Technical Data Sheet

RIDA6400-TW / Railway
6400VA DC/AC INVERTER

DC/AC Inverter

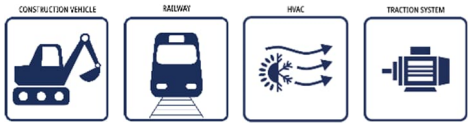
FEATURES

- Sine Wave Output Voltage
- Suitable for Motors Control
- Adjustable Output Frequency
- Adjustable Output Voltage
- Input Voltage According to:
- EN50163: 2006 and EN50124-2: 2017
- High Input-Output Isolation 5200Vrms
- Remote Off Opto-Coupled
- Alarm by Isolated Relay Contacts
- Configurable Input: Reverse or Mid Power
- Remote Control Via RS232
- CAN BUS
- Railway Applications According to EN61287-1
- Fire and Smoke: EN45545-2 pending



Dimensions 430.0 x 450.0 x 87.0 mm (16.93" x 17.72" x 3.43")

APPLICATION



SAFETY & EMC

RoHS² compliant 10 from 10

Reach compliant

- The inverter follows LVD Directive 2014/35/EU and EMC Directive 2014/30/EU.
- The inverter is CE compliant. EMC radiation must be evaluated and tested in the complete system since mounting and wiring have a large influence on radiation behaviour.
- Cybersecurity: the product features a serial communication interface. CRA-relevant security aspects have been considered in the product design and documentation, including risk assessment. The product complies with the Cyber Resilience Act (CRA, EU Regulation 2024/2847) when installed in accordance with the instruction sheet.

DESCRIPTION

The RIDA6400 serie is a three-phase sine-wave DC-AC inverter designed not only to work within 400V to 900V input voltage range but also to withstand surges and over-voltages as described in EN50124-2.

The unit allows:

- Changing the output frequency by means of DIP-switch-7 of SW1. OFF: 50Hz or default programmed, ON: 60Hz
- Change local/remote (waiting RS-232 commands) by means of DIP-switch-6 of SW1. OFF: local, ON: remote
- Shutdown applying voltage output 15V to 143V on pins 3 and 4 of J4
- Start-up motors by means of a soft start. In the start-up, the output voltage rises linearly from 0V to set voltage and the frequency from the initial to the set one. The start-up ramp slope may be changed via RS-232
- Set the rotation speed of a motor according to the appropriate Voltage/Frequency ratio.
- Configurable input (pin 1 and 2 of J4):
  - Reverse mode: Changing the rotation direction for the next start-up of a motor by applying voltage between 15 and 143V.
  - Mid power mode: Changing the output frequency in V/F mode from nominal to a mid-power frequency by applying voltage between 15V and 143V.
- Monitoring the status of the input and output voltage through the contacts of two separate solid-state relays.
- Set and monitor parameters via RS-232, CAN BUS.

The RIDA6400-TW is equipped with maximum average power protection as well as maximum output peak current protection. This protects the semiconductors even when an output short-circuit occurs. It also features a disabled function for input under-voltage, which allows protecting the batteries from harmful discharges.

MODELS

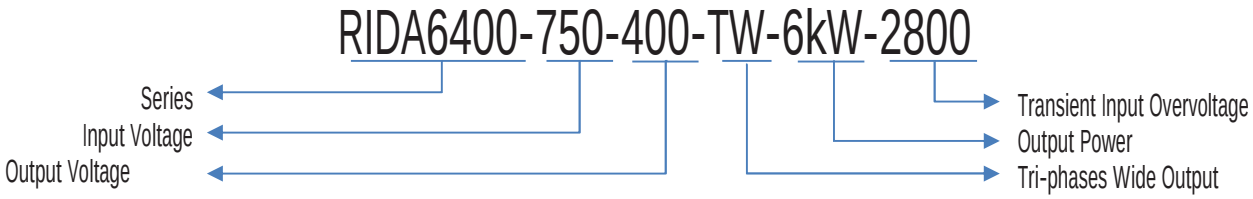
Part Number	Input Voltage Nom. [VDC]	Transient Input Overvoltage acc. EN50163 [V]	Output Voltage Nom. [VAC 3PH]	Output Power [W]
RIDA6400-750-400-TW-6kW	600-750	None	400	6000
RIDA6400-750-400-TW-6kW-2800	600-750	2800	400	6000

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6400VA DC/AC INVERTER

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MODEL NUMBERING



BASIC CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.
INPUT				
Nominal DC Input Voltage			600VDC 750VDC	
DC Input Voltage	Continuous 2800 VDC According to EN50124-2: 2017 4.2.2 and Annex A	400V		900V
Input Voltage Standard	EN50163 (Supply Voltage of Traction Systems)			
Inrush Current			15A	
Max Input Ripple	Vpp from 300 to 360Hz			5%
OUTPUT				
Output Type	With neutral		AC 3ph	
Output Voltage			400V	
Output Voltage Range	Adjust Via Remote Control	20% Vout		100% Vout
Voltage Tolerance		-5%		+5%
Output Frequency	Adjust via DIP-switch	50Hz		60Hz
	Adjust via RS232	5Hz		75Hz
Maximum Continuous Current	(Irms)			9.24A
Maximum Peak Current	5s (Irms)			11.5A
Continuous active power			6000W	
Continuous apparent power			6400VA	
Peak active power	5s			8000W
Peak apparent power	5s			8000VA
Output Wave Distortion THD	Average of 16 Samples			2%
Output HF Ripple				2.5%
Line Regulation				2%
Load Regulation				4.5%

ENVIRONMENTAL

Parameter	Conditions	Value
Operating Temperature Range	Full Load, SU3 Class, According to EN61287-1	-25°C to +55°C, 70°C 10 min
	62.5% Load	-25°C to 70°C
Storage Temperature Range		-25°C to +80°C
Cooling	Internal Forced Air Controlled	
Maximum Altitude	@ Full Load	2000m
Relative Humidity	Without Condensation	5…95%
Environmental Regulations		RoHS & Reach According to Directive 2011/65/EU
Shock and Vibration		EN61373:2011 Category 1 Class B
Life Cycle		20 years (fan maintenance after 10 years is required)
MTBF	40°C According to SN29500	100000h

PROTECTIONS

Parameter	Type	Value
Against overload		Current and I^2T Limited (see overload protection curve)
Against Over-Temperature		Shutdown with Auto-Recovery

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CONTROL

Type	Description
Output OK LED	Green
Input OK LED	Green
Alam LED	Red
Input Alarm	Open when Alarm. Maximum Rating: 0.16A at 160VDC
Output Alarm	Open when Alarm. Maximum Rating: 0.16A at 160VDC
Remote OFF Input	OFF: Applying 15…143 VDC; Impedance >35kΩ
Configurable Input (reverse or mid-power)	ON: Applying 15…143VDC; Impedance >35kΩ

SAFETY AND CERTIFICATION

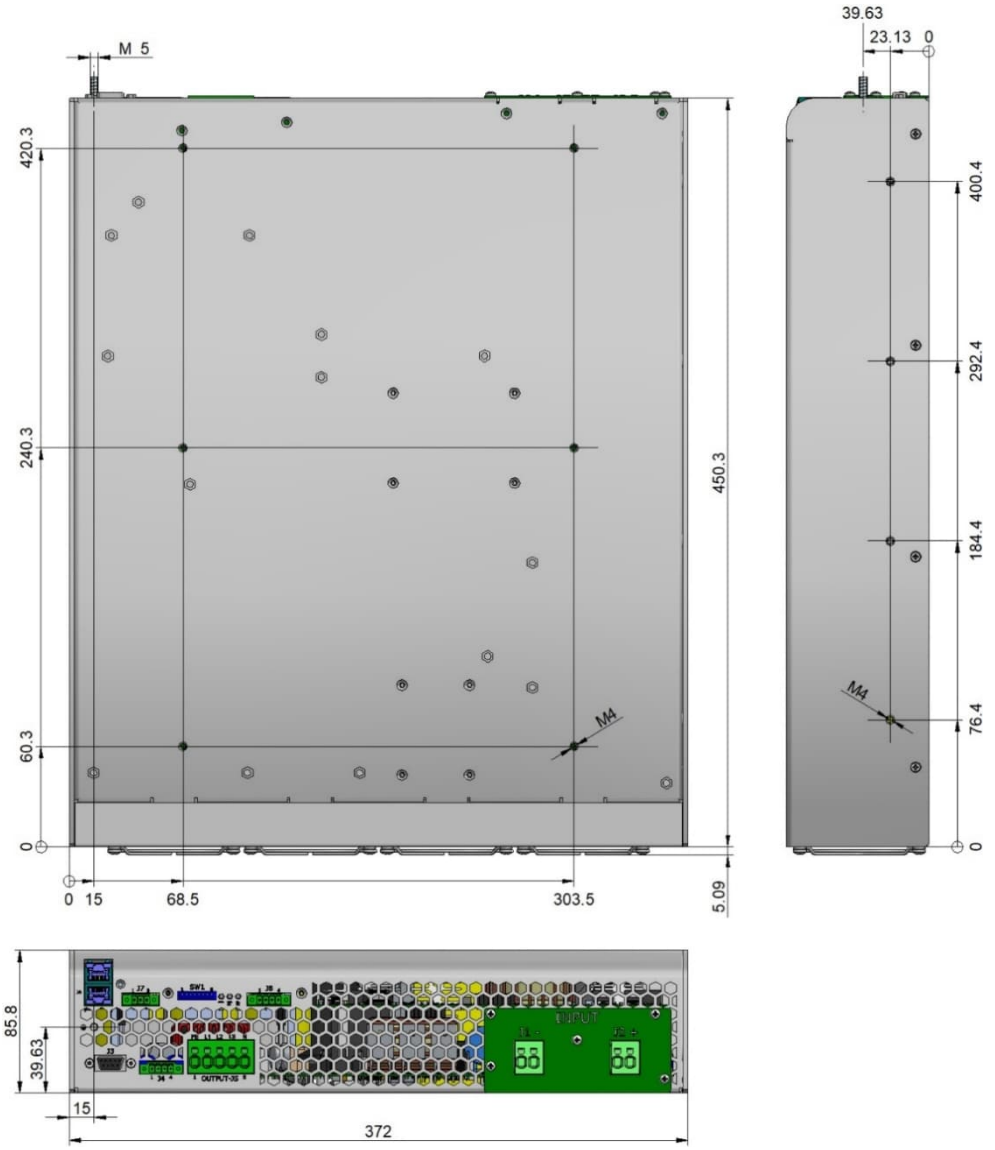
Certification (Type)	Standard
Safety According	EN50124-1 Railway App. (Insulation Coordination)
Dielectric Strength: Input/Output	5200Vrms/50Hz/1min
Dielectric Strength: Output/Earth	2300Vrms/50Hz/1min
Dielectric Strength: Input/Earth	3400Vrms/50Hz/1min
Pollution Degree	PD2
Overvoltage Category	OV3
Fire and Smoke	EN45545-2 pending

EMC

	Conditions	Value
Immunity According		EN61000-6-2, EN50121-3-2
Emission According		EN61000-6-4, EN50121-3-2

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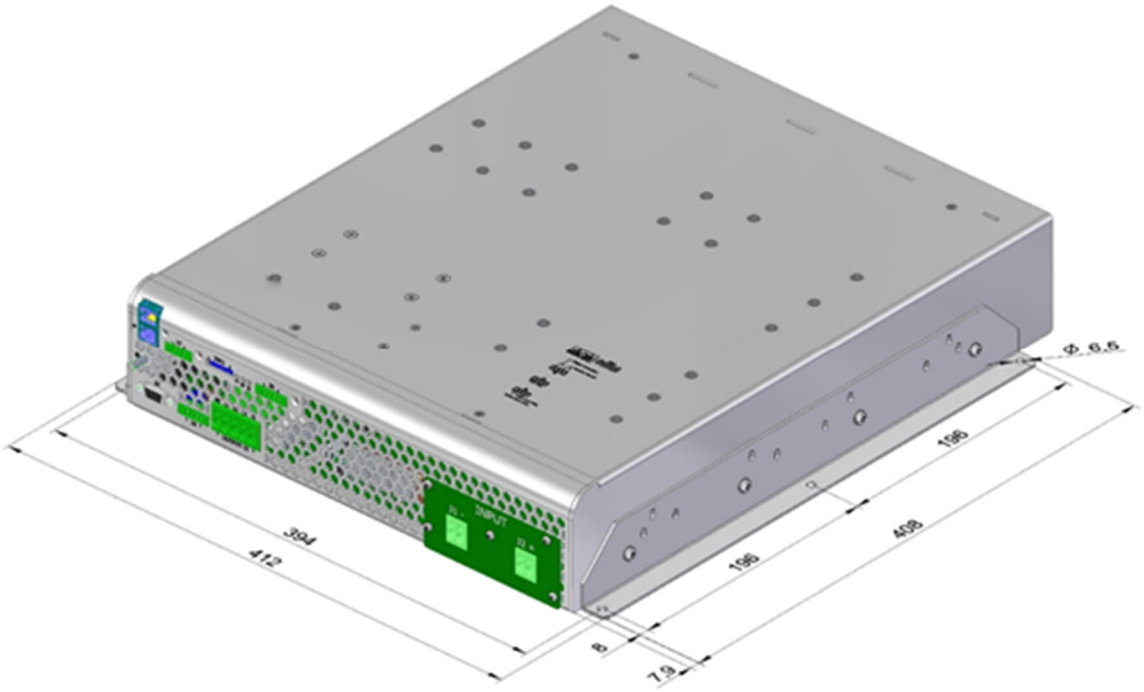
DIMENSION CHARACTERISTICS		
Parameter	Type	Value
Weight		<12000g
Dimensions (W x D x H)		430.0 x 450.0 x 87.0 mm (16.93" x 17.72" x 3.43")
Protection degree		IP20



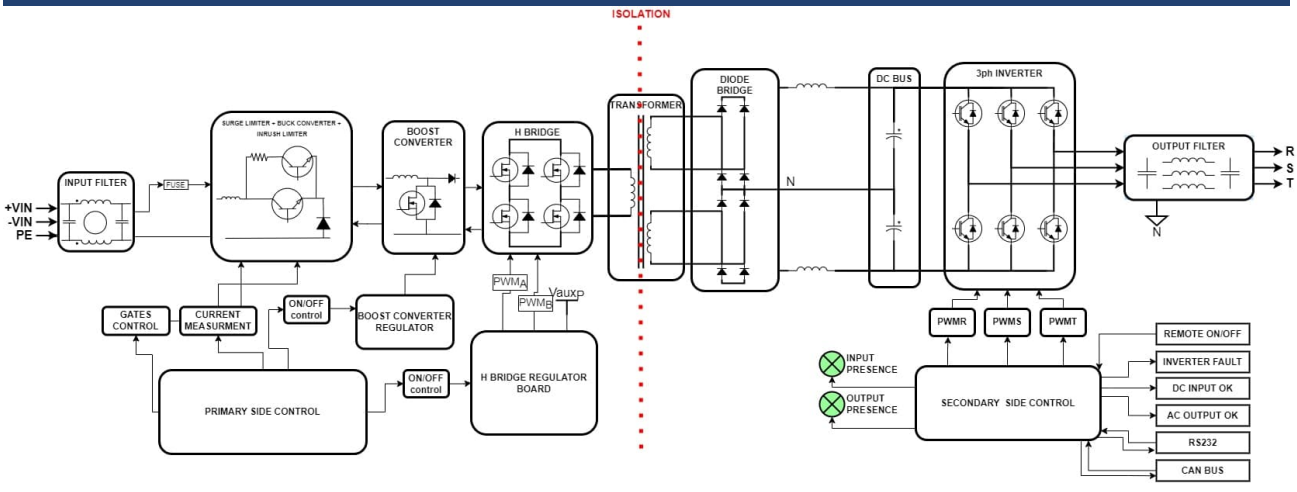
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ACCESSORIES

Description	Notes	Code
Mounting Brackets Kit	Contains Two Brackets and Screws	PR9282

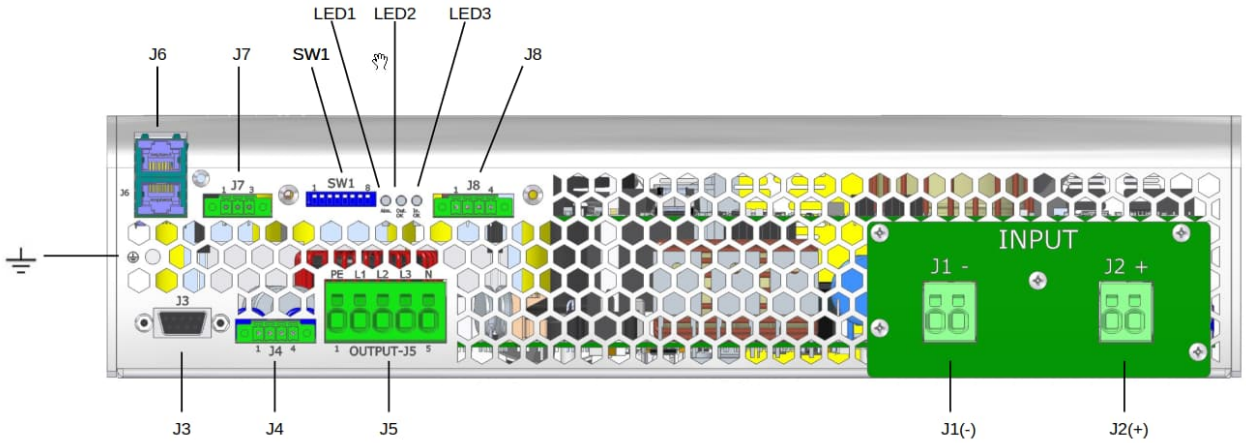


BLOCK DIAGRAM



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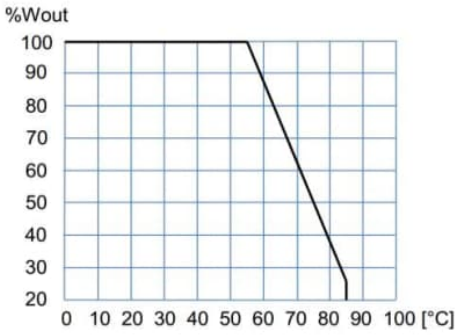
CONNECTIONS



CONNECTIONS

Connection	Terminal	Notes
J1	-Vin	
J2	+Vin	
J5-1	Protective Earth	
J5-2	Output R	Spring Clamp Terminals
J5-3	Output S	Cable 2.5 … 4 mm²
J5-4	Output T	
J5-5	Output Neutral	
J4-1	+Configurable Input	
J4-2	-Configurable Input	Phoenix Contact MC1.5/4-GF-3.81
J4-3	+Remote ON/OFF	Recommended Female:
J4-4	-Remote ON/OFF	Phoenix Contact MC1.5/4-STF-3.81
J8-1	Status Output	
J8-2	Status Output	Phoenix Contact MC1.5/4-GF-3.81
J8-3	Status Input	Recommended Female:
J8-4	Status Input	Phoenix Contact MC1.5/4-STF-3.81
J7-1	CAN L (Optional Can Bus)	
J7-2	CAN H (Optional Can Bus)	Phoenix Contact MC1.5/3-GF-3.81
J7-3	GND CAN	Recommended Female:
J3	RS-232	Phoenix Contact MC1.5/3-STF-3.81
J6A - J6B	Optional Parallel Operation	Female D-Sub DB9
		RJ45

POWER DERATING vs AMBIENT TEMPERATURE



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RS232 COMMUNICATION PORT

It is possible to control and monitor the unit via RS232 by means of a terminal emulator like “Tera Term” or “Putty”. Also, it is possible to control and monitor the unit directly using the protocol showed in table:

Protocol Configuration: ASCII Code, 57600 bauds, Parity None, 8Bits, 1Bit Stop

Header		Function	Parameter		Returns	Explanation
P	R	L	V		PTV■■■.■	Input voltage in Volts
			v		PTv■■■.■	Input voltage ripple in Volts
			Y		PTYRN=■■■■ *[13]*YSN=■■■■ *[13]*YTN=■■■■	Output voltage in Volts RMS Phase-Neutral (*[13]* = char 13 of ASCII code)
			I		PTIR=■■.■■*[13]*IS=■■.■■ *[13]*IT=■■.■■	Output current in Amps RMS (*[13]* = char 13 of ASCII code)
			T		PTT■■■.■	Internal temperature1 in K
			t		PTt■■■.■	Internal temperature 2 in K
			F		PTF■■■.■	Nominal output frequency in Hz
			f		PTf■■■.■	Actual output frequency in Hz
			y		PTy■■■.■	Actual output voltage set-point in V
			S		PTS■■■.■	Inverter state **999.9** → Enabled **000.0** → Disabled **222.2** → Blocked by overload **111.1** → Blocked by overload or shortcircuit
			M		PTM■■■■	Model number
			R		PTR■■■■	Firmware version
			Other		PTE	Command not supported
		G	1	■■■.■	OK / ERR	Set the low input voltage timed shutdown in V
			2	■■■.■	OK / ERR	Set the minimum alarm input voltage in V
			3	■■■.■	OK / ERR	Change the status bit (after start up enabled with SW3 =LOCAL and disabled with SW3 =REMOTE) **999.9** → Inverter enabled **000.0** → Inverter disabled
			4	■■■.■	OK / ERR	Set the output voltage Phase-neutral in Vrms (Vo)(output must be stopped) 040.0≤ ■■■.■ ≤ 230.0
			5	■■■.■	OK / ERR	Set the maximum output current in Arms 20% I_{nom} ≤ ■■■.■ ≤ 100% I_{nom}
			6	■■■.■	OK / ERR	Set the nominal output frequency in Hz (Fo) (output must be stopped) 005.0 ≤ ■■■.■ ≤ 075.0
			7	■■■.■	OK / ERR	Set the alarm maximum output current 0 < ■■■.■ ≤ 100% $I_{max_warning}$
			8	■■■.■	OK / ERR	**111.1** → Reset the inverter
			L	■■■.■	OK / ERR	Set the minimum input starting voltage in Volts
			O	■■■.■	OK / ERR	Set the initial frequency in the startup (Fi) 005.0 ≤ ■■■.■ ≤ 075.0
			P	■■■.■	OK / ERR	Set the ramp-up in increment of “N” cycles per Hz in mode V/F, frequency changes or start-up (Note-1) 001.0 ≤ ■■■.■ ≤ 100.0
			Q	■■■.■	OK / ERR	Set the ramp-down in decrement of “N” cycles per Hz in mode V/F (Note-1) 002.0 ≤ ■■■.■ ≤ 100.0
			Y	■■■.■	OK / ERR	Change the working mode of the input J4-1,J4-2 **111.1** → Input as reverse phase control (default) **222.2** → Input as mid-power control (Note-2)
			X	■■■.■	OK / ERR	Set the mid-power frequency for V/F mode by the use of input J4-1,J4-2 005.0 ≤ ■■■.■ ≤ 75.0
		M	1	■■■.■	OK / ERR	Set a new output frequency in Hz (output must be run and not stored in memory) 005.0 ≤ ■■■.■ ≤ 075.0
			2	■■■.■	OK / ERR	Set a new output voltage in Volts (output must be run and not stored in memory) 040.0 ≤ ■■■.■ ≤ 230.0
			3	■■■.■	OK / ERR	Set a new output frequency in Hz in mode V/F (output must be run and not stored in memory) 005.0 ≤ ■■■.■ ≤ 075.0
			4	■■■.■	OK / ERR	Changes the output phase order (output must be run and not stored in memory) **111.1** → Phase RST (direct phase) **222.2** → Phase SRT (reverse phase)

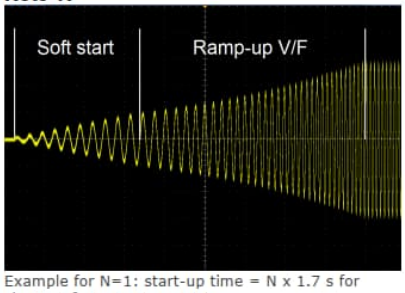
OTHER PORTS PENDING

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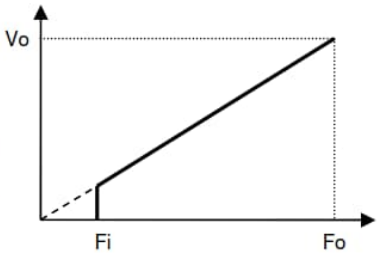
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Note 1:

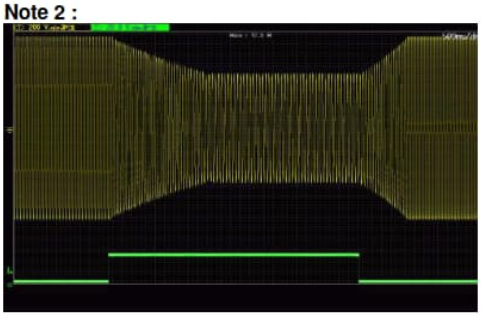


Example for N=1: start-up time = N x 1.7 s for changes from 16 Hz to 50 Hz



Mode V/F curve

Note 2 :



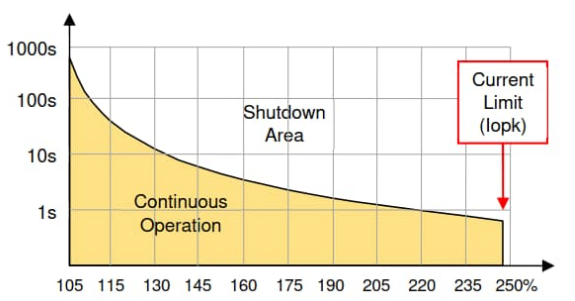
Example for change from 50Hz / 400 V to 30 Hz and 240 V with ramp-down of 2 cycles / Hz and ramp-up de 1 Cycle/Hz. Yellow: output voltage and Green: Mid-Power input signal

WORKING PARAMETERS

Thermal Protection	
Internal Warning Temperature	88°C
Internal Shutdown Temperature	92°C
Internal Restart Temperature	75°C
Internal Temperature of Start-Up	45°C
Input Voltage Parameters	**750VDC**
High Input Voltage Shutdown Instantaneous	1300> VDC
High Input Voltage Timed Shutdown (t)	1270-1080VDC
Time to Shutdown (t)	Controlled Via Temperature Measurement (s)
Start-Up Voltage	390VDC
Low Input Voltage Instantaneous Shutdown	370VDC
Time to Shutdown (t)	500ms
Output Voltage Parameters	
Output Voltage	400VAC (Line to Line)
Output Under-Voltage Shutdown	<85% of Setting 1000ms
Warning Voltage (Output Alarm)	<90% of Setting 200ms
Initial Start-Up Frequency (*)	5Hz
Soft Start Duration	1 Cycle
Ramp-Up V/F (*)	1 Hz/Cycle
Output Current Parameters	
Maximum Continuous Output Current (*)	9.24A
Warning Current (Output Alarm) (*)	8.8A
Maximum Overload I^2t	See Figure Below
Time Between Restart Attempts	4000ms
Number of Attempts of Consecutive Overload	5
Working Failures and Reset	
Lock for Continuous Overload or Internal Failure	Unlimited Time
Reset Time by Input Disconnection	>2min

(*) Configurable parameters underlined

OVERLOAD PROTECTION

Protection Against Overloads and Short-Circuit	By Current Limiting at Iopk By I^2t. The Unit Shutdown when the Current-Time is over the Continuous Operation Curve	
Overload Protection Recovery	Every 4 Seconds After Shutdown, the Unit tries to Restart Up to 5 Times. If the Overload Persists, the Unit Reminds Shutdown Until an Input Reconnection	

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