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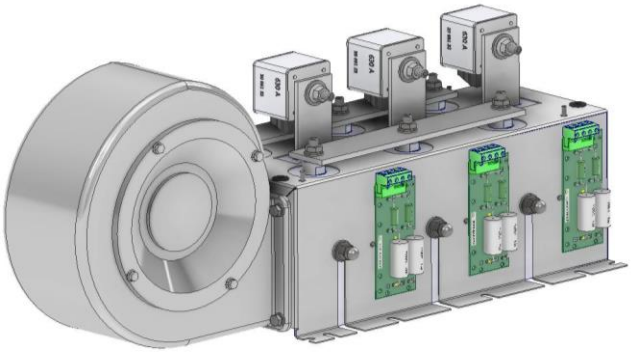
http://gpsemi.it/pdf/GH_016,_021.pdf



GH_016,..,_021
HEXA SCR MODULES

Green Power Easy Module

- ► Electrically insulated metal frame
- ► Extremely high power density
- ► 3000 V_{RMS} insulation voltage
- ► Line voltage range up to 700 V_{RMS}
- ► High reliability
- ► Modularity
- ► Fully customizable
- ► Broad range of accessories
- ► Cost effective solution
- ► Suitable for heavy duty applications

This new family of high power modules brings to the high power applications the same compactness, ease of use and scalability of the lower power semiconductor modules. In addition to these typical features (i.e. standard dimensions, electrical insulation, various circuit types, etc.) the new Green Power Easy Module (GEM) family includes many features aimed to simplify their adoption allowing the end users to focus on their core business. These features include:

• embedded air cooling system (heatsink and fan)
• optimised snubber circuits
• pulse transformer modules
• ducted heat flow.

Maximum ratings of single thyristor

Part number / Parameters		GH_016	GH_021	GH_017	GH_016	Conditions	Units
$I_{T(AV)}$		162	215	177	167	180° cond, half sine Ta = 40 °C Air velocity = 5 m/s	A
$I_{T(RMS)}$		254	338	278	262		A
I_{TSM}		7	13	9	8	50 Hz, Tj = Tjmax, V_R = 0 V	kA
I_{TSM}		7.4	13.7	9.5	8.4	60 Hz, Tj = Tjmax, V_R = 0 V	kA
I^2t		245	845	405	320	50 Hz, Tj = Tjmax, V_R = 0 V	kA^2s
I^2t		223	769	369	291	60 Hz, Tj = Tjmax, V_R = 0 V	kA^2s
V_{DRM}/V_{RRM}		400	400	1600	2200	Tj = Tjmax	V
Tjmax		125	125	125	125		°C

Part Number	V code	V_{DRM} V_{RRM} max repetitive reverse and off-state blocking voltage [V]	I_{DRM} I_{RRM} @ Tjmax [mA]	$V_{L(RMS)}$ maximum suggested RMS line voltage [V]
GH_016	04	400	50	115
GH_021	04	400	100	115
GH_017	16	1600	50	500
GH_016	22	2200	100	700

On-State Characteristics

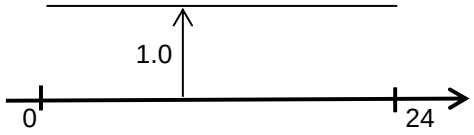
Parameters			GH_016	GH_021	GH_017	GH_016	Conditions	Units
$V_{T(TO)}$	Threshold voltage		0.9	0.9	0.9	1.0	Tj = Tjmax	V
r_T	On-state slope resistance		0.50	0.24	0.65	0.72	Tj = Tjmax	mΩ
I_H	Holding current, max		600	600	600	300	Tj = 25°C	mA
I_L	Latching current, typ		300	1000	1000	1000	Tj = 25°C	mA
P_{MAX}	Max power losses		1074	1285	1264	1247	T_A = 40°C	W

Triggering Characteristics

Parameters			GH_016	GH_021	GH_017	GH_016	Conditions	Units
V_{GT}	Gate trigger voltage		3	2.5	3	3.5	T_j = 25°C, V_D = 5V	V
I_{GT}	Gate trigger current		150	190	200	300	T_j = 25°C, V_D = 5V	mA
P_{GM}	Peak gate power dissipation		10	10	10	10	Pulse width 1 ms	W
$P_{G(AV)}$	Average gate power dissipation		2	2	2	2		W
I_{FGM}	Peak gate current		3	3	3	3		A
V_{FGM}	Peak gate voltage (forward)		20	20	20	20		V
V_{RGM}	Peak gate voltage (reverse)		5	5	5	5		V

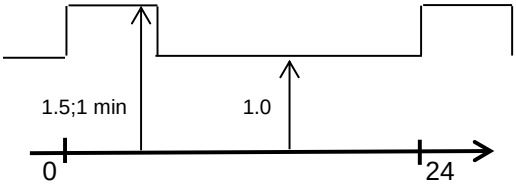
Switching Characteristics

Parameters			GH_016	GH_021	GH_017	GH_016	Conditions	Units
di/dt	Critical rate of rise of on-state current		200	200	200	200	Tj = Tjmax	A/µs
dV/dt	Critical rate of rise of off-state voltage		500	500	500	500	Tj = Tjmax	V/µs
t_q	Turn-off time, typ		200	200	200	200	Tj=Tjmax, IT=1000A di/dt=-20A/µs VR=50V dV/dt=20V/µs	µs



Maximum IEC class 1 currents for typical circuit type

Circuit Type		GH_016	GH_021	GH_017	GH_016	Conditions	Units
Three Phase AC switch		362	480	396	372	T_A = 40 °C delay angle = 0°	A
Six pulse bridge		470	631	511	480	T_A = 40 °C delay angle = 0°	A
Double star with I.P. transf.		942	1261	1025	962	T_A = 40 °C delay angle = 0°	A

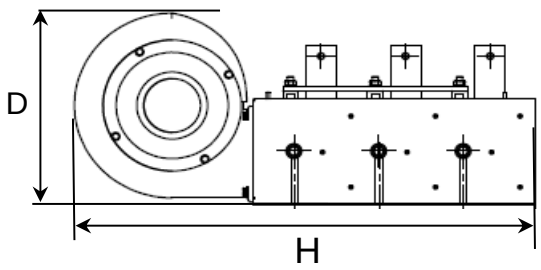


Maximum IEC class 2 currents for typical circuit type

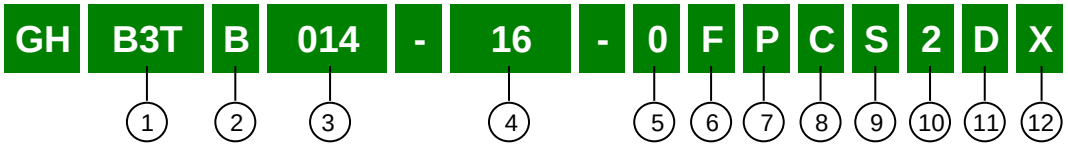
Circuit Type		GH_016	GH_021	GH_017	GH_016	Conditions	Units
Three Phase AC switch		266	365	296	279	T_A = 40 °C delay angle = 0°	A
Six pulse bridge		343	478	380	357	T_A = 40 °C delay angle = 0°	A
Double star with I.P. transf.		680	950	757	711	T_A = 40 °C delay angle = 0°	A

Thermal and mechanical characteristics

Parameters			GH_016	GH_021	GH_017	GH_016	Conditions	Units
T_{jmax}	Max operating junction temperature		125	125	125	125		°C
T_{stg}	Storage temperature		-40 +70	-40 +70	-40 +70	-40 +70		°C
R_{thJA}	Thermal resistance (junction to ambient)		0.499	0.397	0.404	0.409	Air velocity = 5 m/s	°C/W
F	Mounting torque - GEM to panel (+/- 10%)		7	7	7	7	M6 mounting screw	N·m
	Mounting torque - busbar to GEM (+/- 10%)		14	14	14	14	M8 mounting screw	N·m
MTTR	Mean Time To Repair		10	10	10	10		minutes
Overall dimensions								
D	Depth	263						mm
H	Height	599						mm
W	Width	215						mm
m	Mass (with FPC options)	11						kg
Blower electrical characteristics (50/60Hz)								
V_L	Line voltage-single phase	230						V_{RMS}
P	Input power	174						W
A	Current	0.78						A



PART-NUMBERING SYSTEM



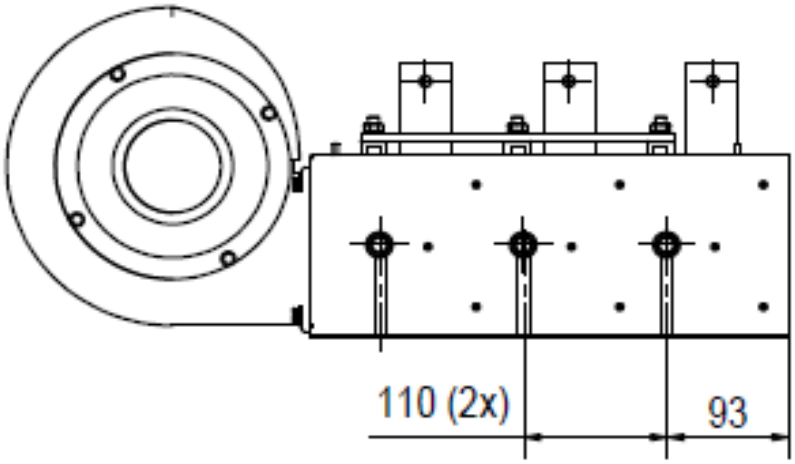
1. Circuit configuration - see table below
2. 0 = No standard busbar B = bridge configuration - D = double star configuration
3. Average current / 10
4. Blocking voltage / 100
5. 0 = No fan B = 220 V blower (other fans available on request)
6. 0 = No fuse - F = Individual fuse - R = individual fuse suitable for regen bridge - L = line fuse
7. 0 = No pulse transformer - P = With pulse transformer (*)
8. 0 = No fan loss detection module - C = With fan loss detection module
9. 0 = No SCR fault detection module - S = SCR fault detection module (only for AC-switches)
10. 0 = No snubber - 3 = three snubber - 6 = six snubbers
11. 0 = No fan-on-demand thermo-switch - D = Fan-on-demand thermo-switch (trip point 50 °C)
12. 0 = Standard aluzinc frame - X = Stainless steel frame

(*) Pulse transformer GT001 (dual) or GT002 (single) depending on the circuit configuration.
For pulse transformer characteristics see their specific datasheets.

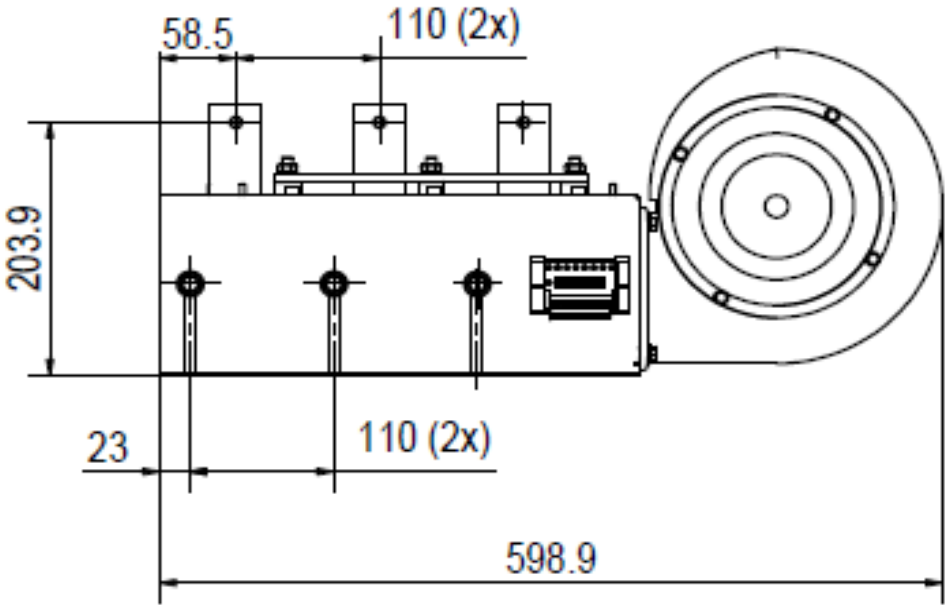
Circuit configuration table	
B3T	six pulse bridge fully controlled
B3H	six pulse bridge half controlled - SCR high side
B3L	six pulse bridge half controlled - SCR low side
DST	double star converter fully controlled - common cathode
DSX	double star converter fully controlled - common anode
W3C	three phase AC-switch

GHB3T Six pulse SCR bridge

Right side view

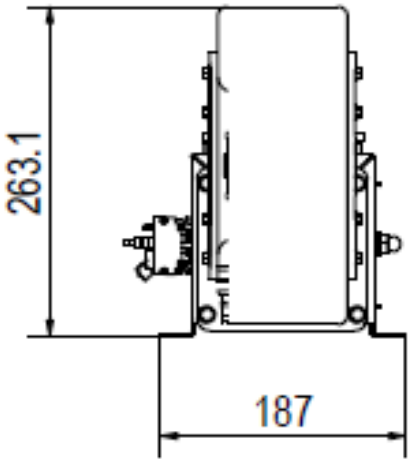


Left side view

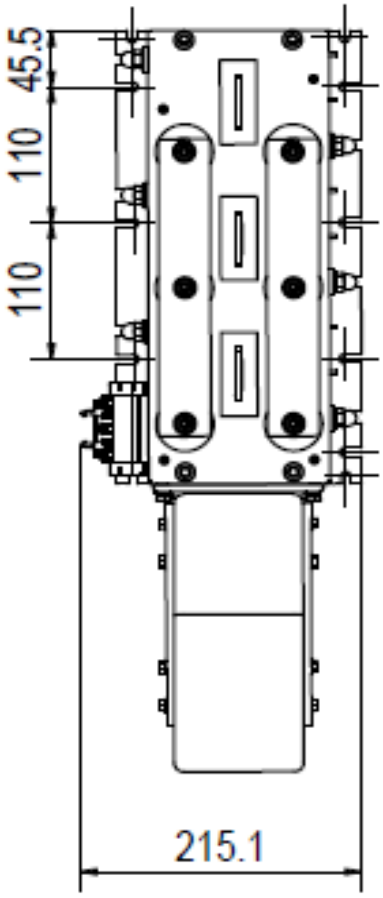


GHB3T Six pulse SCR bridge

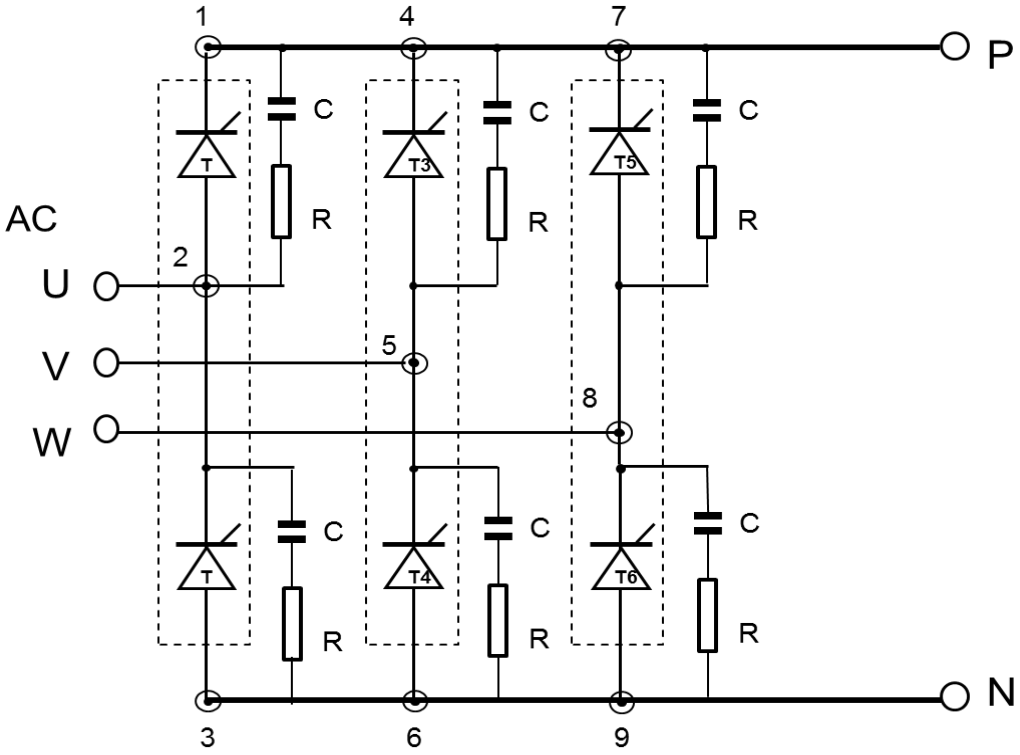
Front view

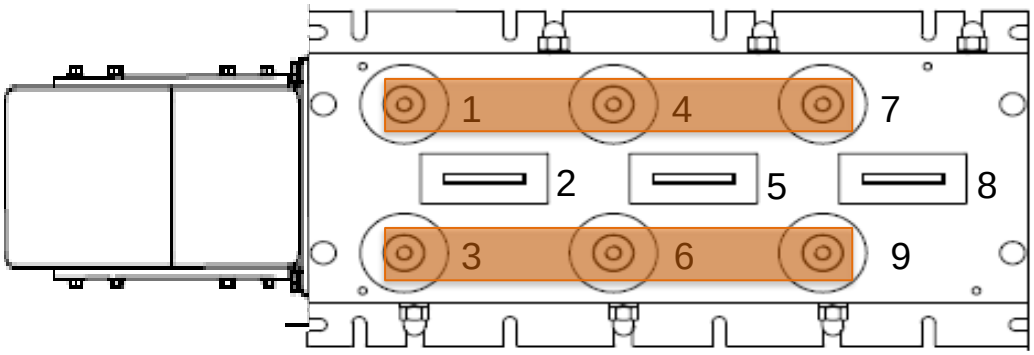


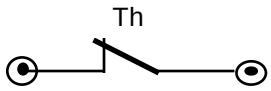
Top view

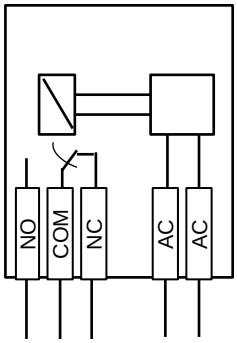


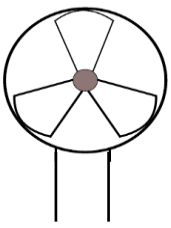
GHB3T Six pulse SCR bridge



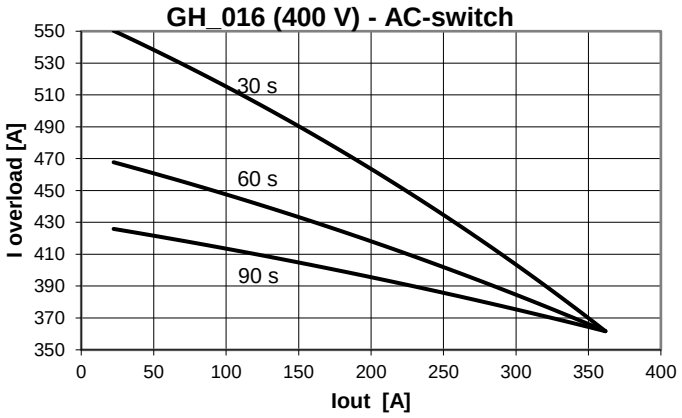


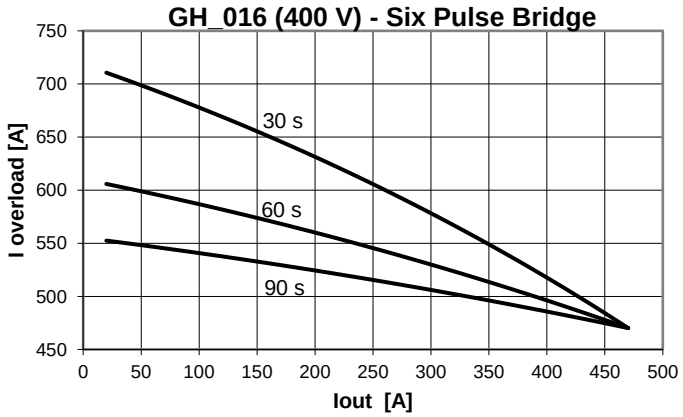


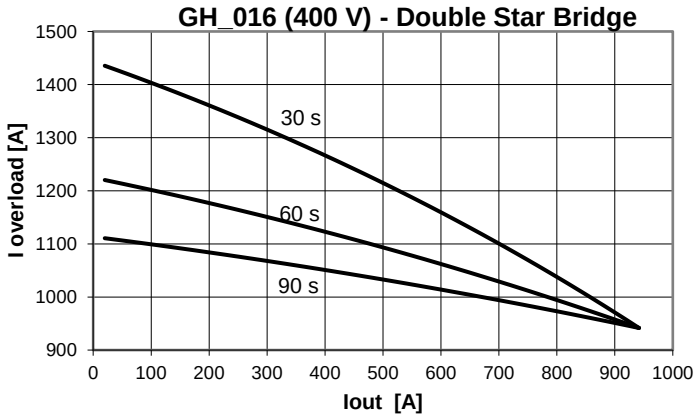




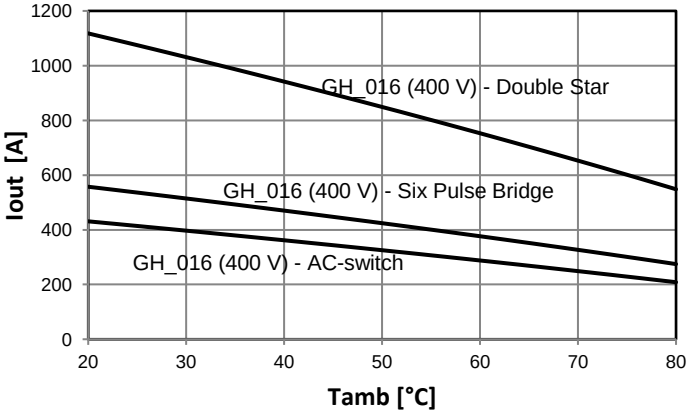
Overload capability at different overload time - Tamb = 40 °C







Max output vs Tamb



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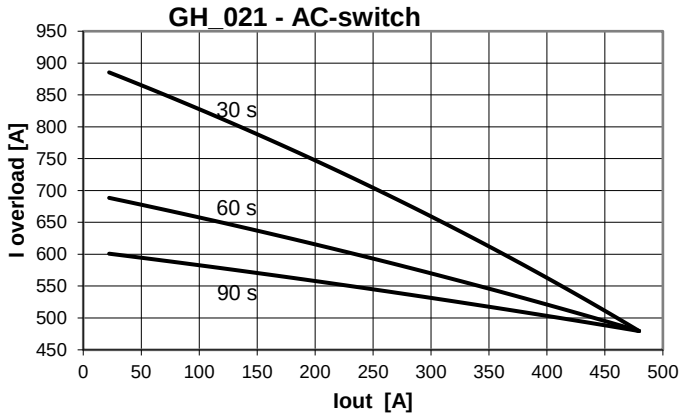
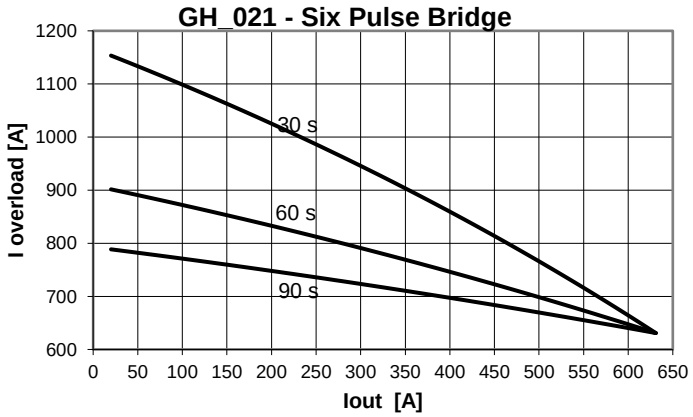
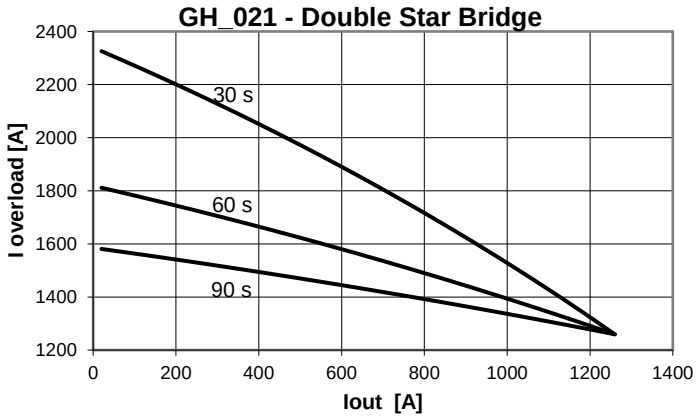
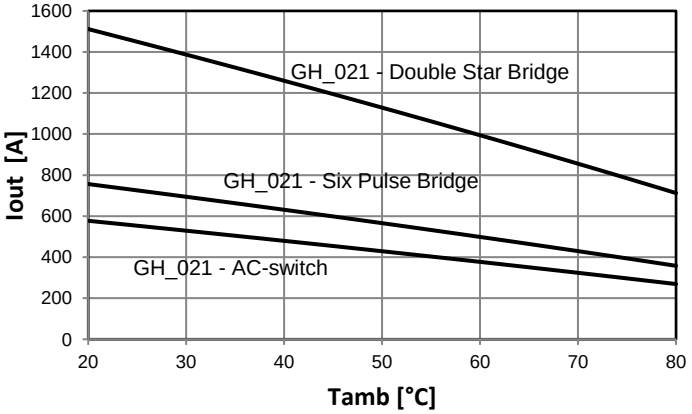






Max output vs Tamb



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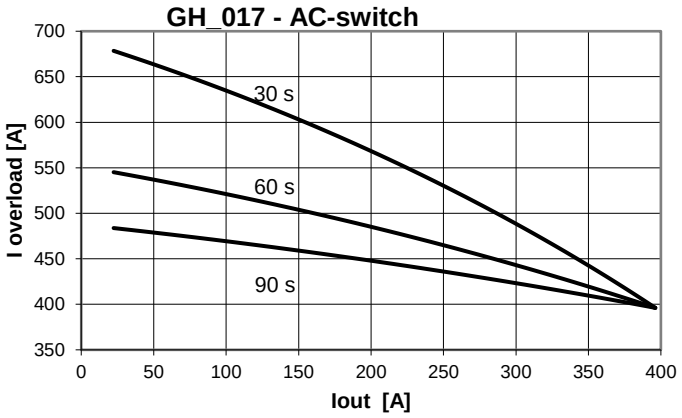

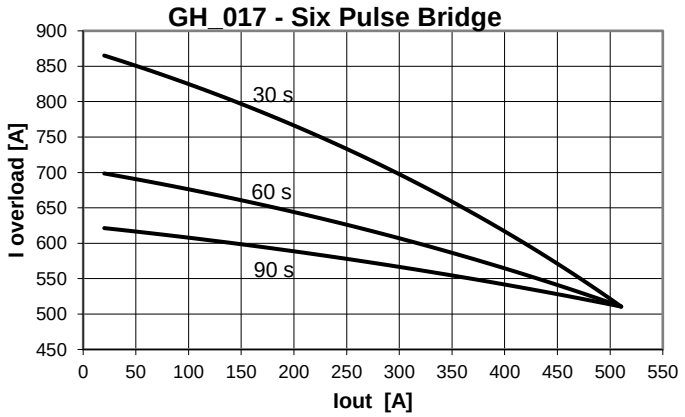

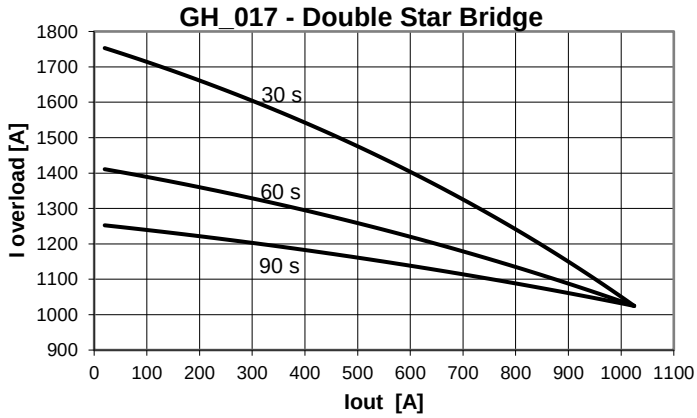

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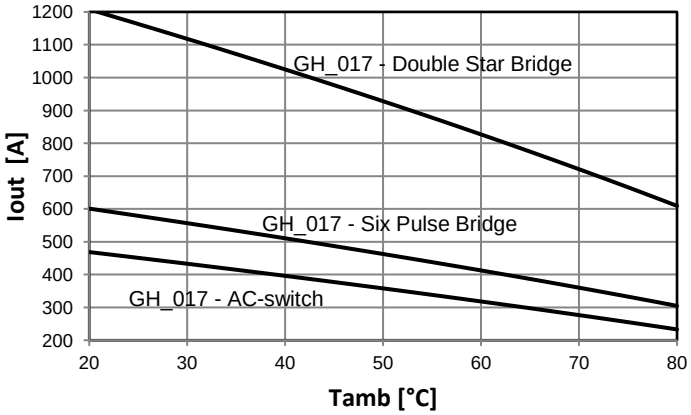

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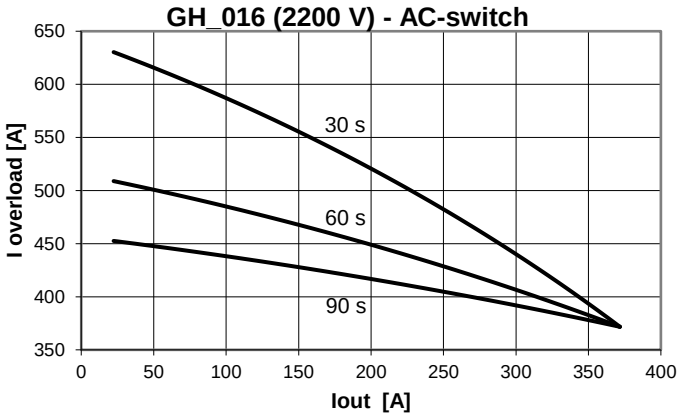

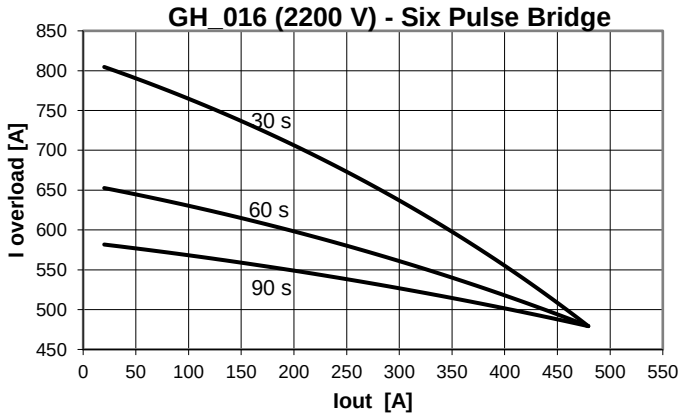

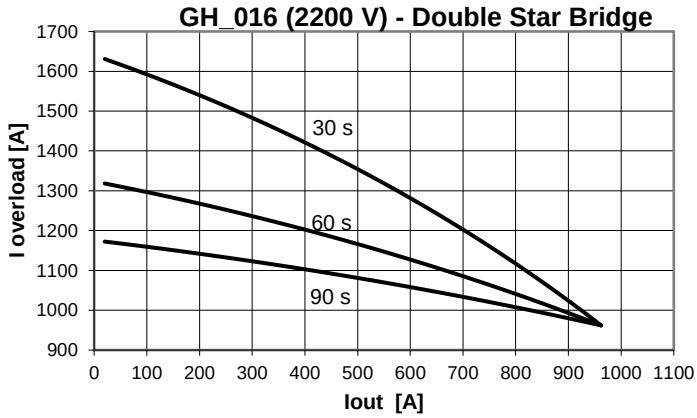

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