Build



The brake is fitted with a stainless steel brake plate to provide additional protection in severe and wet environments.

Dust and Corrosion Protected Brake (SR) — Build

A rubber-sealing boot is installed on the brake to provide additional protection in dusty environments. This feature includes the stainless steel brake plate (RG).

IP66 Brake Enclosure (IP66) — Build

A sealed brake with IP66 enclosure protection can also be provided. This brake has a different mechanical housing that provides a higher degree of protection against severe environments.

Brake Heating — Build

Brakes can be provided with a number of different heating systems. Contact NORD to discuss the details of your application.

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