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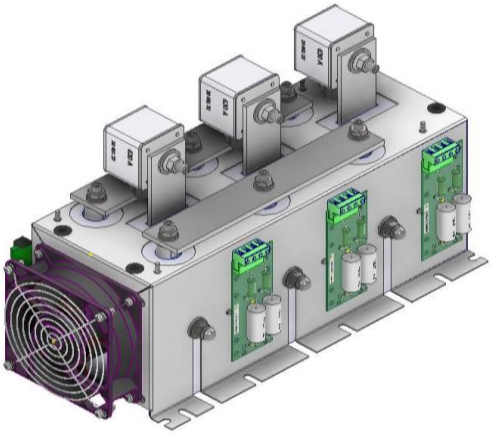
http://gpsemi.it/pdf/GH_011,_017.pdf



GH_011,..,_017
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.
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Part number / Parameters	GH_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
$I_{T(AV)}$	137	118	173	146	137	180° cond, half sine Ta = 40 °C Air velocity = 5 m/s	A
$I_{T(RMS)}$	215	185	272	229	215		A
I_{TSM}	7	6	13	9	8	50 Hz, Tj = Tjmax, V_R = 0 V	kA
I_{TSM}	7.4	6.3	13.7	9.5	8.4	60 Hz, Tj = Tjmax, V_R = 0 V	kA
I^2t	245	180	845	405	320	50 Hz, Tj = Tjmax, V_R = 0 V	kA^2s
I^2t	223	164	769	369	291	60 Hz, Tj = Tjmax, V_R = 0 V	kA^2s
V_{DRM}/V_{RRM}	400	1600	400	1600	2200	Tj = Tjmax	V
Tjmax	125	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_013	04	400	50	115
GH_011	16	1600	50	500
GH_017	04	400	100	115
GH_014	16	1600	50	500
GH_013	22	2200	100	700

On-State Characteristics

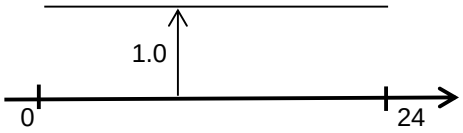
Parameters		GH_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
$V_{T(TO)}$	Threshold voltage	0.9	1.0	0.9	0.9	1.0	Tj = Tjmax	V
r_T	On-state slope resistance	0.50	0.80	0.24	0.65	0.72	Tj = Tjmax	mΩ
I_H	Holding current, max	600	600	600	600	300	Tj = 25°C	mA
I_L	Latching current, typ	300	1000	1000	1000	1000	Tj = 25°C	mA
P_{MAX}	Max power losses	840	875	1010	997	986	T_A = 40°C	W

Triggering Characteristics

Parameters		GH_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
V_{GT}	Gate trigger voltage	3	3.5	2.5	3	3.5	T_j = 25°C, V_D = 5V	V
I_{GT}	Gate trigger current	150	150	190	200	300	T_j = 25°C, V_D = 5V	mA
P_{GM}	Peak gate power dissipation	10	10	10	10	10	Pulse width 1 ms	W
$P_{G(AV)}$	Average gate power dissipation	2	2	2	2	2		W
I_{FGM}	Peak gate current	3	3	3	3	3		A
V_{FGM}	Peak gate voltage (forward)	20	20	20	20	20		V
V_{RGM}	Peak gate voltage (reverse)	5	5	5	5	5		V

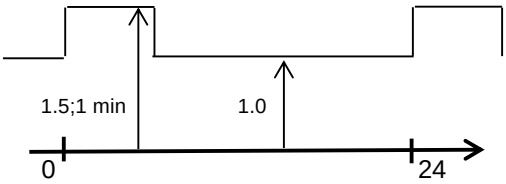
Switching Characteristics

Parameters		GH_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
di/dt	Critical rate of rise of on-state current	200	200	200	200	200	Tj = Tjmax	A/µs
dV/dt	Critical rate of rise of off-state voltage	500	500	500	500	500	Tj = Tjmax	V/µs
t_q	Turn-off time, typ	200	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_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
Three Phase AC switch	306	264	387	326	307	T_A = 40 °C delay angle = 0°	A
Six pulse bridge	400	343	511	423	398	T_A = 40 °C delay angle = 0°	A
Double star with I.P. transf.	800	686	1019	848	797	T_A = 40 °C delay angle = 0°	A

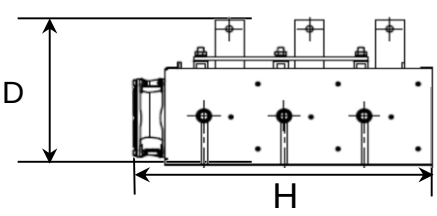


Maximum IEC class 2 currents for typical circuit type

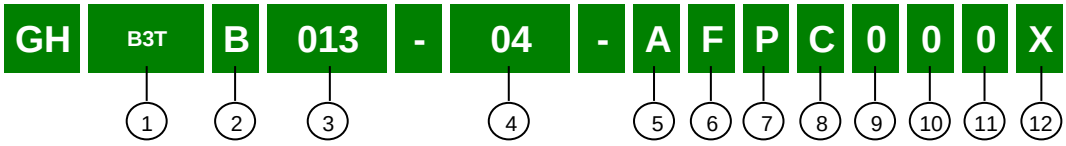
Circuit Type	GH_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
Three Phase AC switch	226	195	295	245	231	T_A = 40 °C delay angle = 0°	A
Six pulse bridge	299	251	368	316	297	T_A = 40 °C delay angle = 0°	A
Double star with I.P. transf.	592	509	769	641	603	T_A = 40 °C delay angle = 0°	A

Thermal and mechanical characteristics

Parameters		GH_013	GH_011	GH_017	GH_014	GH_013	Conditions	Units
T_{jmax}	Max operating junction temperature	125	125	125	125	125		°C
T_{stg}	Storage temperature	-40 +70	-40 +70	-40 +70	-40 +70	-40 +70		°C
R_{thJA}	Thermal resistance (junction to ambient)	0.607	0.583	0.505	0.512	0.517	Air velocity = 5 m/s	°C/W
F	Mounting torque - GEM to panel (+/- 10%)	7	7	7	7	7	M6 mounting screw	N·m
	Mounting torque - busbar to GEM (+/- 10%)	14	14	14	14	14	M8 mounting screw	N·m
MTTR	Mean Time To Repair	12	12	12	12	12		minutes
Overall dimensions								
D	Depth	218						mm
H	Height	411						mm
W	Width	215						mm
m	Mass (with FPC options)	10						kg
Blower electrical characteristics (50/60Hz)								
V_L	Line voltage-single phase	230						V_{RMS}
P	Input power	20						W
A	Current	0.13						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 A = 220 V axial fan V = 115 V axial fan

(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)

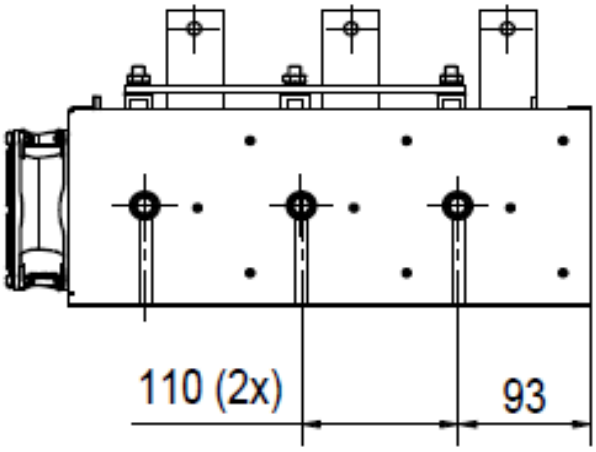
(12) 0 = Standard aluzinc frame - X = Stainless steel frame

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

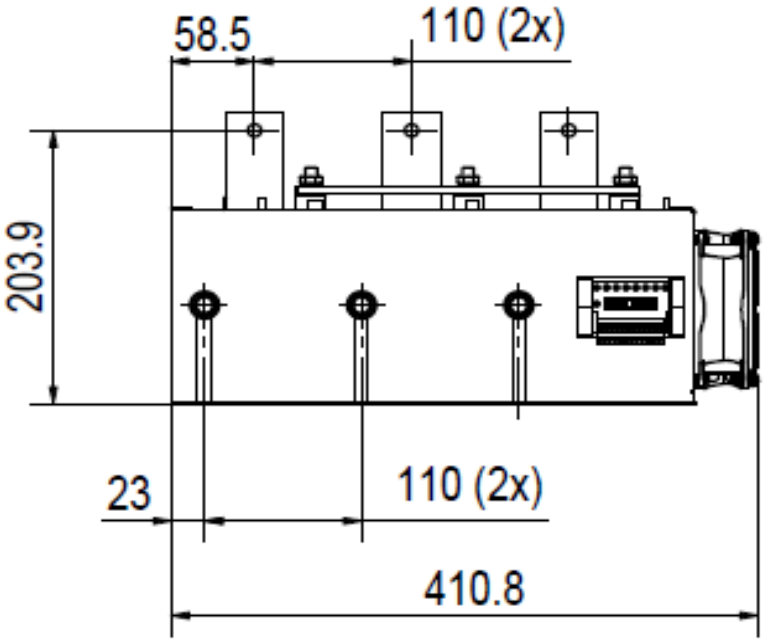
Circuit configuration table	
B3T	six pulse bridge fully controlled
B3H	six pulse bridge half controlled - SCR high side
B3L	six pulse bridge half controlled - SCR low side
DST	double star converter fully controlled - common cathode
DSX	double star converter fully controlled - common anode
W3C	three phase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

GHB3T Six pulse SCR bridge

Right side view

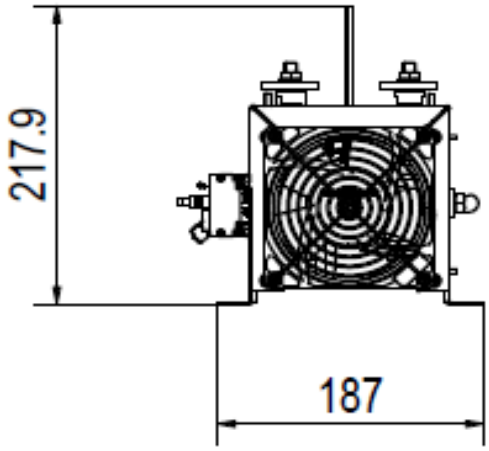


Left side view

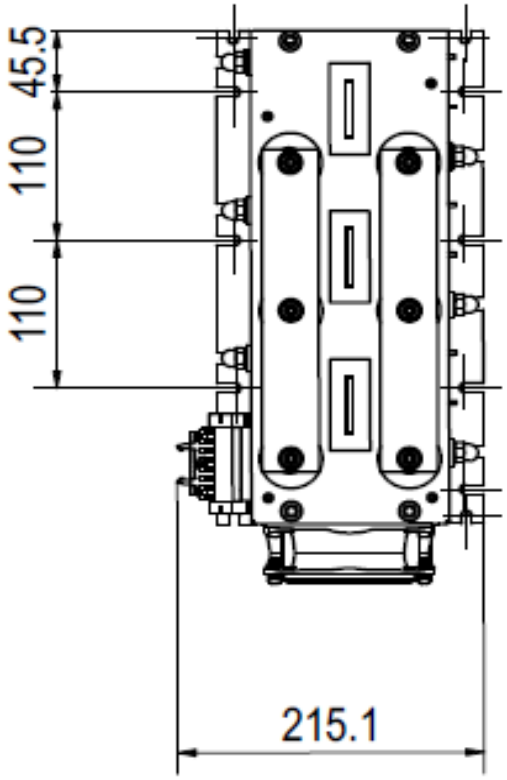


GHB3T Six pulse SCR bridge

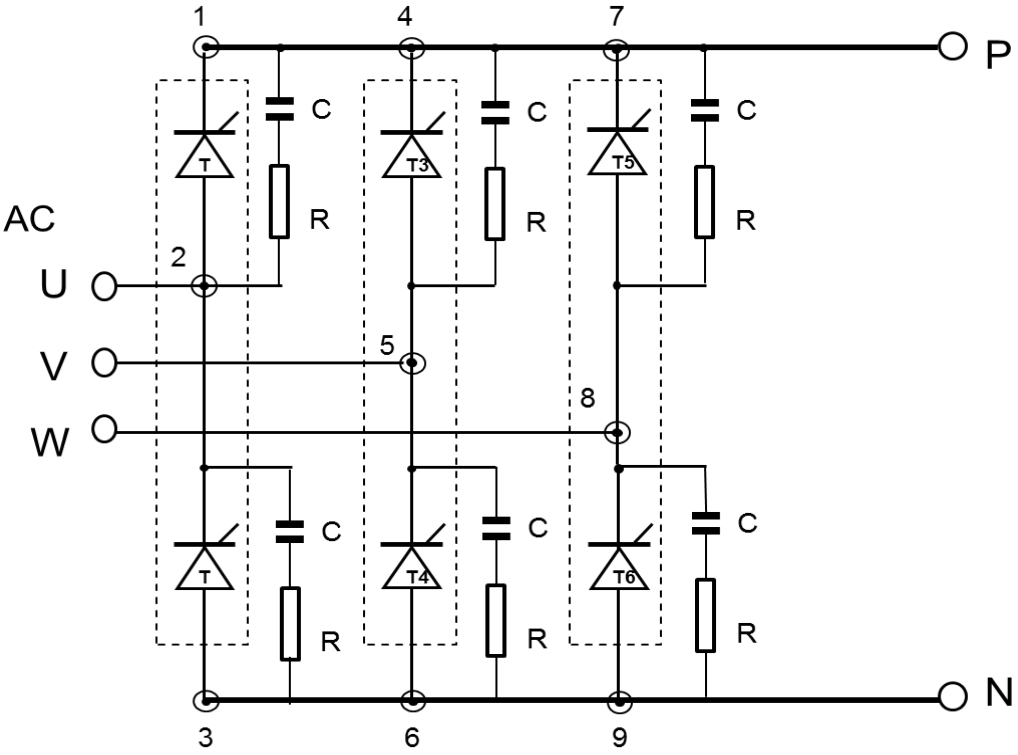
Front view

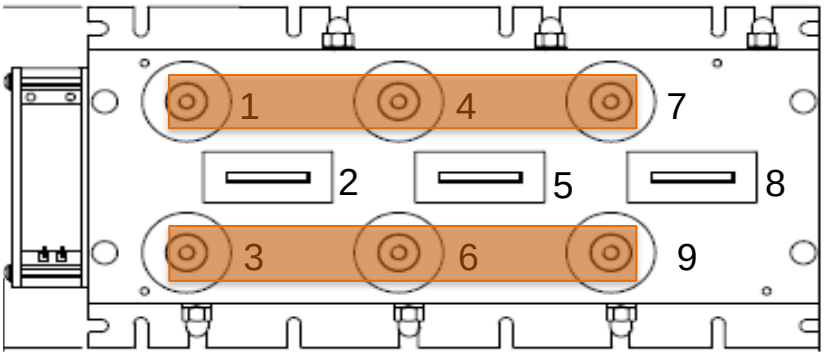


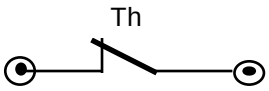
Top view

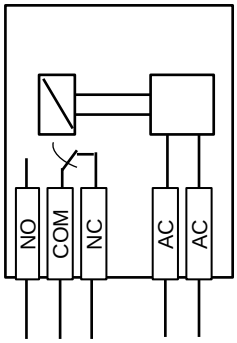


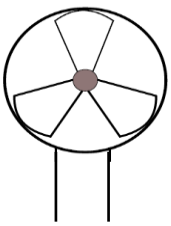
GHB3T Six pulse SCR bridge



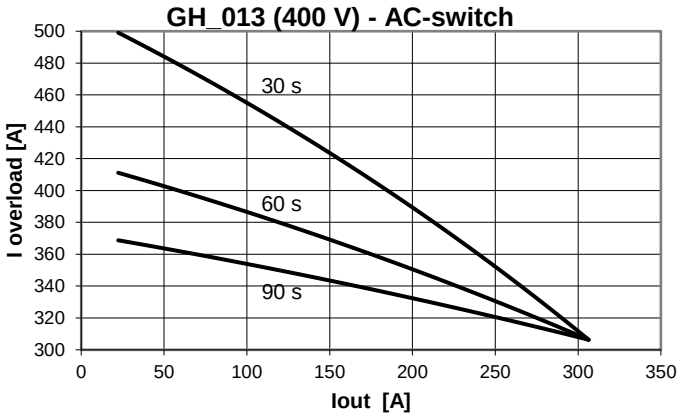


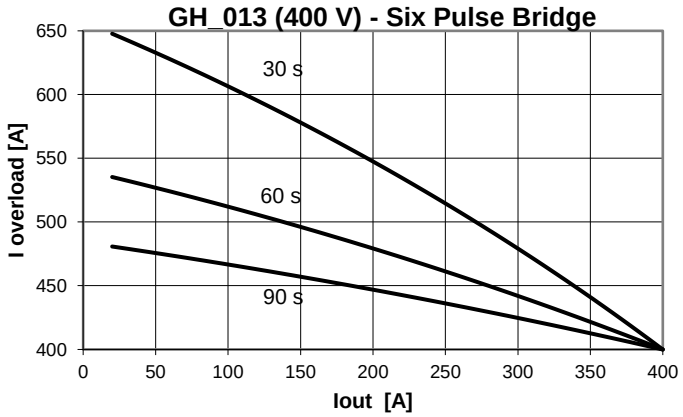


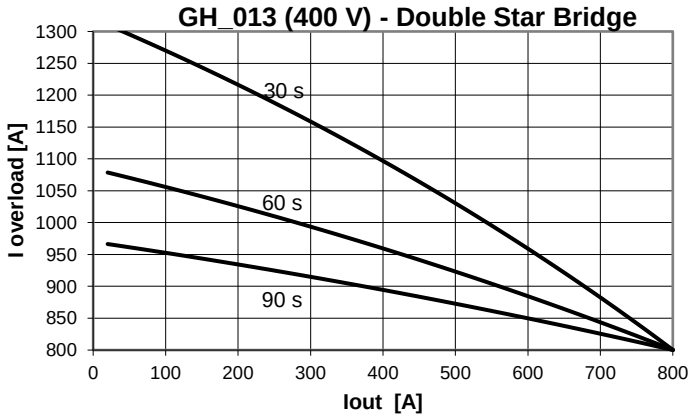




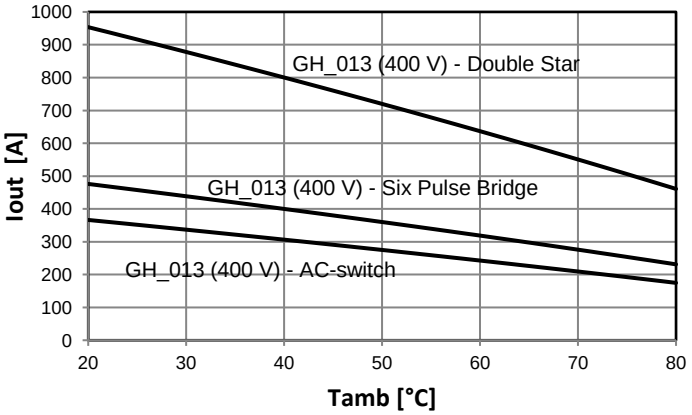
Overload capability at different overload time - Tamb = 40 °C







Max output vs Tamb



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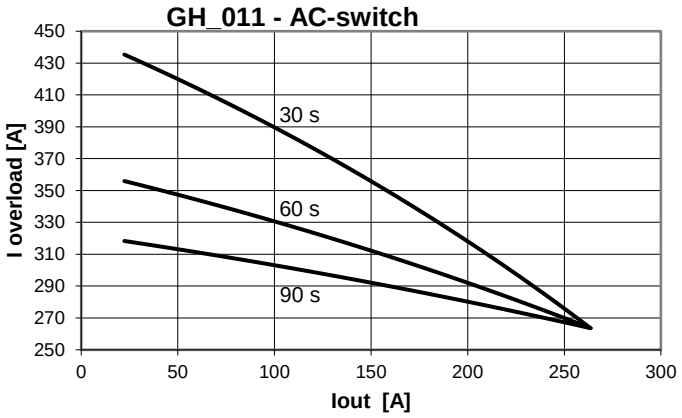

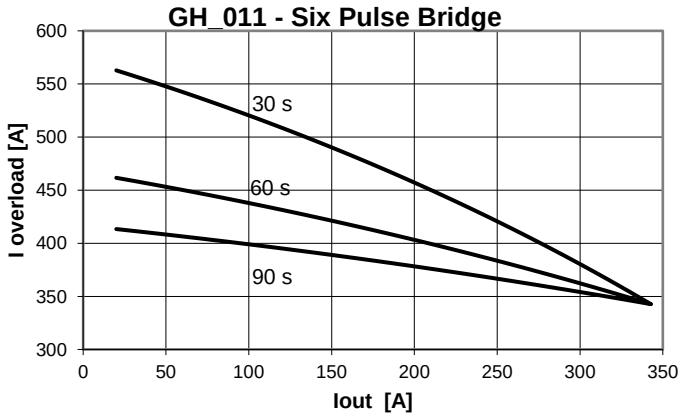

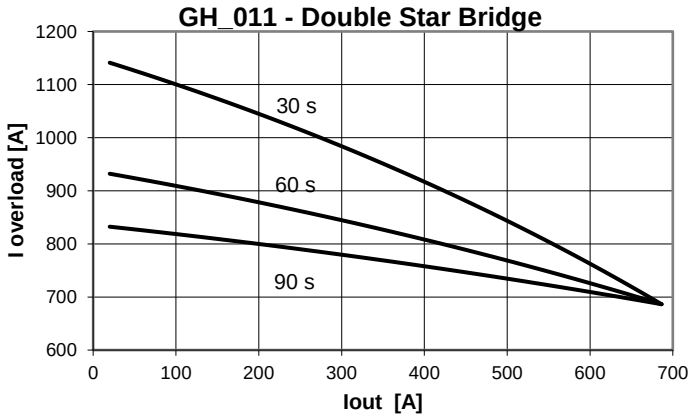

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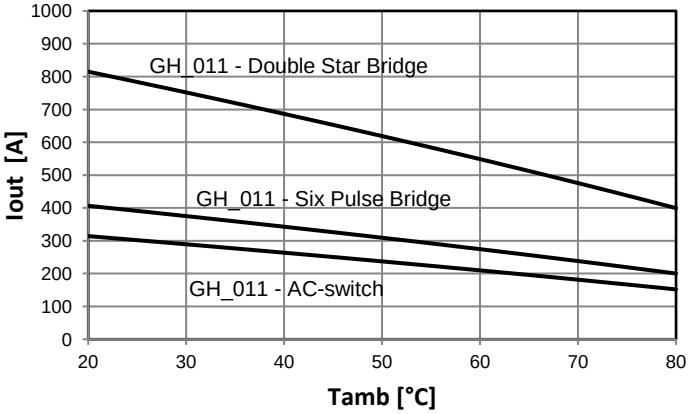

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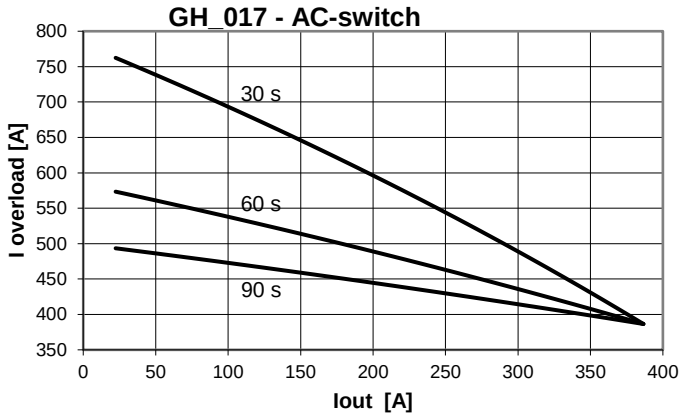

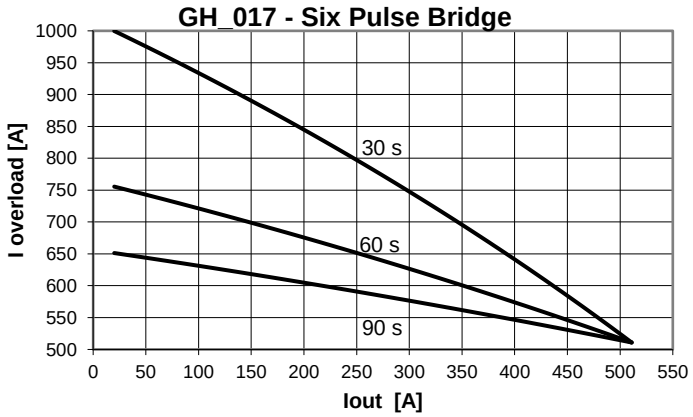

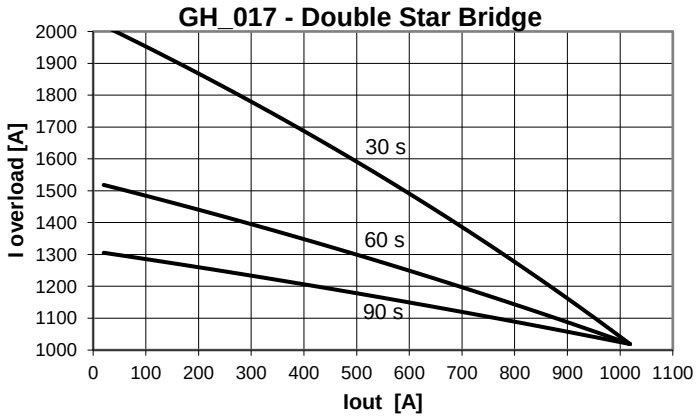

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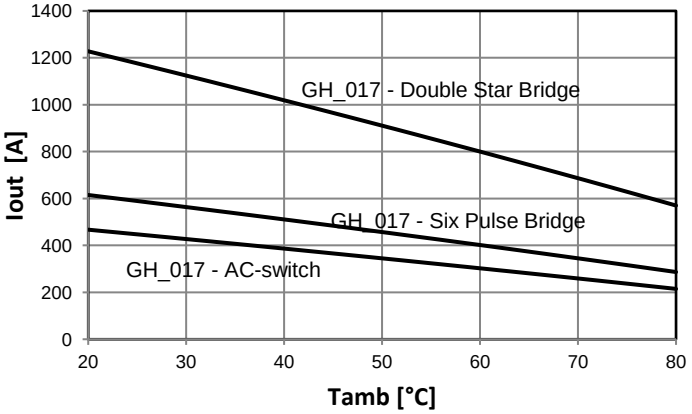

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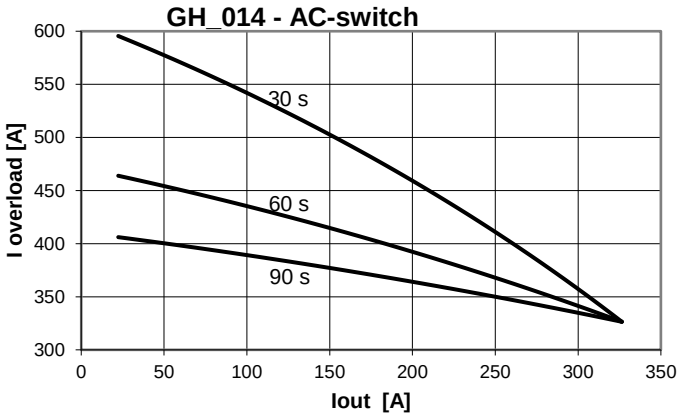

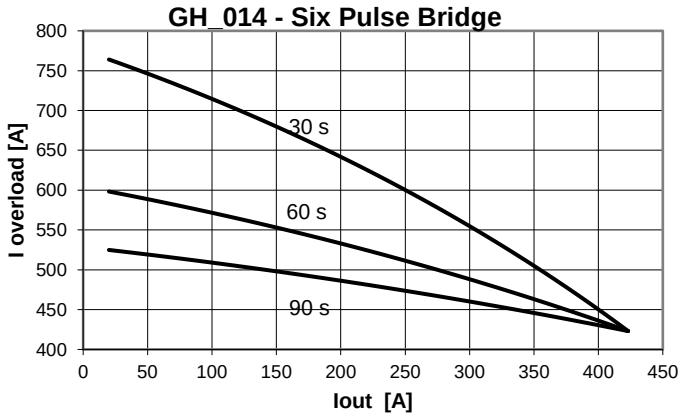

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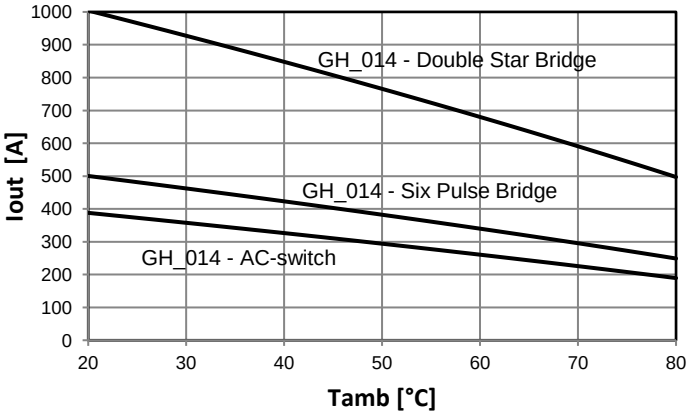

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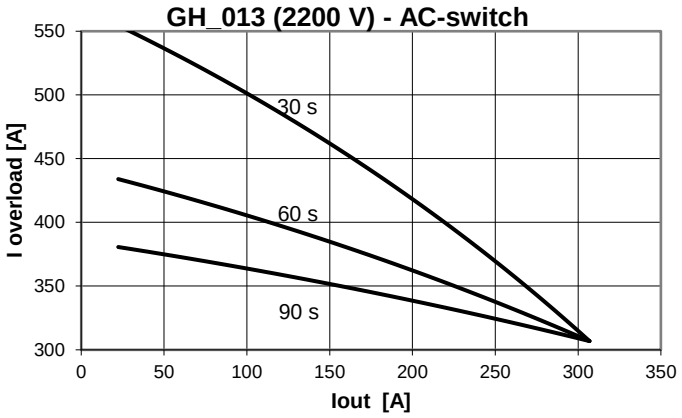

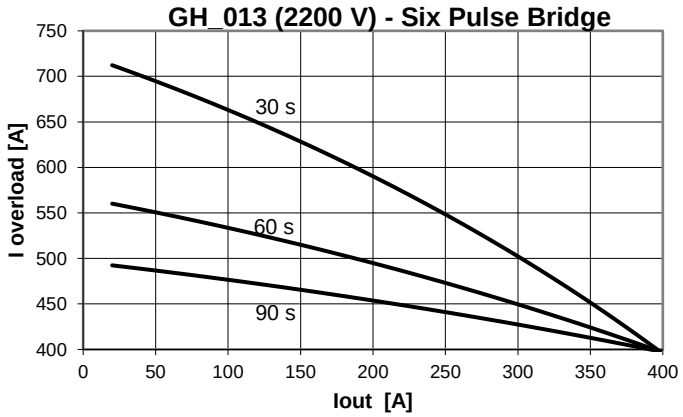

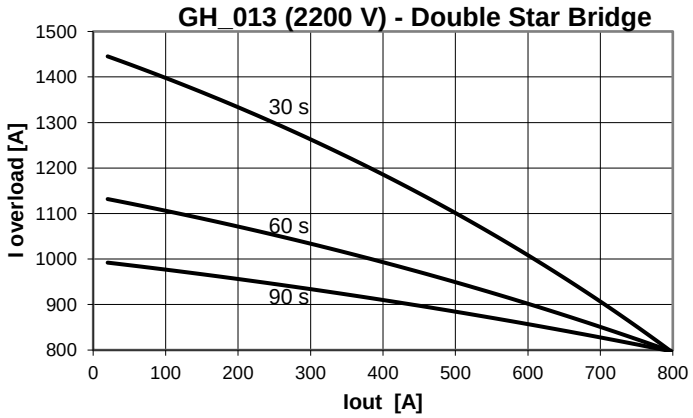

Max output vs Tamb