

AC Line Regenerative Module

Our AC Line Regen Module turns any PWM AC Drive into a Line Regenerative AC Drive. Excess (regenerative) energy from the AC Motor is efficiently returned to the AC Power Line, eliminating the need for expensive, bulky and inefficient braking resistors. This is especially true when continuous braking is required.



Typical Applications that require regeneration are:

- High Inertia Loads that must be stopped or slowed down quickly - Saws, Fans, Flywheels and Centrifuges.
- Unwind Stands of all types - Uncoilers, Payoffs
- Overhauling Loads - Hoists, Cranes, Downhill Conveyors and Holdback Rolls in Process Line Applications.
- Machine applications with fast cycle times that require rapid deceleration.

Our AC Line Regen Module is easy to use. There are only five wires to connect: 3 - AC Power and 2 - DC Bus.

Our AC Line Regen Modules are 99% efficient and operate at near unity power factor. Modules are easily paralleled for higher power applications.

- **ELIMINATES THE NEED FOR ENERGY WASTING BRAKING RESISTORS**
- **PROVIDES CONTINUOUS REGENERATION ON OVERHAULING LOADS**
- **INSTANTANEOUS ENERGY FLOW BETWEEN LOAD & UTILITY**
- **PREVENTS AC DRIVES FROM OVERVOLTAGE TRIPPING**
- **ALLOWS RAPID STOPPING OF HIGH INERTIA LOADS**
- **USES THE LATEST GENERATION OF IGBT POWER DEVICES**
- **DELIVERS SUBSTANTIAL ENERGY SAVINGS**
- **PHASE INSENSITIVE TO THE AC POWER LINE**

SPECIFICATIONS AND FEATURES

Electrical Specifications:

Rated Input Voltage:	200-250Vac, 380-500Vac, 500-600Vac -10% of minimum, +10% of maximum.
Frequency Tolerance:	47-63 Hz
Number of Phases:	3
Efficiency:	99% or greater
Max. Short Circuit Current Rating:	200,000A rms symmetrical, 600 volts (when used with AC input line fuses specified in tables 1 to 3).
Noise Immunity:	IEEE C62.41-1991 Category B (Formerly known as IEEE 587) - 6000V tests EN50082-1, 2 Generic Immunity Standards IEC 1000-4-2 (IEC 801-2) IEC 1000-4-3 (IEC 801-3) IEC 1000-4-4 (IEC 801-4) IEC 1000-4-5 (IEC 801-5) IEC 1000-4-6 (IEC 801-6) IEC 1000-4-8 (IEC 801-8)

Environmental Specifications:

Ambient Temperature:	-10°C to 55°C (14°F to 131°F) Nema type 1 enclosed.
Storage Temperature:	-40°C to 70°C (-40°F to 158°F) Nema type 1 enclosed.
Altitude:	Sea level to 3000 Feet [1000m] without derating.
Humidity:	95% relative humidity non-condensing.
Vibration:	9.8m/sec ² (1.0G) peak.

Physical attributes:

Mounting:	Though hole or panel mount.
Nema Rating:	Type 1 (IP20) as standard, Type 12 (IP54) optional.
Construction:	Steel construction (reduces E.M.I.)

Control I/O:

- 2 Digital Inputs: Regen Enable & Regen Reset
- 2 Digital Outputs: Form C dry contacts rated 115Vac @ 5A; 30Vdc @ 3.5A.
- 1 meter output: Use with 100 μ A movement analog meter.
- 24Vdc source: Use to power operator pushbuttons and US Drives option boards: 24Vdc @ 100 mA max.

Protective Features:

- Peak output current monitoring to protect against line-to-line shorts and line-to-ground shorts.
- Ground fault monitoring.
- Heatsink over-temperature monitoring.
- AC line & DC bus over-voltage protection.
- AC line & DC bus under-voltage protection.
- Control power supply power ride-thru.
- Internal power supply monitoring.
- AC phase loss detection.

Standard Regen Features

- Latest generation IGBT.
- Nema type 1 (IP20) as standard for all models.
- 55°C ambient with standard Nema type 1 (IP20) enclosure.
- High voltage ratings: 250Vac+10% , 500Vac+10% models, and 600Vac+10% models
- Input line suppression: Metal oxide varistors for line-to-line and line-to-ground voltage surge protection.
- No programming or hardware jumper for all voltages.

Table 1
Class 200 AC Regen Models (Typical Voltage 208/230/240 VAC)

200-250VAC (-10% to +10%)							
Frame Designation	NEMA 1 (IP20) Catalog Number	Continuous DC Bus Current (Amps)	Continuous Regen Power ¹ KW	Drive HP ²	AC Current (Amps)	Maximum Recommended AC Line Fuses ³ (Amps)	Total Power Losses ⁴ (W)
SIZE 1	RG-0200-0030-N1	30	11	15	29	40	176
	RG-0200-0045-N1	45	16	20	44	60	239
	RG-0200-0060-N1	60	21	30	58	90	302
	RG-0200-0090-N1	90	32	40	85	125	428
	RG-0200-0120-N1	120	42	60	116	175	554
	RG-0200-0180-N1	180	63	75	175	250	806
SIZE 2	RG-0200-0240-N1	240	84	100	233	350	1058
	RG-0200-0300-N1	300	105	125	291	450	1300
	RG-0200-0360-N1	360	126	150	349	600	1562
SIZE 3	RG-0200-0480-N1	480	168	200	466	700	2066
	RG-0200-0540-N1	540	189	250	524	900	2318
	RG-0200-0600-N1	600	210	300	582	900	2570
	RG-0200-0720-N1	720	252	350	698	1000	3074
	RG-0200-0840-N1	840	294	400	815	1200	3578
	RG-0200-0960-N1	960	336	450	931	1200	4082
	RG-0200-1080-N1	1080	378	500	1048	1500	4586
	RG-0200-1440-N1	1440	504	700	1397	2000	6098

¹ KW based on 240Vac AC Power line.

² Drive HP ratings are calculated for 230 VAC Motors based on 100% Continuous Regeneration and 150% Regeneration for 1 Minute or Less.

Consult Factory for Module sizing when Regeneration requirements are less than or greater than these values.

³ UL Class T, High Speed/Class J, and Semiconductor Fuses (preferred): Ferraz Shawmut A50P, A60X, Bussmann FWH.

⁴ Total Power Loss shown is for continuous operation at full regeneration.

Table 2
Class 400 AC Regen Models (Typical Voltage 380/415/480 VAC)

380-500VAC (-10% to +10%)							
Frame Designation	NEMA 1 (IP20) Catalog Number	Continuous DC Bus Current (Amps)	Continuous Regen Power ¹ KW	Drive HP ²	AC Current (Amps)	Maximum Recommended AC Line Fuses ³ (Amps)	Total Power Losses ⁴ (W)
SIZE 1	RG-0400-0030-N1	30	21	30	29	40	200
	RG-0400-0045-N1	45	32	40	44	60	275
	RG-0400-0060-N1	60	42	60	58	90	350
	RG-0400-0090-N1	90	63	75	85	125	500
	RG-0400-0120-N1	120	84	100	116	175	650
	RG-0400-0180-N1	180	126	150	175	250	950
SIZE 2	RG-0400-0240-N1	240	168	200	233	350	1250
	RG-0400-0300-N1	300	210	300	291	450	1525
	RG-0400-0360-N1	360	252	350	349	600	1850
SIZE 3	RG-0400-0480-N1	480	336	450	466	700	2450
	RG-0400-0540-N1	540	378	500	524	900	2750
	RG-0400-0600-N1	600	420	600	582	900	3050
	RG-0400-0720-N1	720	504	700	698	1000	3650
	RG-0400-0840-N1	840	588	800	815	1200	4250
	RG-0400-0960-N1	960	672	900	931	1200	4850
	RG-0400-1080-N1	1080	756	1000	1048	1500	5450
	RG-0400-1440-N1	1440	1008	1400	1397	2000	7250

¹ KW based on 480Vac AC Power line.

² Drive HP ratings are calculated for 460 VAC Motors based on 100% Continuous Regeneration and 150% Regeneration for 1 Minute or Less.

Consult Factory for Module sizing when Regeneration requirements are less than or greater than these values.

³ UL Class T, High Speed/Class J, and Semiconductor Fuses (preferred): Ferraz Shawmut A50P, A60X, Bussmann FWH.

⁴ Total Power Loss shown is for continuous operation at full regeneration.

Table 3

Class 500 AC Regen Models (Typical Voltage 525/575/600 VAC)

525-600VAC (-10% to +10%)							
Frame Designation	NEMA 1 (IP20) Catalog Number	Continuous DC Bus Current (Amps)	Continuous Regen Power ¹ KW	Drive HP ²	AC Current (Amps)	Maximum Recommended AC Line Fuses ³ (Amps)	Total Power Losses ⁴ (W)
SIZE 1	RG-0500-0030-N1	30	26	30	29	40	236
	RG-0500-0045-N1	45	39	50	44	60	329
	RG-0500-0060-N1	60	53	75	58	90	422
	RG-0500-0090-N1	90	79	100	85	125	608
	RG-0500-0120-N1	120	105	150	116	175	794
SIZE 2	RG-0500-0180-N1	180	158	200	175	250	1166
	RG-0500-0240-N1	240	210	250	233	350	1538
	RG-0500-0300-N1	300	263	350	291	450	1900
SIZE 3	RG-0500-0360-N1	360	315	400	349	600	2282
	RG-0500-0480-N1	480	420	500	466	700	3026
	RG-0500-0540-N1	540	473	600	524	900	3390
	RG-0500-0600-N1	600	525	700	582	900	3770
	RG-0500-0720-N1	720	630	800	698	1000	4514
	RG-0500-0840-N1	840	735	900	815	1200	5250
	RG-0500-0960-N1	960	840	1000	931	1200	6002
	RG-0500-1080-N1	1080	945	1300	1048	1500	6746
	RG-0500-1440-N1	1440	1260	1750	1397	2000	8978

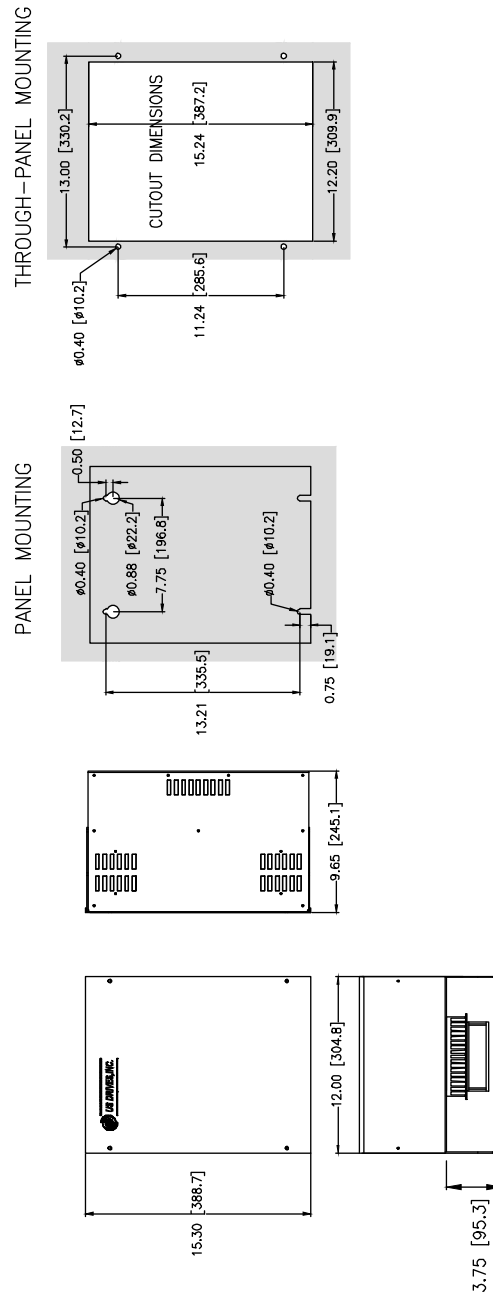
¹ KW based on 600Vac AC Power line.

² Drive HP ratings are calculated for 575 VAC Motors based on 100% Continuous Regeneration and 150% Regeneration for 1 Minute or Less.

Consult Factory for Module sizing when Regeneration requirements are less than or greater than these values.

³ UL Class T, High Speed/Class J, and Semiconductor Fuses (preferred): Ferraz Shawmut A60X, A70P, Bussmann FWP.

⁴ Total Power Loss shown is for continuous operation at full regeneration.

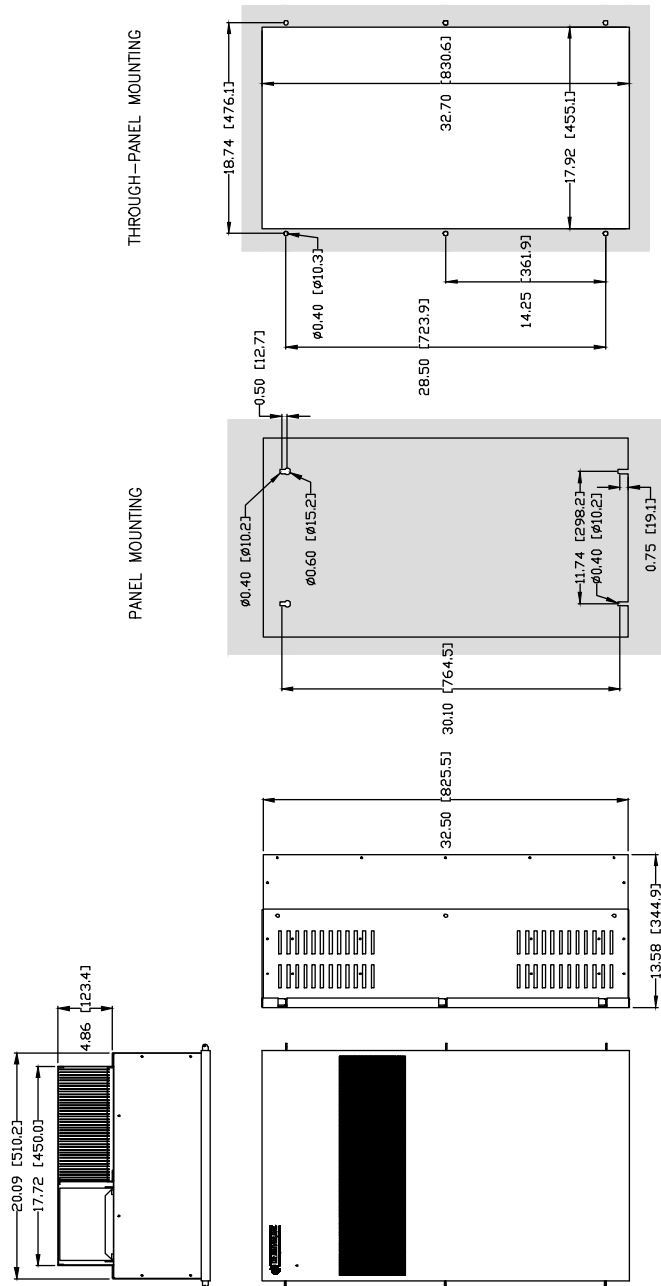


Approximate Weight: 35 Lbs. [16 Kgs]

Notes:

- Top and bottom endplates are removable to gain access inside the drive and to punch holes for conduits.
- Endplates must be removed from the drive before drilling and punching holes to avoid metal dust inside the drive enclosure. Failure to do so will cause damage to the drive.
- For through-panel mounting, customer is to seal for gap on all side of cutout. Provided by customer, aluminum angle 1" x 1" x 0.050" can be used to attach to all sides of drive to help seal and secure the drive.

Figure 2
AC Regen Mounting Information:
Size 1 (Nema Type 1)

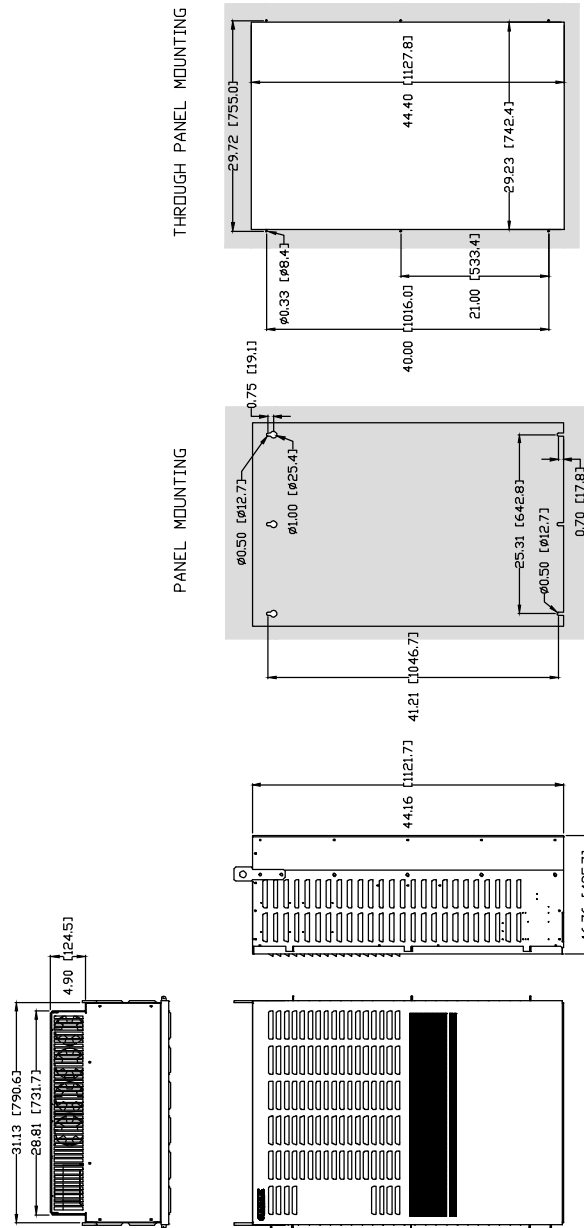


Approximate Weight: 150 Lbs. [68 Kgs]

Notes:

- Top and bottom endplates are removable to gain access inside the drive and to punch holes for conduits.
- Endplates must be removed from the drive before drilling and punching holes to avoid metal dust inside the drive enclosure. Failure to do so will cause damage to the drive.
- For through-panel mounting, customer is to seal for gap on all side of cutout. Provided by customer, aluminum angle 1" x 1" x 0.050" can be used to attach to all sides of drive to help seal and secure the drive.

Figure 2-2a
AC Regen Mounting Information:
Size 2 (Nema Type 1)



Approximate Weight: 450 Lbs. [204 Kgs]

Notes:

- Top and bottom endplates are removable to gain access inside the drive and to punch holes for conduits.
- Endplates must be removed from the drive before drilling and punching holes to avoid metal dust inside the drive enclosure. Failure to do so will cause damage to the drive.
- For through-panel mounting, customer is to seal for gap on all side of cutout. Provided by customer, aluminum angle 1" x 1" x 0.050" can be used to attach to all sides of drive to help seal and secure the drive.
- Size 3 enclosure can also be free-standing with optional floor stand kit from US Drives, Inc.

**Figure 2-2b
AC Regen Mounting Information:
Size 3 (Nema Type 1)**



PHOENIX REGEN

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