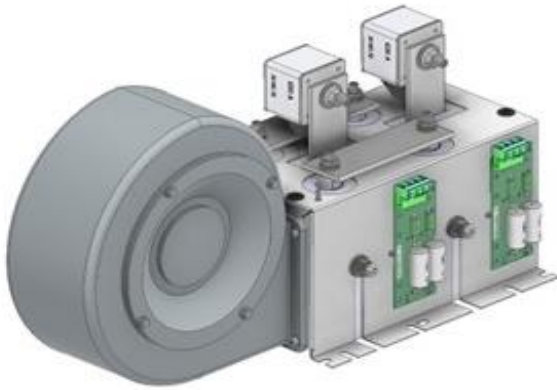


G_014Q,....,_022Q QUAD SCR MODULES

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	G_016	G_014	G_022	G_018	G_017	Conditions	Units
$I_{T(AV)}$	166	144	222	183	172	180° cond, half sine Ta = 40 °C	A
$I_{T(RMS)}$	261	226	349	287	270	Air velocity = 5 m/s	A
I_{TSM}	7	6	13	9	8	50 Hz, Tj = Tjmax, VR = 0 V	kA
I_{TSM}	7.4	6.3	13.7	9.5	8.4	60 Hz, Tj = Tjmax, VR = 0 V	kA
I^2t	245	180	845	405	320	50 Hz, Tj = Tjmax, VR = 0 V	kA ² s
I^2t	223	164	769	369	291	60 Hz, Tj = Tjmax, VR = 0 V	kA ² s
V_{DRM}/V_{RRM}	400	1600	400	1600	2200	Tj = Tjmax	V
T_{jmax}	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} @ T _{jmax} [mA]	V _{L(RMS)} maximum suggested RMS line voltage [V]
G_016	04	400	50	115
G_014	16	1600	50	500
G_022	04	400	100	115
G_018	16	1600	50	500
G_017	22	2200	100	700

On-State Characteristics

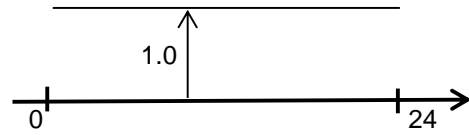
Parameters	G_016	G_014	G_022	G_018	G_017	Conditions	Units
V _{T(TO)} Threshold voltage	0.9	1.0	0.9	0.9	1.0	T _j = T _{jmax}	V
r _T On-state slope resistance	0.50	0.80	0.24	0.65	0.72	T _j = T _{jmax}	mΩ
I _H Holding current, max	600	600	600	600	300	T _j = 25°C	mA
I _L Latching current, typ	300	1000	1000	1000	1000	T _j = 25°C	mA
P _{MAX} Max power losses	351	370	445	437	431	T _A = 40°C	W

Triggering Characteristics

Parameters	G_016	G_014	G_022	G_018	G_017	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

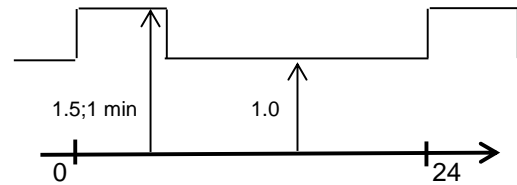
Switching Characteristics

Parameters	G_016	G_014	G_022	G_018	G_017	Conditions	Units
di/dt Critical rate of rise of on-state current	200	200	200	200	200	T _j = T _{jmax}	A/μs
dV/dt Critical rate of rise of off-state voltage	500	500	500	500	500	T _j = T _{jmax}	V/μs
t _q Turn-off time, typ	200	200	200	200	200	T _j =T _{jmax} , I _T =1000A di/dt=-20A/μs V _R =50V dV/dt=20V/μs	μs



Maximum IEC class 1 currents for typical circuit type

Circuit Type	G_016	G_014	G_022	G_018	G_017	Conditions	Units
AC switch	371	321	497	409	383	T _A = 40 °C delay angle = 0°	A
Two pulse bridge	332	288	444	366	344	T _A = 40 °C delay angle = 0°	A

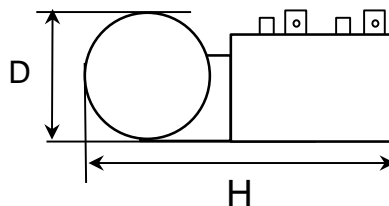


Maximum IEC class 2 currents for typical circuit type

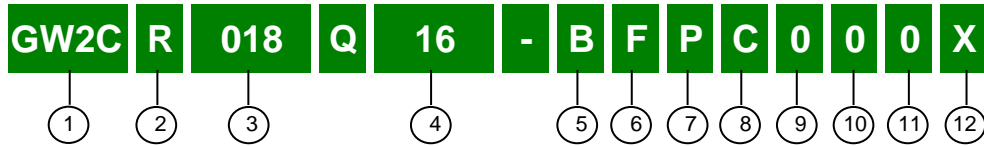
Circuit Type	G_016	G_014	G_022	G_018	G_017	Conditions	Units
AC switch	267	231	370	306	281	T _A = 40 °C delay angle = 0°	A
Two pulse bridge	239	207	331	274	252	T _A = 40 °C delay angle = 0°	A

Thermal and mechanical characteristics

Parameters	G_016	G_014	G_022	G_018	G_017	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)	0.484	0.460	0.382	0.389	0.394	Air velocity = 5 m/s	°C/W	
F Mounting torque - GEM to panel (+/- 10%)	7	7	7	7	7	M6 mounting screw	N·m	
	14	14	14	14	14	M8 mounting screw	N·m	
MTTR Mean Time To Repair	8	8	8	8	8		minutes	
Overall dimensions								
D Depth	297							mm
H Height	430							mm
W Width	192							mm
m Mass (with FPC options)	7							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 - 2 = two RC snubber - 4 = four RC snubbers
- ⑪ 0 = No fan-on-demand thermo-switch - D = Fan-on-demand thermo-switch (trip point 56 °C)
- ⑫ 0 = Standard aluzinc frame - X = Stainless steel frame

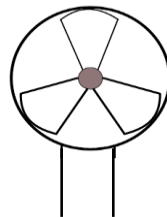
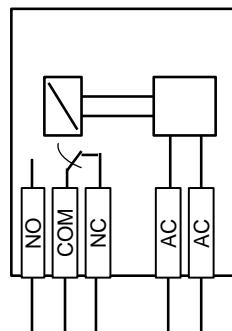
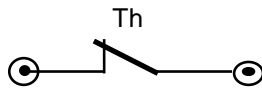
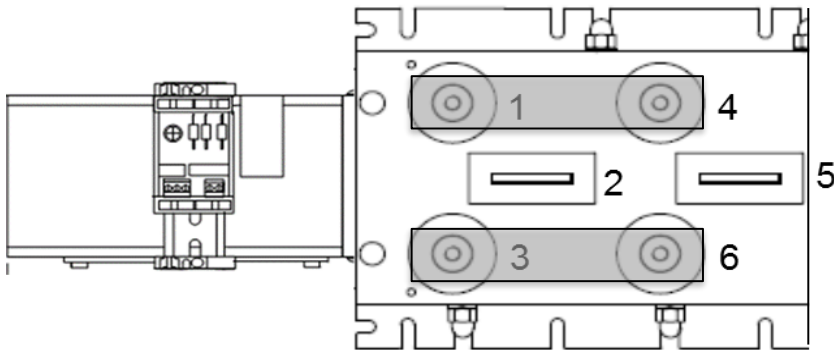
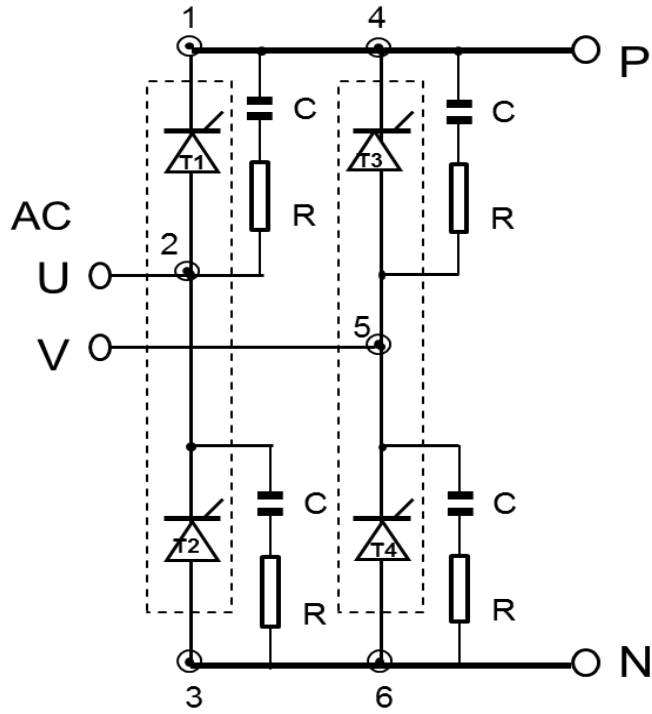
(*) Pulse transformer GT001 (dual) or GT002 (single) depending on the circuit configuration. For pulse transformer characteristics see their specific datasheets.

Circuit configuration table	
GB2T	two pulse bridge fully controlled
GW2C	two phase AC-switch

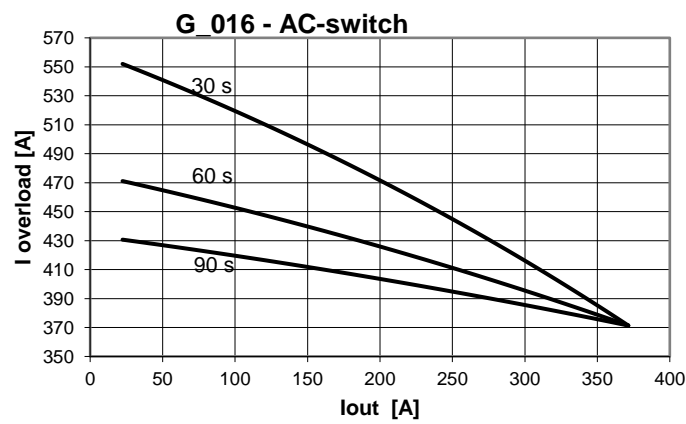
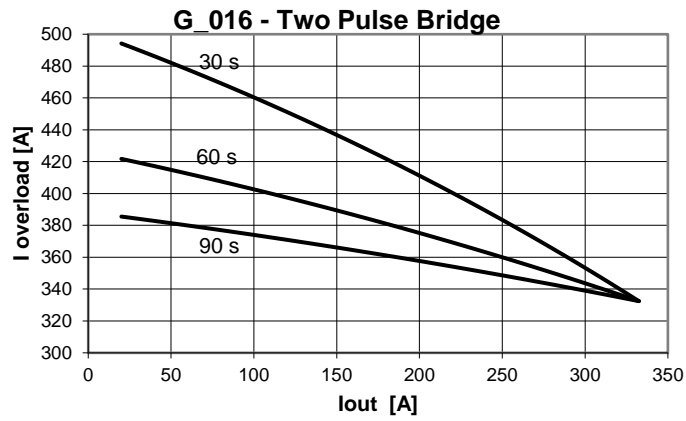
GEM modules are not covered by the Low Voltage Directive (LVD) 2014/35/EU because, according to LVD Guidelines, they are components "the safety of which can only, to a very large extent, be assessed taking into account how they are incorporated and for which a risk assessment cannot be undertaken".

In the interest of product improvement Green Power Solutions reserves the right to change any specification given in this data sheet without notice.

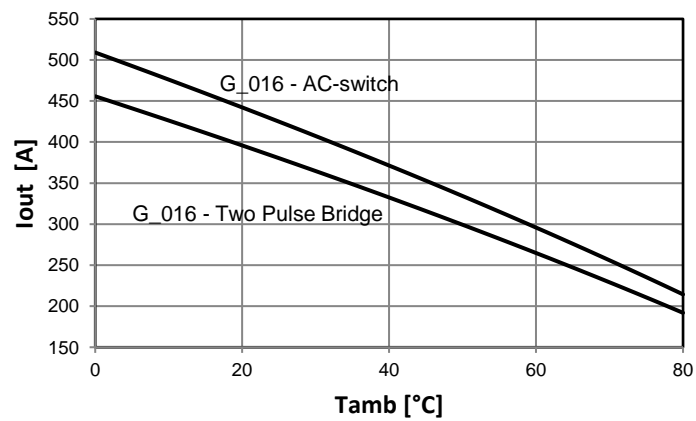
GB3D Two pulse rectifier bridge



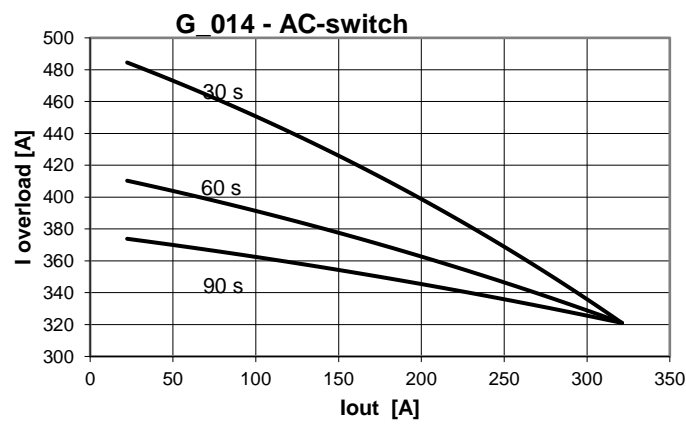
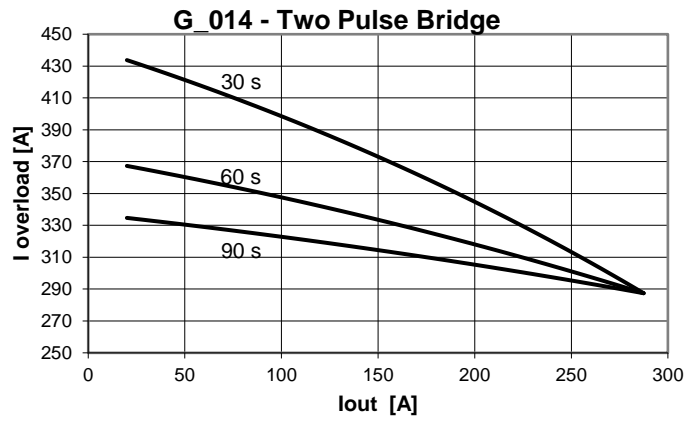
Overload capability at different overload time - Tamb = 40 °C



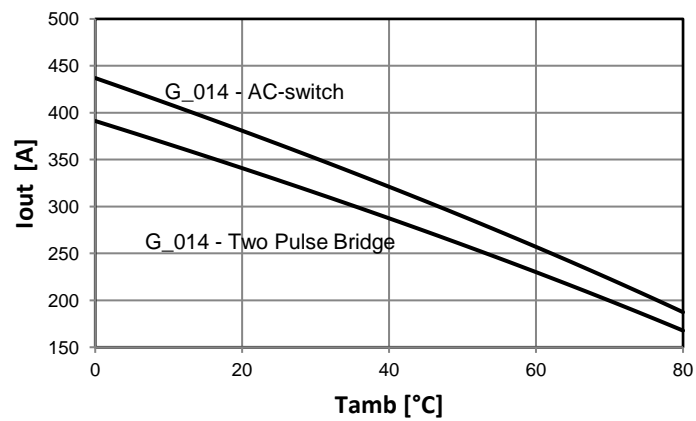
Max output vs Tamb



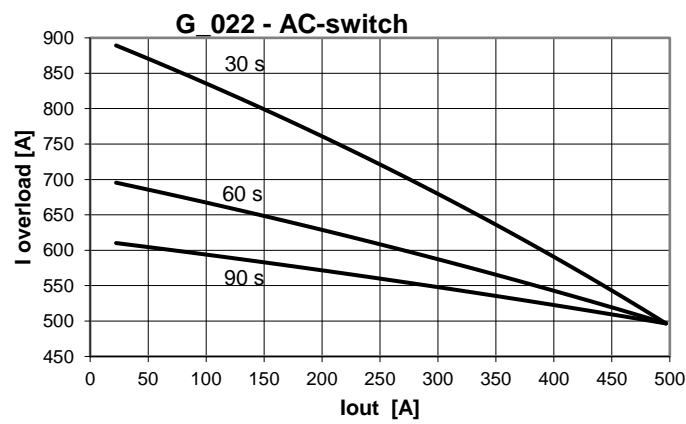
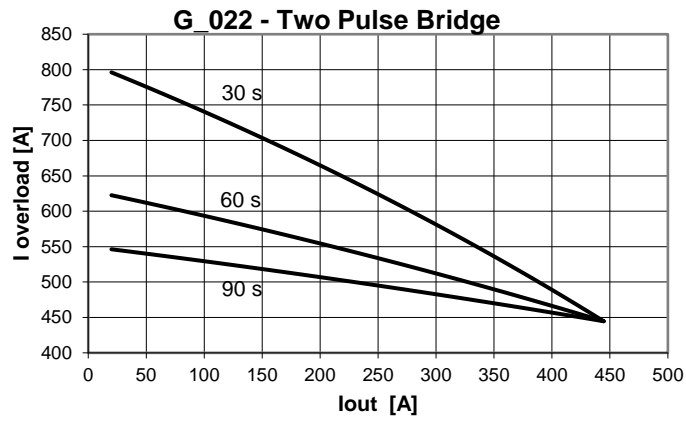
Overload capability at different overload time - Tamb = 40 °C



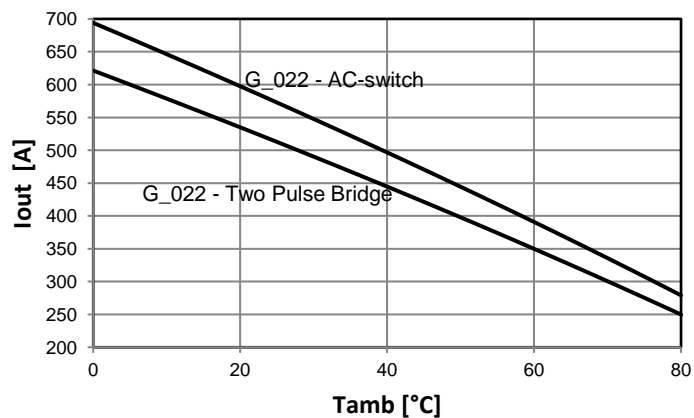
Max output vs Tamb



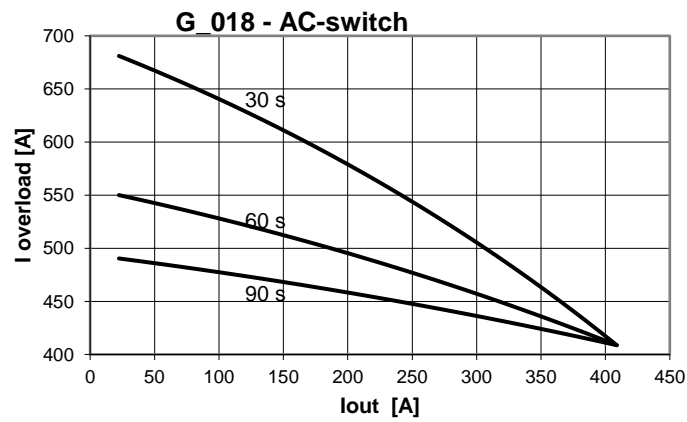
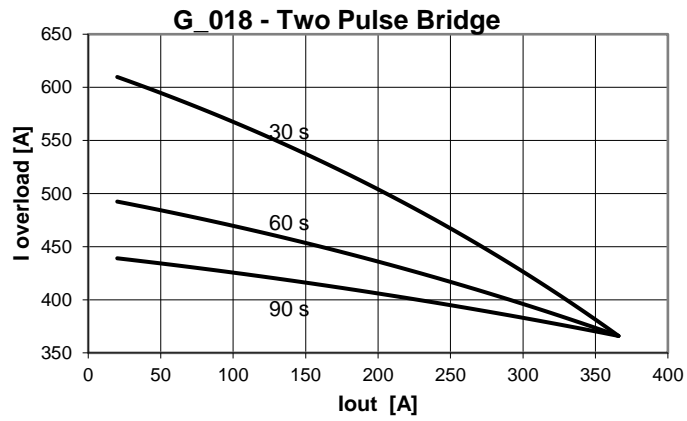
Overload capability at different overload time - Tamb = 40 °C



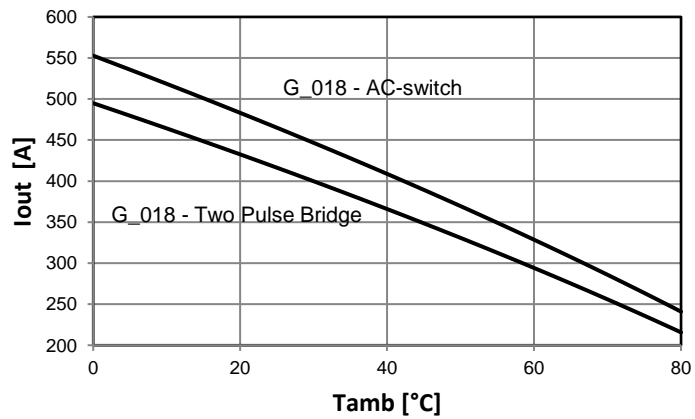
Max output vs Tamb



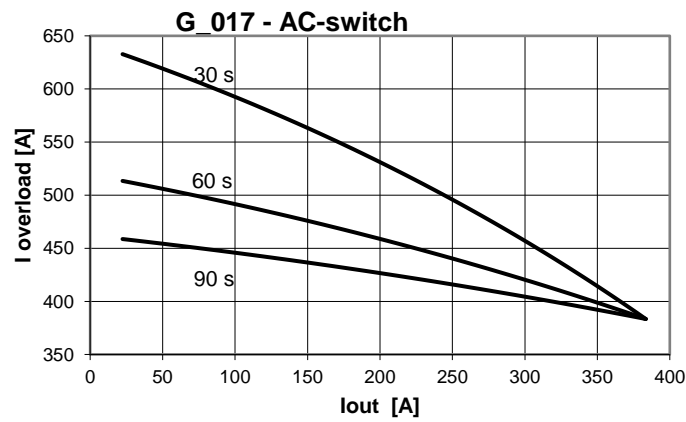
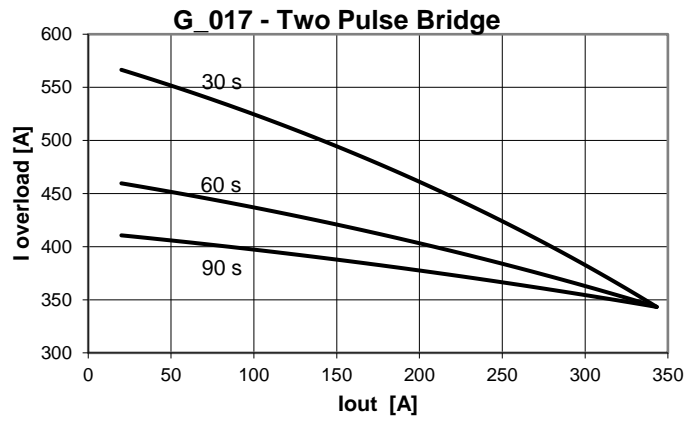
Overload capability at different overload time - Tamb = 40 °C



Max output vs Tamb



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



Max output vs Tamb

