

KONTRAC GP170DC_SK **KONTRAC SSM**



KONTRAC GP170DC_SK: Development of the tramcar propulsion converter with supercapacitor module, ref. No. KK.01.2.1.01.0131 Project leader: KONČAR - ELECTRONICS AND INFORMATICS Ltd. for production and services Partner: University of Zagreb, Faculty of Electrical Engineering and Computing Total budget of the project: 16.700.900,99 HRK Awarded grant: 6.528.270,54 HRK Duration of the project: 02.11.2018 - 02.08.2022

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KONTRAC GP170DC_SK

Main tramcar propulsion drive converter with DC-DC converter and the energy storage device

KONTRAC GP170DC_SK is the main tramcar propulsion drive converter intended for the supply of vehicle's traction motors. Unlike the existing TMK 2200 and TMK 2300 series main propulsion drive converters, the KONTRAC GP170DC_SK converter has an integrated DC-DC converter towards the energy storage device (supercapacitors), which enables the storage of vehicle braking energy in the energy storage device and its subsequent use during vehicle acceleration.

KONTRAC GP170DC_SK converter consists of:

- Precharging circuit
- Input filter
- Input circuit
- · Three-phase, two-level inverter
- Braking chopper
- Three-phase Buck-Boost DC/DC converter
- Multiprocessor control system
- · Monitoring and diagnostic system

KONTRAC GP170DC_SK converter features:

- Latest generation dual IGBT semiconductor modules are used
- Plug-and-play excitation circuits are used
- Multiprocessor control system enables easy monitoring of operation and diagnostics
- Semiconductor control pulses are generated using a floating-point microcontroller, which improves the control system accuracy and reliability
- Separate microcontroller is designated for inverter, input circuit and braking chopper control
- Separate microcontroller is designated for control of DC/DC converter
- Robust design
- Easy maintenance
- · Mounting on vehicle roof













TECHNICAL DATA:

Input data		
	Rated input voltage	600 V d.c.
Input voltage	Permissible input voltage deviation	from 420 V to 720 V d.c.
input voltage	Input voltage waviness for full-wave, six-pulse rectification	4.2%
	Rated input current	300 A
Input current	Maximum input current during traction	360 A
	Maximum regenerative braking current	500 A
Output data		
	Rated output voltage during traction	3 x 400 V
	Rated output voltage during braking	3 x 520 V
	Rated output voltage during emergency braking	3 x 625 V
Output voltage	Output voltage fundamental frequency	from ≈ 0 to ≈ 160 Hz
Output voltage	Output voltage form	Pulse Width Modulation
	Switching frequency	from ≈ 1500 Hz to ≈ 2500 Hz
	du/dt value of the output voltage	< 4 kV/µs
	Rated output current	3 x 320 A r.m.s.
Output current	Maximum output current during traction	3 x 450 A r.m.s.
	Maximum output current during braking	3 x 650 A r.m.s.
	Braking resistor power	600 kW
Braking assembly	Braking chopper maximum current	800 A
Auviliary input data		
	Rated voltage	24 V d c

Control electronics power supply	Rated voltage	24 V d.c.
	Permissible voltage deviation	from 17 V to 31 V d.c.
	Maximum consumption of auxiliary input during operation	240 W
Cooling ventilator power supply	Ventilator supply voltage	3 x 400 V, 50 Hz, sinusoidal waveform
	Maximum ventilator power consumption	900 W

Environmental and mechanical properties		
	Converter dimensions	1705 mm x 1000 mm x 515 mm
	Mechanical protection degree	IP54
	Ambient temperature during operation	from -25 °C to +40 °C
	Humidity	max. 90%, without condensing
	Cooling method	Forced air-cooling (built-in ventilator
	Storage temperature	from -40 °C to +85 °C









Operativni program KONKURENTNOST I KOHEZIJA

KONTRAC SSM Supercapacitor module box

KONTRAC SSM is a box with supercapacitor modules and other equipment which is installed on the vehicle together with KONTRAC GP17ODC_SK converter. Three supercapacitor modules of 129.6 V rated voltage and 62 F rated capacity are built in the KONTRAC SSM, while the modules are connected in series. KONTRAC SSM is electrically connected to the corresponding output connectors of the KONTRAC GP17ODC_SK converter, and to a special discharge resistor. KONTRAC SSM is also connected by signal connections to the KONTRAC GP17ODC_SK converter, which enables CAN communication with supercapacitor modules, as well as powering the switch, relays and ventilators.

TECHNICAL DATA:

Input data and capacity			
Voltage	Rated voltage	388.8 V d.c.	
	Maximum permissible voltage	410.4 V d.c.	
Energy	Total capacity	433.8 Wh	
Current	Maximum continuous current with temperature rise of 15 K	140 A	
	Maximum continuous current with temperature rise of 40 K	240 A	

Environmental and mechanical properties		
	Converter dimensions	1705 mm x 1107 mm x 401 mm
	Mechanical protection degree	IP54
	Ambient temperature during operation	from -25 °C to +40 °C
	Humidity	max. 90%, without condensing
	Cooling method	Forced air-cooling (built-in ventilator)
	Storage temperature	from -40 °C to +85 °C



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