

Power Regenerative Unit selection

Delta offers four model selection methods of REG2000:

- A. Make selection base on the specs of brake resistor
Suit for applications that require to perform rapid acceleration and deceleration, such as tapping drilling machines and lathes.
- B. Make selection base on the overload ability of drive
Servo drive has higher overload ability than an inverter.
- C. Make selection base on the load characteristics of applications
Calculate the regenerated power of the application using the application's system characteristics and specifications, especially for elevator and hoist application.
- D. Make selection base on Product Selection Wizards
Delta offer Product Selection Wizards software beta version, you can get the recommended REG model through Product Selection Wizards.

The four model selection methods are described in more detail below:

Model selection method 1 (base on the specs of brake resistor)

Take 220V as an example, if a 1500W 13Ω brake resistor is selected, with brake level set to 380V, then the total braking current would be $380V / 13\Omega = 29A$.

DC power equals AC power, i.e. $V_{dc} * I_{dc} = \sqrt{3} * V_{ac} * I_{ac}$

V_{ac} is AC voltage

I_{ac} is AC current

V_{dc} is DC voltage

I_{dc} is DC current

i.e. $I_{ac} = (V_{dc} * I_{dc}) / (\sqrt{3} * V_{ac}) = (380 * 29) / (\sqrt{3} * 220) = 28.9A$

The brake resistor's braking torque is 125% at 10%ED, and REG2000 is 150% at 10%ED, therefore selections can be made using REG2000's current at 150% in the following tables. In this example, REG075A23A-21 can be selected, as the current at 150% of 30A > total braking current of 28.9A

230V series

Frames		A		B			C	
Model REG__ _A23A-21		075	110	150	185	220	300	370
Rated power (kW)		7.5	11	15	18.5	22	30	37
Mains	Input current (A)	20	32	38	49	60	80	100
	Input current at 150%	30	48	57	73.5	90	120	150

460V series

Frames	A	B	C
--------	---	---	---

Model REG___A43A-21	075	110	150	185	220	300	370	450	550	
Rated power (kW)	7.5	11	15	18.5	22	30	37	45	55	
Mains	Input current (A)	10.5	17	20	25	32	43	49	60	75
	Input current at 150%	15.8	25.5	30	37.5	48	64.5	73.5	90	112.5

* Please contact Delta if the required current exceeds those listed above.

Model selection method 2 (base on the overload ability of drive)

Make the selection based on the overload ability of the drive. The table as below is an example that C2000 using with REG2000 when the condition is 10%ED and maximum regenerated work time during one cycle is 10sec. The overload ability of C2000 is 160% 3sec and 120% 60sec base on rated output current

Voltage	10%ED 10s		
	Drive	REG selection	
	kW	Model	Quantity
220V	0.7	REG075A23A	1
	1.5	REG075A23A	1
	2.2	REG075A23A	1
	3.7	REG075A23A	1
	5.5	REG075A23A	1
	7.5	REG075A23A	1
	11	REG110A23A	1
	15	REG110A23A	1
	18	REG150A23A	1
	22	REG185A23A	1
	30	REG220A23A	1
	37	REG300A23A	1
	45	REG370A23A	1
	55	Please contact the Delta factory	-
	75		
	90		

Voltage	10%ED 10s		
	Drive	REG selection	
	kW	Model	Quantity
440V	0.7	REG075A43A	1
	1.5	REG075A43A	1
	2.2	REG075A43A	1
	3.7	REG075A43A	1
	4	REG075A43A	1
	5.5	REG075A43A	1
	7.5	REG075A43A	1
	11	REG075A43A	1
	15	REG110A43A	1
	18	REG150A43A	1
	22	REG185A43A	1
	30	REG220A43A	1
	37	REG300A43A	1
	45	REG370A43A	1
	55	REG450A43A	1
	75	REG550A43A	1
90	Please contact the Delta factory	-	
110			
132			
160			
185			
220			
280			
315			
355			

Model selection method 3 (base on the load characteristics of applications)

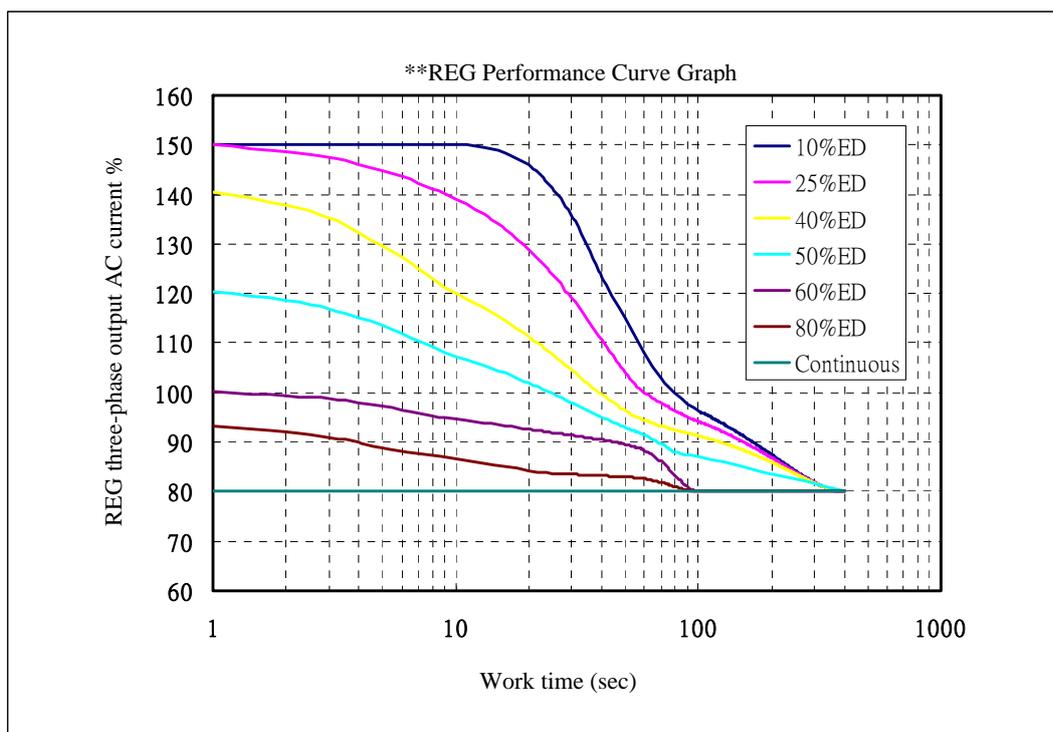
Crane/Hoist Application

The equipment weighs 10 tons, drive model: VFD075CH43A, with a 5.5kW motor

From the crane's specification we know

Model No.	V10C4B036I-W18I		Serial No.	
Capacity	10	TON	Duty Cycle	40%ED, ISO M5
Lifting Height	9	m	Hoisting Speed	3.6/0.36 m/min
Trolley Type	W		Traveling Speed	24/2.4 m/min
Main Voltage	380/60	V/Hz	Date	2010/9/15

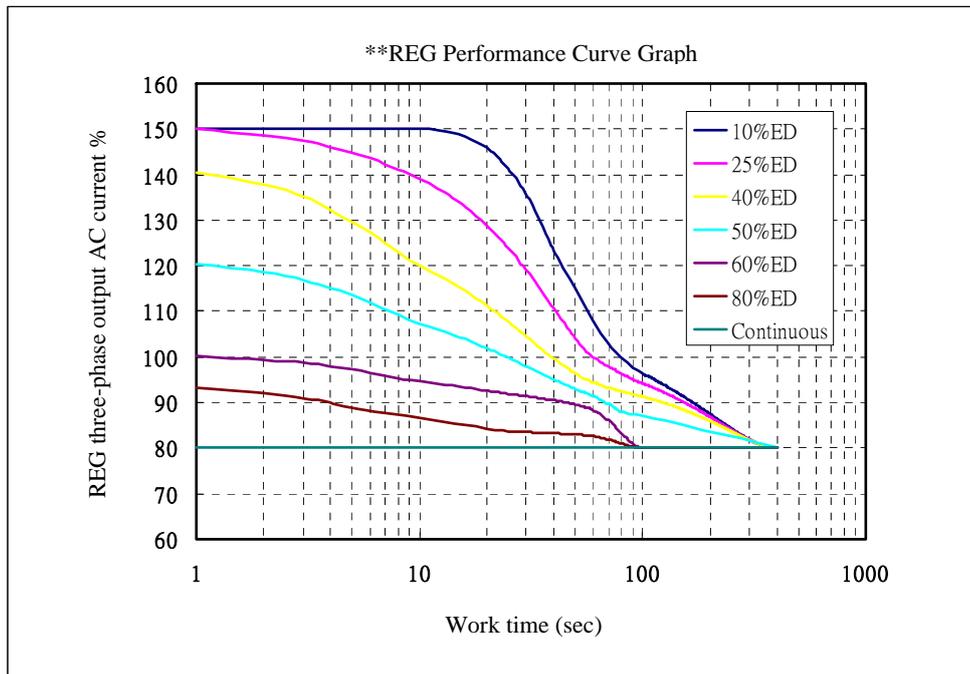
1. In high-speed operation, the time it takes from top to bottom is $9(m)/3.6(m/min) = 2.5(min) = 150(sec)$
2. Assuming the motor efficiency is 85%, mechanical efficiency is 85%, and the drive and the REG2000's efficiencies are both 95%, the useful power output would be $5.5kW * 0.85^2 * 0.95^2 = 3.57kW$
3. When using the REG2000, and mains voltage is 380V, the current would be $3.57kW / (\sqrt{3} * 380V) = 5.4 A$
4. From the table below, at 40%ED, and a working duration of 150s, the output current must be lower than 90% of the rated current to not cause overloading.
5. From the specification sheet, REG075A43A-21 rated current is 10.5A, $10.5A * 90\% = 9.45A > 5.4A$ therefore, in this case, we can select REG075A43A-21



Elevator Application

In an elevator with 2 ton working load, a speed of 60m/min, floors from B1 - 4F, using 22kW motor, and a counterweight of 48%

1. The elevator takes 30s to reach 4F from B1, the whole trip takes 100s, then $ED = 30/100 = 30\%$
2. Assuming the motor efficiency is 85%, mechanical efficiency is 85%, and the drive and the power feedback unit's efficiencies are both 95%, the useful power output would be $22kW * 85% * 85% * 95% * 95% = 14.3kW$
3. When using the REG2000, and mains voltage is 380V, the current would be $14.3kW / (\sqrt{3} * 380V) = 21.8 A$
4. From the table below, at 30%ED, and a working duration of 30s, the output current must be lower than 115% of the rated current to not cause overloading.



5. From the specification sheet,
REG110A43A-21 if rated current is 17A, $17A * 115\% = 19.55A < 21.8A$,
REG150A43A-21 if rated current is 20A, $20A * 115\% = 23A > 21.8A$,
therefore, in this case, we can select REG150A43A-21

Model selection method 4 (base on Product Selection Wizards)

To use this method, the pickup current must be known, and then use the Product Selection Wizards to make the optimal selection.

In the crane/hoist example, just enter the REG three-phase output AC current, work time, and cycle time to get a recommended model.

Customer use VFD075CH23A for hoist application and the maximum output current is 9 amps during regenerated. The regenerated working time is 150 sec and a complete cycle is 375 sec (including hoist UP and DOWN)

Please refer to the REG2000 announcement to get the Product Selection Wizard beta version.

The screenshot shows the DELTA REG_ST software interface. At the top, the DELTA logo and "DELTA ELECTRONICS, INC." are displayed. Below this, there are two tabs: "Current Selection" and "Elevator Application". A diagram illustrates the duty cycle with a pulse width 't' and a period 'T'. The "Setting" section includes a "Voltage(V)" dropdown set to "380V", a "condition" dropdown set to "REG output current(Aac)", and radio buttons for "Simple setting" (selected) and "Multiform setting". The "Simple application" section has input fields for "REG output current(Aac)" (9), "Temperature(°C)" (30), "Working time-t(sec)" (150), and "Period-T(sec)" (375), with a "Continuous" checkbox. The "Result" section shows "Duty (%ED)" as 40 and the recommended model "REG075A43A". A blue checkmark icon is at the bottom right.

Parameter	Value
Voltage(V)	380V
condition	REG output current(Aac)
REG output current(Aac)	9
Temperature(°C)	30
Working time-t(sec)	150
Period-T(sec)	375
Duty (%ED)	40
Recommended Model	REG075A43A