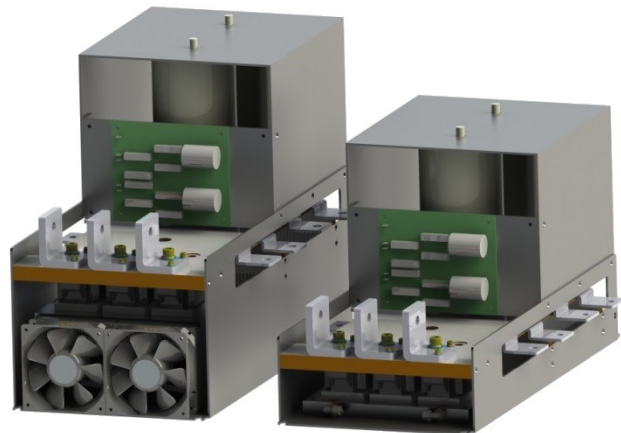
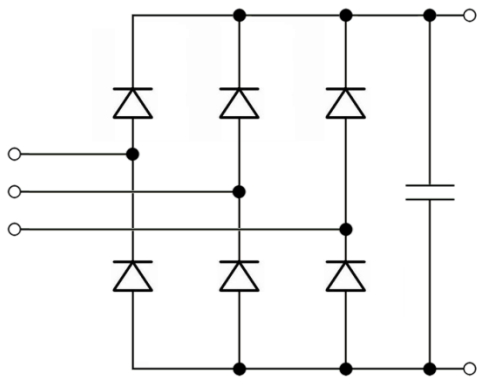


Datasheet (Preliminary)

Rectifier Module VARIS™ R-580-U

- Uncontrolled diode- rectifier module
- Fully compatible to the Variable Inverter System VARIS™
- Water or forced air cooling available
- 2740-8000 μ F capacitance per module



1. Technical Data Diode Module

2. Power Rating 3-Phase Rectifier

General information:

VARIS™ R consists of a full three phase rectifier bridge B6U with DC-link capacitors. It is fully compatible to the Modular Inverter System VARIS™ and is available with water or forced air cooling. Each module has its own heatsink, DC-link with capacitance, and snubber circuit. For the technical data of the 3-phase rectifier please see section 2.



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1. Technical Data Module

Absolute maximum rated values		Symbol	Min.	Typ.	Max.	Unit
Average forward current	180° half-sine wave, $T_{vj}=100^{\circ}\text{C}$	I_{FAV}			580	A
RMS forward current		I_{FRMS}			910	A
Surge forward current	180° half-sine wave; 50 Hz ($t_p=10$ ms); single pulse; $V_R=0$ V;	I_{FSM} at $T_j=T_{j\max}$			14	kA
		I_{FSM} at $T_j=25^{\circ}\text{C}$			16	
	180° half-sine wave; 60 Hz ($t_p=8.3$ ms); single pulse; $V_R=0$ V; $T_j=T_{j\max}$ $T_j=25^{\circ}\text{C}$	I_{FSM} at $T_j=T_{j\max}$			15	
		I_{FSM} at $T_j=25^{\circ}\text{C}$			17	
Repetitive peak reverse voltages	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz;	V_{RRM}		2600		V
Non-repetitive peak reverse voltages	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz; single pulse;	V_{RSM}		2700		V
Reverse continuous voltages	$T_j=T_{j\max}$	V_R		$0,75 \cdot V_{RRM}$		V
DC-link voltage		V_{dc}			1200	V
Maximum line voltage	$\pm 10\%$ tolerance	V_{line}			690	V_{RMS}
Insulation test voltage according EN 61800-5-1	$f=50\text{Hz}$, $t=1\text{min}$	V_{iso}			3000	V_{RMS}
Junction temperature	At continuous current I_{dc}	T_{vjsw}			125	$^{\circ}\text{C}$
Junction temperature under overload conditions	At $I_{ac_over1/2}$ see page 5	T_{vjsw}			150	$^{\circ}\text{C}$

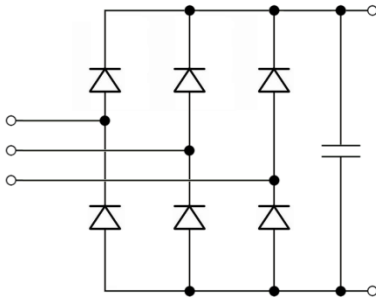
Characteristic values		Symbol	Min.	Typ.	Max.	Unit
Rated voltage		V_{dc}		900	1300	V
Total capacitance	Capacitor rated tolerance $\pm 10\%$	C_{dc}	2740		8000	μF
DC-link current ripple	$T_{amb} \leq 55^{\circ}C$	I_{ripple_Cdc}			200	A_{RMS}
Capacitor type	IEC61071 Standard, 50 FIT (100000h, $\theta_{Hotspot} \leq 70^{\circ}C$)			PP- Foil		
Balance or discharge resistor per DC link unit	Optional, refers to customers desired discharge time			TBD		k Ω

System data general		Sym- bol	Min.	Typ.	Max.	Unit
Storage temperature	Without remains of coolant	$T_{storage}$	-40		80	$^{\circ}C$
Operational ambient temp.		T_{op_amb}	-20		55	$^{\circ}C$
Humidity	No condensation	Rel. H		95		%
Cabinet cooling air velocity	PCB, DC link capacitor, bus bar	V_{air}	2			m/s
Vibration	According DIN IEC 60721			TBD		m/s^2
Mech. shock	According DIN IEC 60721			TBD		m/s^2
Protection degree				IP00		
Pollution degree				2		
Dimensions	Width x Depth x Height (height depends on capacitor type)	water	344	625.5	338.5 or 453.5	mm
		air	344	633.5	441.5 or 556.5	mm

System data water cooled		Symbol	Min.	Typ.	Max.	Unit
Water flow		Q	4			L/min
Water pressure drop		Δp		200		mbar
Coolant inlet temperature		T_{inlet}	-25		55	°C
Coolant composition	Mix ratio: Water – antifreeze		48 Water		52 anti- freeze	%
Cooling channel material	Copper					
Water connection	Standard terminal at the front, inner thread			¼		inch
Weight	System water cooled			27.7		kg

System data air cooled		Symbol	Min.	Typ.	Max.	Unit
Input voltage fan	Supply voltage	V_{fan}	16	24	30	V_{DC}
Cooling air velocity	at 24 V_{DC}	V_{air}		6		m/s
Power consumption fan	at 24 V_{DC} , each fan	P_{fan}		19.5		W
Ambient temperature	Standard atmosphere	t_{amb}	-25		55	°C
Heatsink material	Aluminum					
Weight	System air cooled			30		kg
Electrical interface	two-wire cable					
Pin 1	Supply voltage	V_{fan}		24		V_{DC}
Pin 2	Ground	GND		0		V_{DC}

2. Power Rating 3-Phase Rectifier:



Characteristic values		Cooling type	Symbol	Min.	Typ.	Max.	Unit
Rated RMS input current per leg	$V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $T_{inlet}/T_{amb} \leq 25^{\circ}C$, $T_{vjsw} \leq 125^{\circ}C$	Water	I_{AC}		825		A_{RMS}
		Air			583		A_{RMS}
Rated continuous output current per leg	$V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $T_{inlet}/T_{amb} \leq 25^{\circ}C$, $T_{vjsw} \leq 125^{\circ}C$	Water	I_{DC}		1430		A_{DC}
		Air			1010		A_{DC}
Rated continuous output power	$V_{dc}=1000V$, $V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $T_{inlet}/T_{amb} \leq 25^{\circ}C$, $T_{vjsw} \leq 125^{\circ}C$	Water	P_{out}		1323		kW
		Air			934		kW
Rated continuous over- current $t_{on} \leq 60s$	$V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $T_{inlet}/T_{amb} \leq 25^{\circ}C$, $t_{on} \leq 60s$ $T_j \leq 150^{\circ}C$	Water	I_{ac_over1}		tbd		A_{RMS}
		Air			tbd		A_{RMS}
Rated continuous over- current $t_{on} \leq 3s$	$V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $T_{inlet}/T_{amb} \leq 25^{\circ}C$, $t_{on} \leq 3s$ $T_j \leq 150^{\circ}C$	Water	I_{ac_over2}		tbd		A_{RMS}
		Air			tbd		A_{RMS}
Power losses 3 phase rectifier	$V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $T_{inlet}/T_{amb} \leq 25^{\circ}C$, $T_{vjsw} \leq 125^{\circ}C$	Water	P_{loss_tot}		4277		W
		Air			2680		W

Current and Power ratings of the air cooled VARIS™ R-580-U-A:

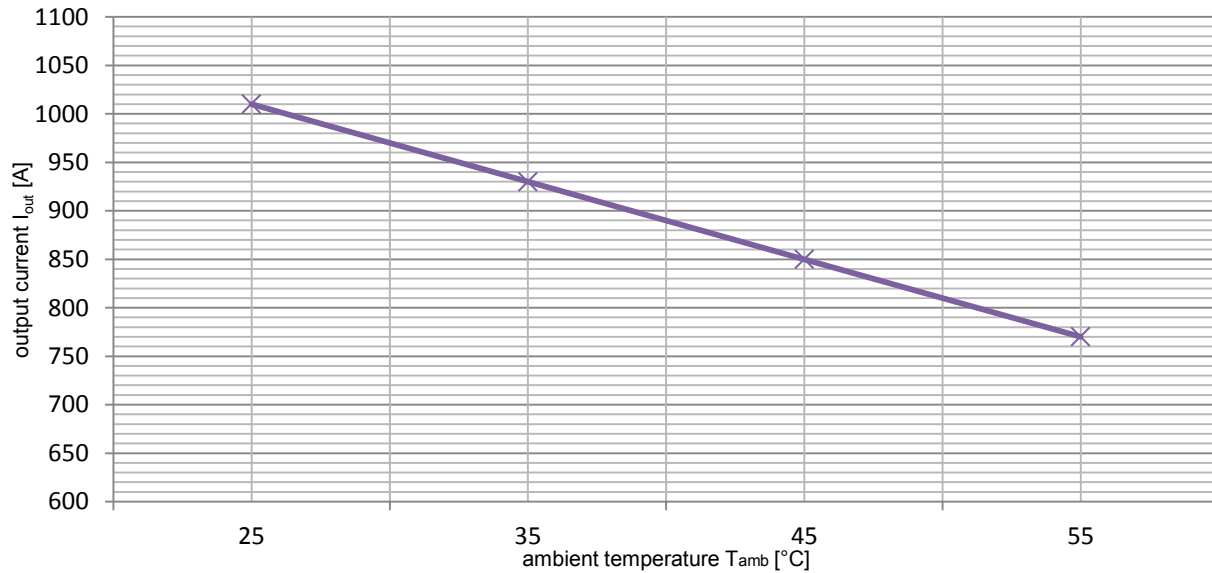


Figure 1: Current rating VARI R-580-U-A
Measurement at $V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $v_{air} = 6m/s$, $T_{vjsw}\leq 125^{\circ}C$

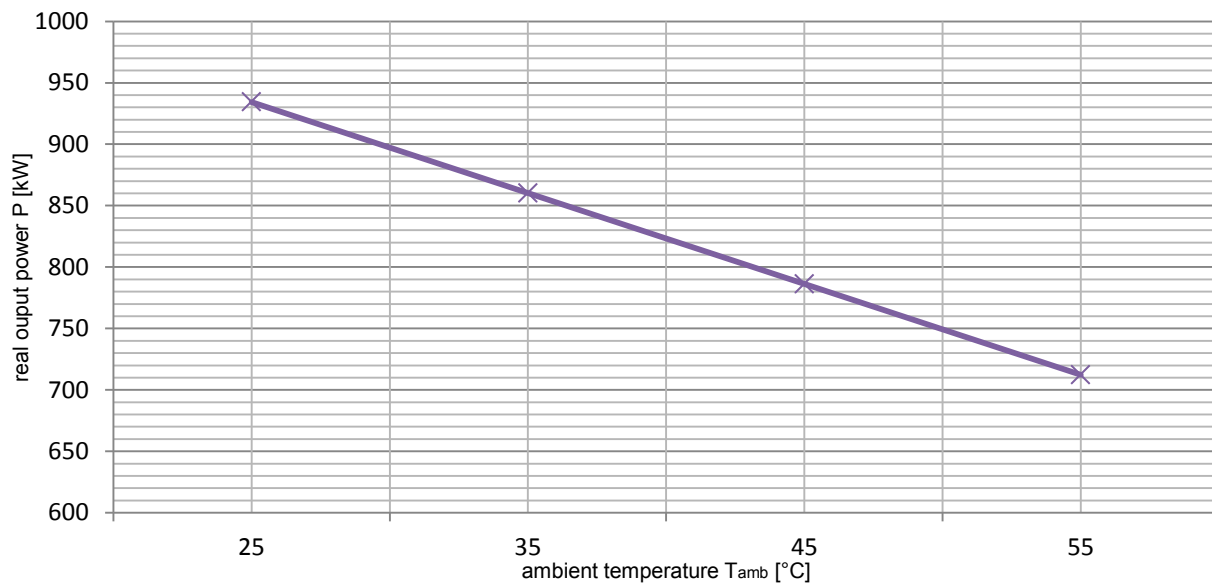


Figure 2: Power rating VARI R-580-U-A
Measurement at $V_{dc}=925V$, $V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $v_{air} = 6m/s$, $T_{vjsw}\leq 125^{\circ}C$

Current and Power ratings of the water cooled VARIS™ R-580-U-W:

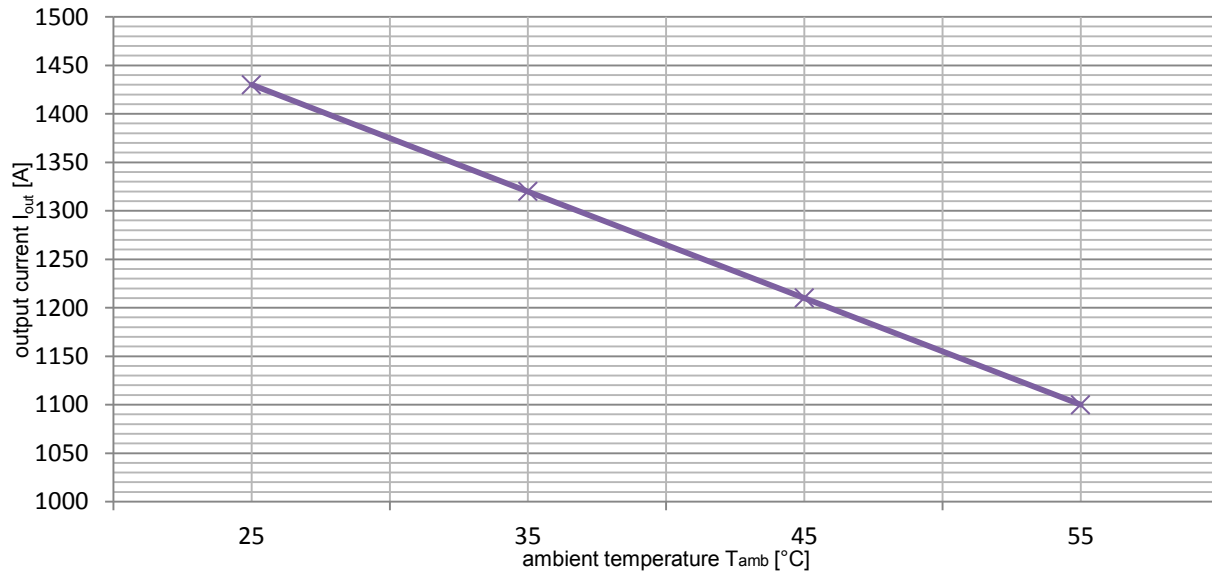


Figure 3: Current rating VARI R-580-U-W
Measurement at $V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $v_{air} = 6m/s$, $T_{vjsw} \leq 125^{\circ}C$

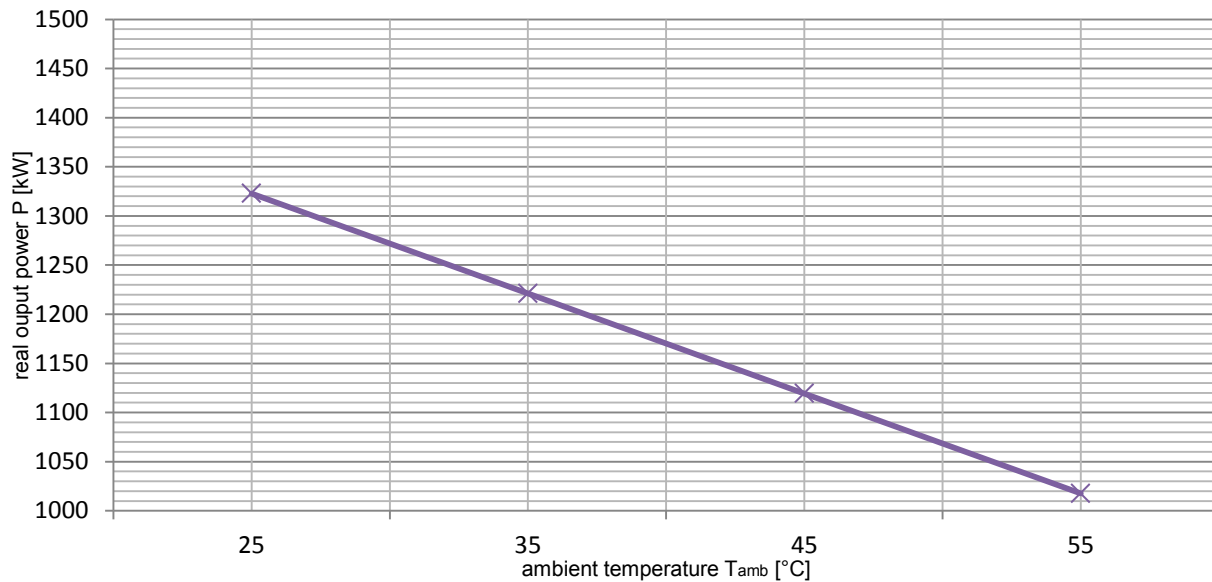
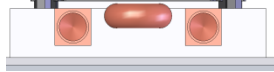


Figure 4: Power rating VARI R-580-U-W
Measurement at $V_{dc}=925V$, $V_{ac}=690V_{rms}$, $f_{ac_sine}=50Hz$, $v_{air} = 6m/s$, $T_{vjsw} \leq 125^{\circ}C$

Signal Interfaces:

Water cooler (¼ inch):



Fan (red: 24V, black: GND):



Mechanical drawing:

- All dimensions in millimeter (mm)

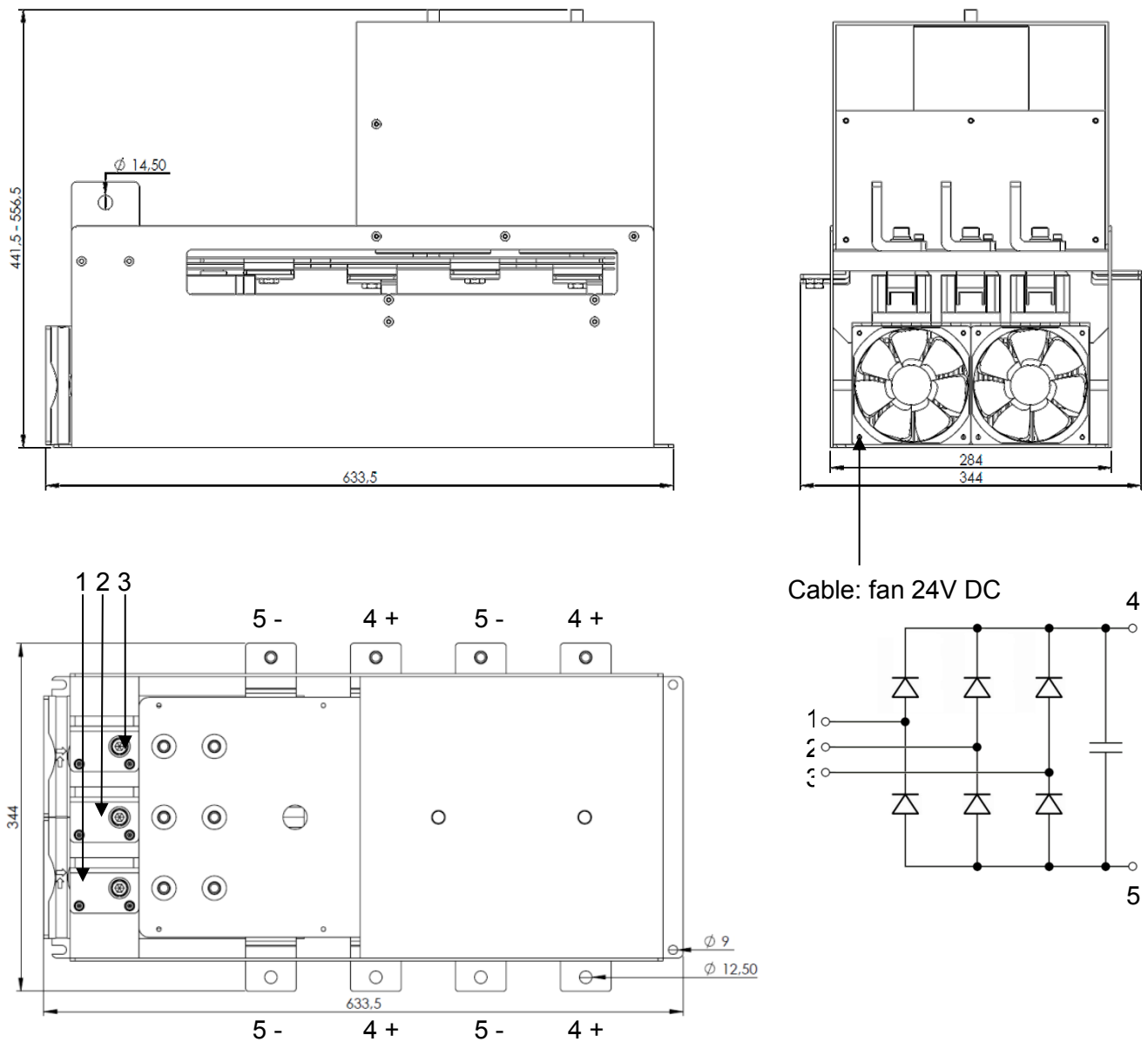


Figure 5: Mechanical drawing of the VARIS™ R-580-U-A (air cooled)

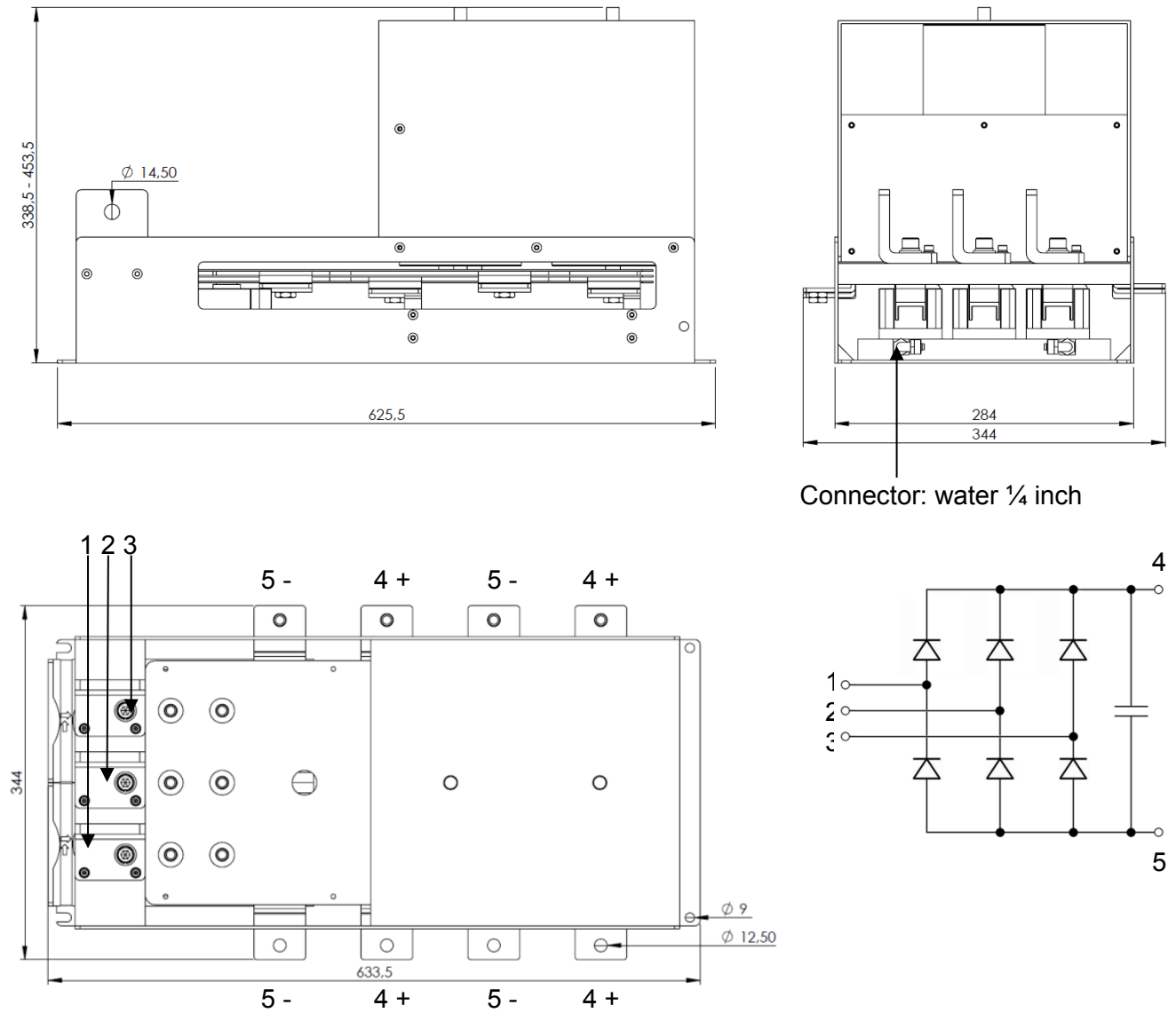


Figure 6: Mechanical drawing of the VARIS™ R-580-U-W (water cooled)

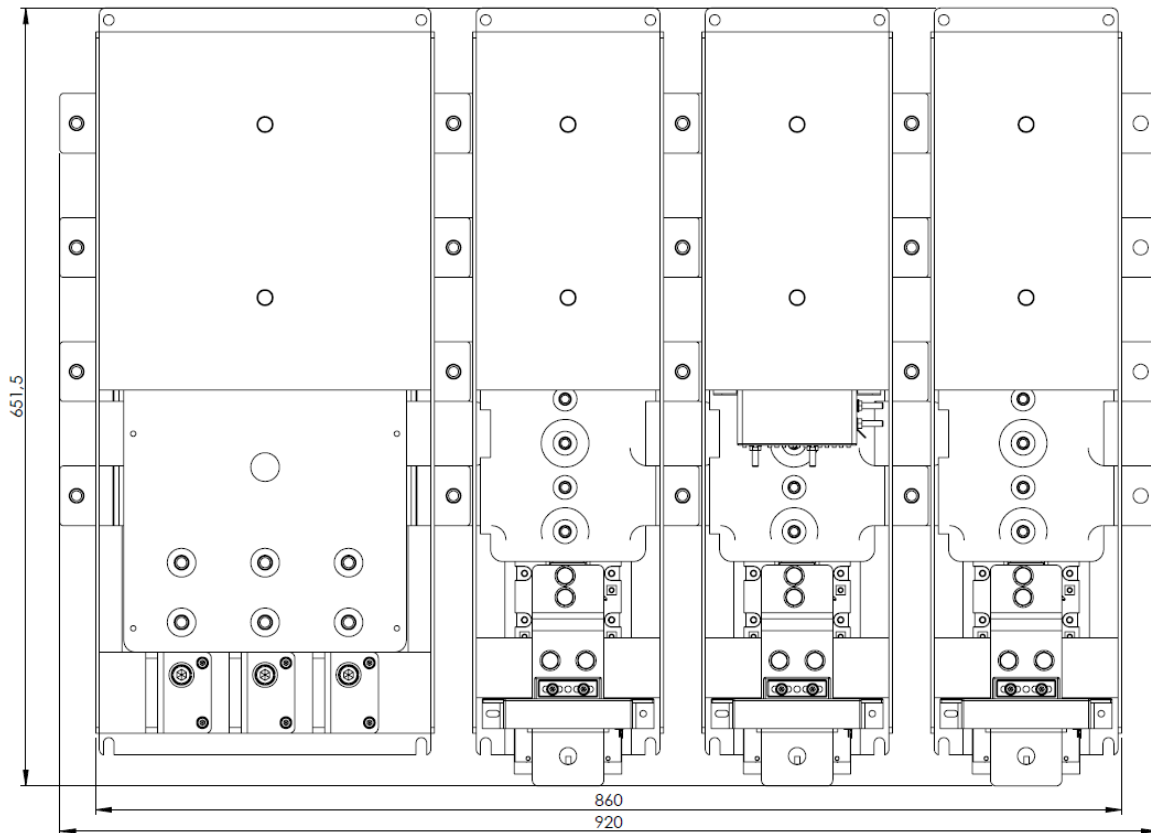


Figure 7: Mechanical drawing of VARIS™ R in combination with three VARIS™ R

GvA Leistungselektronik GmbH reserves the right to adapt or amend the content of this technical information at any time and without prior notification.

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