

# BRAKING TRANSISTORS FOR AC DRIVES

**B**onitron's M3675T, M3575T and M3452 Braking Modules provide protection for AC adjustable speed drives (ASDs) from overvoltage faults due to regenerated voltage. Typical applications which involve regeneration to the drive are:

- Stopping high inertia loads such as saws, fans, and centrifuges.
- Eccentric loads such as slicers, punch presses, stamping operations, tumblers, and dryers.
- High cycle loads such as machine tool, stackers, and pick and place systems.

**B**onitron's Braking Modules work on any AC drive system that uses a fixed DC bus as with PWM ASDs. Controlled braking of the AC drive dramatically shortens the amount of time required for motor stopping as opposed to coasting to stop. The Bonitron Braking Modules dissipate regenerated energy in resistive loads. Three series of modules are available:

- M3675T Electronics for microdrives up to 10hp.
- M3575T Electronics with IGBT switches for applications up to 600 hp. Master/Slave modules up to 2400 hp.
- M3452 Electronics with IGBT switches for higher duty cycle applications up to 750 hp. Master/Slave modules up to 2400 hp.

**M3675T** series modules are designed to be used with drives that do not include a braking transistor. They monitor the DC drive bus levels and controls the switching transistor which connects the load across the bus. Standard modles are rated up to 10 Amps DC.

**M3575T** series modules are designed to be used with drives that have an inadequate or no internal braking transistor. They monitor the DC drive bus levels and control the IGBT power switch which connects the load across the bus. Standard models up to 600 Amps DC.



**M3675T M3575T M3452**

**M3452** series modules are designed to be used with drives that have an inadequate or no internal braking transistor. They monitor the DC drive bus levels and control the IGBT power switch which connects the load across the bus. Standard models include fusing and are rated up to 600 Amps DC.

**R**esistive Braking Modules are typically used in applications where infrequent, low duty cycle, or low Hp regeneration occurs. The standard duty cycle for the Dynamic Braking Modules is 20% or less. Applications which have duty cycles that exceed 20% should consider the Bonitron M3345 Line Regeneration modules. M3345 Line Regen Modules return regenerated energy to the AC line with near unity power factor! This regenerated energy can be used to power other equipment, providing remarkable cost savings

# BONITRON – INDUSTRIAL ELECTRONICS

## M3675T BRAKING TRANSISTOR MODULES

The model **M3675** Micro Braking Transistor is the newest in a series of Bonitron modules for AC PWM drives. This module is intended for use with drives which do not have an internal brake and which are rated from 0.5 to 10 hp. The module is easily installed. Connections are made to the DC bus of the drive and to an external braking resistor.



*“The transistor modules are rated up to 10 Amps braking current. Packaged in wall mountable NEMA-1 enclosures with Internal Terminal Strip Connections. This version requires a separate resistor load bank sized accordingly.”*

## M3675T MODELS AND PRICING

Peak hp	Duty Cycle	Max Amps	Chassis Type	Part Number	List Price
<b>115 VAC AC Drives</b>					
2.5	20%	10	Enclosed	M3675T-U10	\$ 304
<b>230 VAC AC Drives</b>					
5	20%	10	Enclosed	M3675T-L10	\$ 304
<b>460 VAC AC Drives</b>					
10	20%	10	Enclosed	M3675T-H10	\$ 304

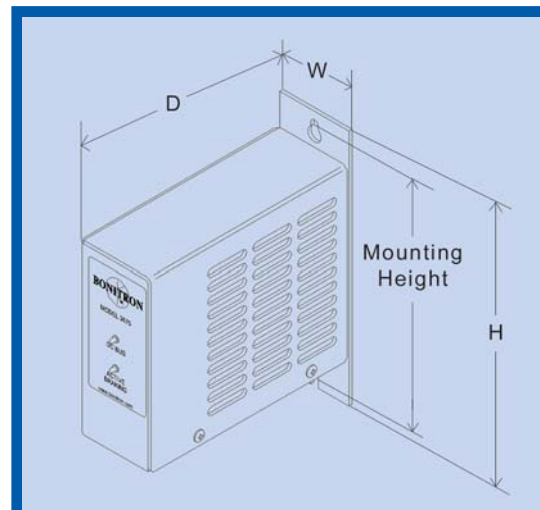
NOTE: These models are not currently UL listed.

## M3675T SPECIFICATIONS

<b>Brake Currents.....</b>	10 Amps DC
<b>Duty Cycle.....</b>	20%
<b>Maximum ON-Time.....</b>	15 Seconds
<b>Chassis Style.....</b>	Enclosed Chassis, 6.5"*2"*6.1", H*W*D
<b>Connections.....</b>	DC Bus+, DC Bus-, Res+, Res-
<b>Wiring.....</b>	Terminal Strip Connections
<b>Indicators.....</b>	DC Bus, Active Braking
<b>Control Power.....</b>	Derived from DC Bus
<b>Turn-ON Voltage.....</b>	750 VDC (460 VAC), 375 VDC (230 VAC), 190 VDC (115 VAC)
<b>Turn-OFF Voltage.....</b>	725 VDC (460 VAC), 363 VDC (230 VAC), 175 VDC (115 VAC)

## M3675 CHASSIS DIMENSIONS

Chassis Type	Dimensions (HxWxD)	Mounting Height
Enclosed	7.00 x 2.06 x 5.90"	6.350



# QUALITY ENGINEERING SERVICES

The Model M3575T series of Resistive Braking Control modules is available in a variety of ratings and configurations for use as an external voltage controlled chopper modules for drives have an inadequate or no internal braking transistors



## MODEL M3575T TRANSISTOR MODULES

*"The transistor modules are rated up to 600 Amps braking current. Packaged in wall mountable NEMA-1 enclosures with IP20 connections. This version requires a separate resistor load bank sized accordingly."*

*\* NOTE: 125-600 Amp models have recessed terminals and integral terminal covers.*

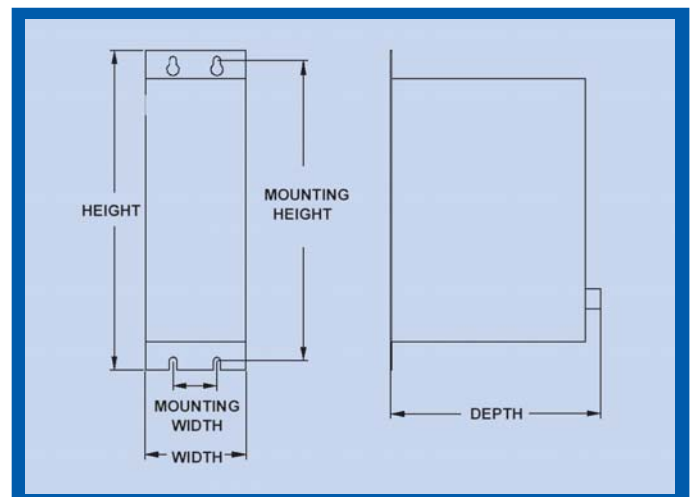
Max DC Amps	Drive hp	Minimum Required Load in $\Omega$ 's	Chassis Type	Part Num.	List Price
<b>230 VAC AC Drives</b>					
15	8	25	M3	* M3575T-L15	\$ 670
30	15	12.5	M3	* M3575T-L30	\$ 788
60	30	6.25	M4	* M3575T-L60	\$ 926
125	62	3	B5	** M3575T-L125	\$ 1,435
150	75	2.5	B5	** M3575T-L150	\$ 1,846
<b>460 VAC AC Drives</b>					
15	15	50	M3	* M3575T-H15	\$ 670
30	30	25	M3	* M3575T-H30	\$ 788
75	75	10	M4	* M3575T-H75	\$ 926
125	126	6	B5	** M3575T-H125	\$ 1,435
150	150	5	B5	** M3575T-H150	\$ 1,846
200	200	3.8	B7	** M3575T-H200	\$ 2,053
300	300	2.5	B7	** M3575T-H300	\$ 2,218
600	600	1.25	B7	** M3575T-H600	\$ 3,043

## M3575T SPECIFICATIONS

<b>Voltages</b> .....	230, 460, VAC UL® Listed (380, 575 VAC Non UL Units Available)
<b>Current</b> .....	5-600 Amps
<b>Connections</b> .....	Drive DC Bus - Resistors - Fault Contact
<b>Control Power</b> .....	Derived from DC Bus
<b>Turn-On Voltage</b> .....	750 VDC (460 VAC), 375 VDC (230 VAC)
<b>Turn-Off Voltage</b> .....	725 VDC (460 VAC), 365 VDC (230 VAC)
<b>Adjustments</b> .....	No Field Adjustments Necessary
<b>Panel Indicators</b> .....	DC Bus, Active Braking
<b>Package</b> .....	NEMA 1
<b>Duty Cycle</b> .....	20% MAX (Use Bonitron M3452 for higher Duty Cycle.)
<b>Maximum 'On-Time'</b> .....	60 Seconds
<b>Faults Output</b> .....	Fault Output Contact Opens on: * Over Temperature * Transistor Failure * Open Load

## CHASSIS DIMENSIONS

Chassis Name	Dimensions (WxHxD)	Mounting (WxH)
M3	3.0 x 12.75 x 8.70"	12.0" (height)
M4	4.00 x 12.75 x 8.70"	1.75 x 12.0"
B5	5.65 x 17.75 x 8.00"	3 x 16.75"
B7	7.00 x 17.75 x 8.00"	5.0 x 16.75"



# BONITRON AC DRIVE MODULES

## M3452 BRAKING TRANSISTOR



The M3452 includes the control electronics, an IGBT transistor, and fusing mounted in an enclosed chassis. Resistive loads connected to these modules should not be less than the minimum load specified. If the horsepower rating of the connected resistors is less than the horsepower available at the maximum current rating, thermostats for interlock control to the AC drive should be used to prevent overloading and subsequent overheating.

Maximum DC Amps	Drive hp	Chassis Style	Duty Cycle	Maximum "On-Time"	Minimum Required Load in $\Omega$ 's	Part Number	List Price
<b>230 VAC Drives</b>							
19	5	K1	50%	120 seconds	20	M3452-L19K1	\$ 731
54	8	K1	25%	120 seconds	6.0	M3452-L54K1	\$ 815
<b>460 VAC Drives</b>							
9	9	K1	100%	Continuous	75	M3452-H9K1	\$ 846
27	27	K1	50%	120 seconds	25	M3452-H27K1	\$ 1,148
75	75	K2	50%	120 seconds	10	M3452-H75K2	\$ 1,409
75	75	B7	100%	Continuous	6.0	M3452-H75B7	\$ 1,690
125	126	K2	50%	120 seconds	6.0	M3452-H125K2	\$ 1,639
150	151	K2	100%	Continuous	5.0	M3452-H150K2	\$ 1,780
150	151	B7	100%	Continuous	5.0	M3452-H150B7	\$ 2,136
200	201	K3	100%	Continuous	3.8	M3452-H200K3	\$ 1,979
200	201	K6	100%	Continuous	3.8	M3452-H200K6	\$ 2,374
300	302	K3	100%	Continuous	2.5	M3452-H300K3	\$ 2,136
300	302	K6	100%	Continuous	2.5	M3452-H300K6	\$ 2,563
600	605	K3	50%	60 seconds	1.25	M3452-H600K3	\$ 2,753
600	605	K6	50%	60 seconds	1.25	M3452-H600K6	\$ 3,303
<b>575 VAC Drives</b>							
9	11	K1	100%	Continuous	105	M3452-C9K1	\$ 971
27	34	K1	50%	120 seconds	35	M3452-C27K1	\$ 1,320
75	95	K2	50%	120 seconds	13	M3452-C75K2	\$ 1,621
75	95	B7	100%	Continuous	13	M3452-C75B7	\$ 1,945
125	158	K2	50%	120 seconds	7.6	M3452-C125K2	\$ 1,885
150	189	K2	100%	Continuous	6.3	M3452-C150K2	\$ 2,048
150	189	B7	100%	Continuous	6.3	M3452-C150B7	\$ 2,457
200	252	K3	100%	Continuous	4.7	M3452-C200K3	\$ 2,275
200	252	K6	100%	Continuous	4.7	M3452-C200K6	\$ 2,730
300	378	K3	100%	Continuous	3.2	M3452-C300K3	\$ 2,456
300	378	K6	100%	Continuous	3.2	M3452-C300K6	\$ 2,947
600	750	K3	50%	60 seconds	1.6	M3452-C600K3	\$ 3,165
600	750	K6	50%	60 seconds	1.6	M3452-C600K6	\$ 3,798

## MODEL 3452 OPEN CHASSIS SPECIFICATIONS

**Voltages**.....230, 380, 460, 575 VAC  
**Connections**.....Drive DC Bus, Input AC Line (single  $\emptyset$   $\pm 10\%$  @ 50 / 60 Hz)  
 Ground, Resistor Load Bank  
**Package**.....Open Chassis ( K6 Enclosed)  
**Panel Indicators**.....DC Bus  
 Control Power  
 Active Braking  
**Duty Cycle**.....See Open Chassis Model Ratings  
**Maximum 'On-Time'**...See Open Chassis Model Ratings  
**Adjustments**.....None  
**Operating Temp**.....0 to 50°C  
**Storage Temp**.....-20 to +65°C  
**Humidity**.....Below 90%, Non Condensing  
**Atmosphere**.....Free of Corrosive Gas and Dust

## CHASSIS DIMENSIONS

Chassis Style	Dimensions W x H x D	Mounting W x H
K1	6.00 x 15.00 x 6.75"	14.00 (Height)
K2	12.00 x 15.00 x 8.00"	11.00 x 14.00"
K3	15.00 x 16.00 x 8.00"	14.00 x 15.00"
K6	7.375 x 20.00 x 10.25"	5.00 x 19.25"
B7	7.00 x 17.75 x 7.70	5.00 x 17.75

