

KONTRAC GP170DC Propulsion converter for tramways

*KONTRAC GP170DC
for tramways*



KONTRAC GP170DC converts 600 Vdc or 750 Vdc line voltage into propulsion power to control and drive asynchronous traction motors on tramway vehicles. The converter supplies two asynchronous traction motors connected in parallel. The electrical motor drive operates in two modes: traction mode and braking mode.

Features

- Input line voltage 600 Vdc or 750 Vdc
- Latest IGBT technology
- Vector control of asynchronous traction motors
- Easy maintenance
- Light and compact design
- Modular design of power unit and control electronic
- Roof mounting
- Extended ambient temperature range from -40 °C to +40 °C

KONTRAC GP170DC consists of

- Input contactor and precharging circuit
- Input filter
- One propulsion inverter
- DC link overvoltage protection
- Air-cooled cooling system
- Traction control unit

KONTRAC GP170DC

Traction control unit

Traction control unit (TCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs). TCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks. Special care is put on obsolescence issues and modularity.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics. Remote diagnostic functions allow monitoring of all intelligent units from one connection point.

Mechanical design and cooling system

The converter is designed for roof mounting with IP54 protection. Modular design of power unit and control electronic allows an easy maintenance access enabling easy replacement of power unit module. The increased power density of the power unit module enables compact and light-weighted converter design. Converter box is made from stainless steel and it is intended for use in extended ambient temperature range from -40°C to +40°C. The converter is efficiently cooled by forced air.

Application example

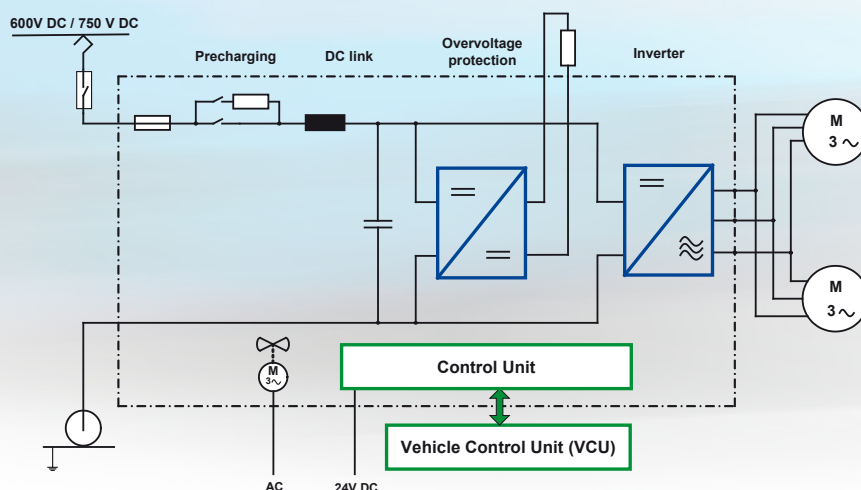
KONTRAC GP170DC is mounted on the roof of 100 % low-floor KONČAR tramway TMK 2200 that operates in City of Zagreb, the capital of Croatia. The tramway car series TMK 2200 is distinguished by its modern and attractive design, superior technical characteristics and comfortable ride. These modern vehicles significantly contribute to efficient and comfort public transport in City of Zagreb.

BASIC TECHNICAL DATA

| | |
|----------------------|----------------------|
| Input voltage | 600 / 750 VDC |
| Propulsion output | 170 kW |
| Braking chopper | 470 kW |
| Cooling | Forced air-cooling |
| Size (L x W x H) | 1580 x 1000 x 520 mm |
| Weight | 328 kg |
| Mounting place | Roof |
| Connecting interface | CAN / MVB / Ethernet |



KONČAR tramway vehicle in Zagreb



Block diagram of the converter

KONČAR

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KONTRAC PN25DC

Auxiliary converter for tramways



*KONTRAC PN25DC
for tramways*

KONTRAC PN25DC is used as the auxiliary power supply converter in tramway vehicles. It converts 600 VDC or 750 VDC line voltage into three-phase AC voltage intended for supplying of tramway's air-conditioning unit.

Features

- Input line voltage 600 VDC or 750 VDC
- Latest IGBT technology
- Galvanic insulation input / output
- High-frequency resonant converter
- Easy maintenance
- Light and compact design
- Roof mounting
- Extended ambient temperature range from -40 °C to +40 °C

KONTRAC PN25DC consists of

- Input filter
- Pre-charging circuit
- Buck converter
- Resonant converter
- Three-phase inverter
- Sinus filter
- Cooling system
- Control unit

KONTRAC PN25DC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Remote diagnostic functions allow monitoring of all intelligent units from one connection point.

Mechanical design and cooling system

The converter is designed for roof mounting with IP54 protection. High-frequency resonant converter enables use of transformers and chokes with smaller dimensions and mass which significantly decreases mass and size of the converter, resulting in minimized vehicle weight. Converter box is made from stainless steel and is intended for use in extended ambient temperature range from -40°C to $+40^{\circ}\text{C}$. The converter is efficiently cooled by forced air.

Application example

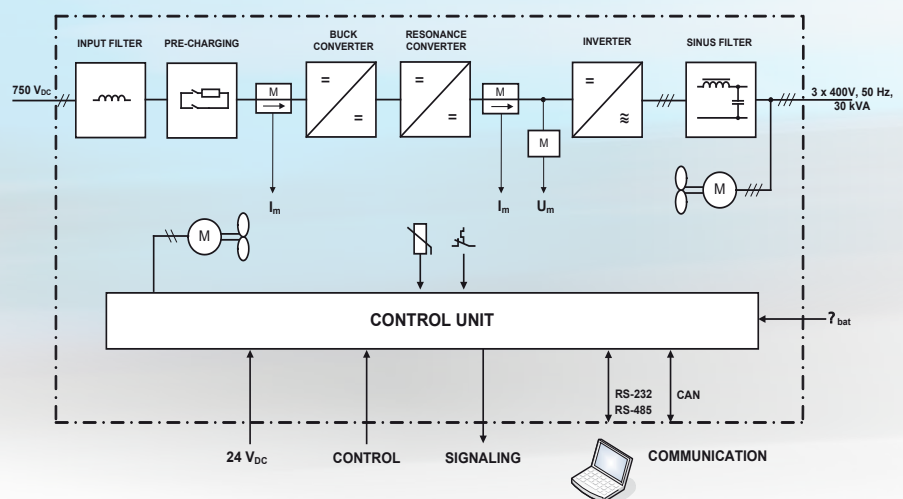
KONTRAC PN25DC is mounted on the roof of 100% low-floor KONČAR tramway TMK 2200 that operates in City of Zagreb, the capital of Croatia. The tramway car series TMK 2200 is distinguished by its modern and attractive design, superior technical characteristics and comfortable ride. These modern vehicles significantly contribute to efficient and comfort public transport in City of Zagreb.

BASIC TECHNICAL DATA

| | |
|----------------------|--------------------------|
| Input voltage | 600 / 750 VDC |
| AC output | 3 x 400 V, 50 Hz, 30 kVA |
| Cooling | Forced air-cooling |
| Size (L x W x H) | 1515 x 555 x 520 mm |
| Weight | 246 kg |
| Mounting place | Roof |
| Connecting interface | CAN / MVB / Ethernet |



KONČAR tramway vehicle in Zagreb



Block diagram of the converter

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KONTRAC PN35DC

Auxiliary converter for tramways

*KONTRAC PN35DC
for tramways*



KONTRAC PN35DC is used as the auxiliary power supply converter in tramway vehicles. It converts 600 VDC or 750 VDC line voltage into three-phase AC voltage intended for supplying of tramway's air-conditioning unit, single-phase AC voltage for service purposes and DC voltage intended for charging batteries and supplying of all DC consumers on board the tramways.

Features

- Input line voltage 600 VDC or 750 VDC
- Latest IGBT technology
- Galvanic insulation input / outputs and among outputs
- High-frequency resonant converter
- Easy maintenance
- Light and compact design
- Roof mounting
- Extended ambient temperature range from -40 °C to +40 °C

KONTRAC PN35DC consists of

- Input filter
- Pre-charging circuit
- Buck converter
- Resonant converter
- Three-phase inverter
- Sinus filter
- Battery charger
- Cooling system
- Control unit

KONTRAC PN35DC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Remote diagnostic functions allow monitoring of all intelligent units from one connection point.

Mechanical design and cooling system

The converter is designed for roof mounting with IP54 protection. High-frequency resonant converter enables use of transformers and chokes with smaller dimensions and mass which significantly decreases mass and size of the converter, resulting in minimized vehicle weight. Converter box is made from stainless steel and is intended for use in extended ambient temperature range from -40°C to $+40^{\circ}\text{C}$. The converter is efficiently cooled by forced air.

Application example

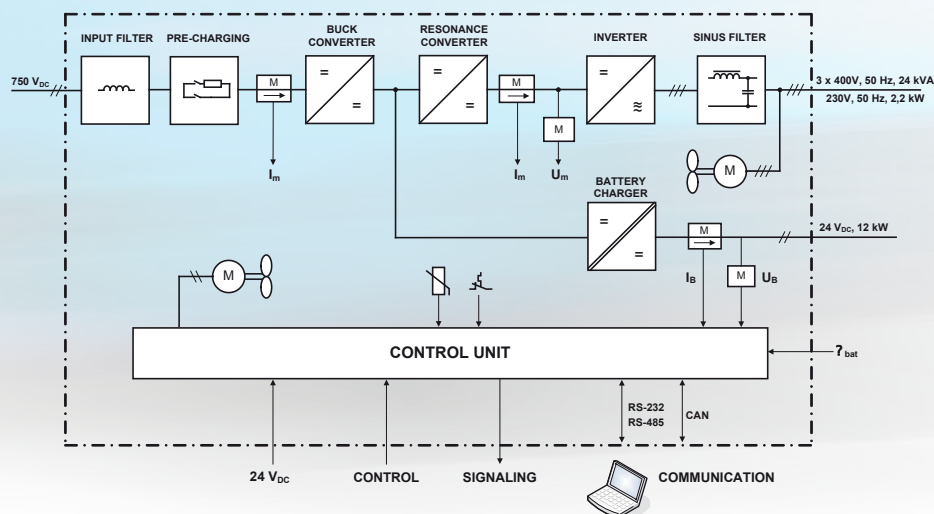
KONTRAC PN35DC is mounted on the roof of 100% low-floor KONČAR tramway TMK 2200 that operates in City of Zagreb, the capital of Croatia. The tramway car series TMK 2200 is distinguished by its modern and attractive design, superior technical characteristics and comfortable ride. These modern vehicles significantly contribute to efficient and comfort public transport in City of Zagreb.

BASIC TECHNICAL DATA

| | |
|----------------------|---|
| Input voltage | 600 / 750 VDC |
| AC outputs | 3 x 400 V, 50 Hz, 25 kVA 230 V, 50 Hz, 2,2 kVA |
| DC output | 24 Vdc, 12 kW |
| Cooling | Forced air-cooling |
| Size (L x W x H) | 1715 x 555 x 520 mm |
| Weight | 300 kg |
| Mounting place | Roof |
| Connecting interface | CAN / MVB / Ethernet |



KONČAR tramway vehicle in Zagreb



Block diagram of the converter

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KONTRAC GP550AC Propulsion converter for electric multiple units

*KONTRAC GP550AC
for electric multiple units*



KONTRAC GP550AC converts the power from transformer outputs of AC network into propulsion power for the traction motors.

KONTRAC GP550AC has sinusoidal input current in phase with voltage and with low harmonic content. During braking, the converter feeds back energy to the network. All control, protective, communication and monitoring functions are implemented in one control electronics inside the converter.

Features

- Regenerative braking capability
- Modular design of power units
- High energy efficiency
- Machine room mounting
- Easy maintenance
- Line friendly
- Motor friendly
- Latest IGBT technology
- Liquid cooling system

KONTRAC GP550AC consist of

- Input contactors and precharging circuit
- Two 4 quadrant converters
- One propulsion inverter
- DC link overvoltage protection
- Liquid cooling system
- Traction control unit



Converter power unit

KONTRAC GP550AC

Traction control unit

Traction control unit (TCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

TCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks. Special care is put on obsolescence issues and modularity.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics. Remote diagnostic functions allow monitoring of all intelligent units from one connection point.

Mechanical design and cooling system

The converter is designed for mounting in machine room with IP54 protection. Modular design of the converter allows an easy maintenance access enabling easy replacement of each module. The increased power density of the power modules enables compact and light-weighted converter design. The equipment is efficiently liquid cooled. Cooling system uses water to cool the converter power modules - a feature contributing to the converter's very compact design. The water itself is cooled by an external water-to-air heat exchanger.

Application examples

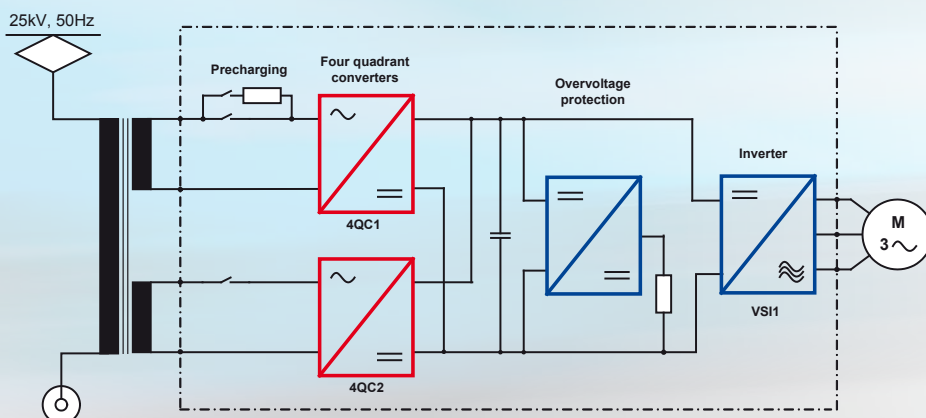
KONTRAC GP550AC is used as a propulsion converter in a low-floor KONČAR electric multiple unit built and delivered for Croatian Railways. The electric multiple unit, which is distinguished by its modern and attractive design, superior technical characteristics and comfortable ride, is intended for regional passenger transport in Croatia. The converter KONTRAC GP550AC is also used as a propulsion converter in electric multiple unit built also for Croatian Railways but for urban passenger transport. These modern vehicles significantly contribute to efficient and comfortable passenger commute in urban and regional transport.

BASIC TECHNICAL DATA

| | |
|----------------------|----------------------|
| Input voltage | 2 x 800 V, 50 Hz |
| Propulsion output | 550 kW |
| Cooling | Liquid cooled |
| Size (W x D x H) | 1350 x 840 x 1900 mm |
| Weight | 849 kg |
| Mounting place | Machine room |
| Connecting interface | CAN / MVB / Ethernet |



KONČAR electric multiple unit for Croatian Railways



Block diagram of the converter

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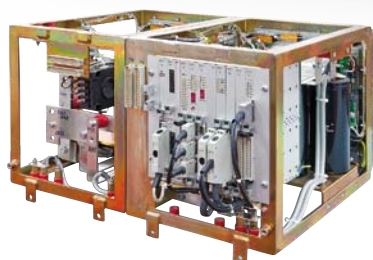
KONTRAC PN110AC

Auxiliary converter for electric multiple units

*KONTRAC PN110AC
for electric multiple units*



KONTRAC PN110AC is used as the auxiliary power supply converter in multiple unit trains. It is fed from a dedicated winding of the main transformer and supplies stabilized voltages to electrical loads. The converter has two three-phase outputs and one DC output. Its input current is nearly sinusoidal and its fundamental harmonic is in phase with the input voltage.



Power units of input rectifier and chopper

Features

- Modular design of power units
- High energy efficiency
- Machine room mounting
- Easy maintenance
- Latest IGBT technology

KONTRAC PN110AC consists of

- Input contactor and precharging circuit
- Input rectifier and chopper power modules
- Two output inverter modules
- Two output sine filters
- Battery charger
- Cooling system
- Control unit

KONTRAC PN110AC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Special care is put on obsolescence issues and modularity.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics. Remote diagnostic functions allow monitoring of all intelligent units from one connection point.

Mechanical design and cooling system

The converter is designed for mounting in machine room with IP54 protection. Modular design of the converter allows an easy maintenance access enabling easy replacement of each power module. The increased power density of the power modules enables compact and light-weighted converter design. The converter is efficiently cooled by forced air.

Application examples

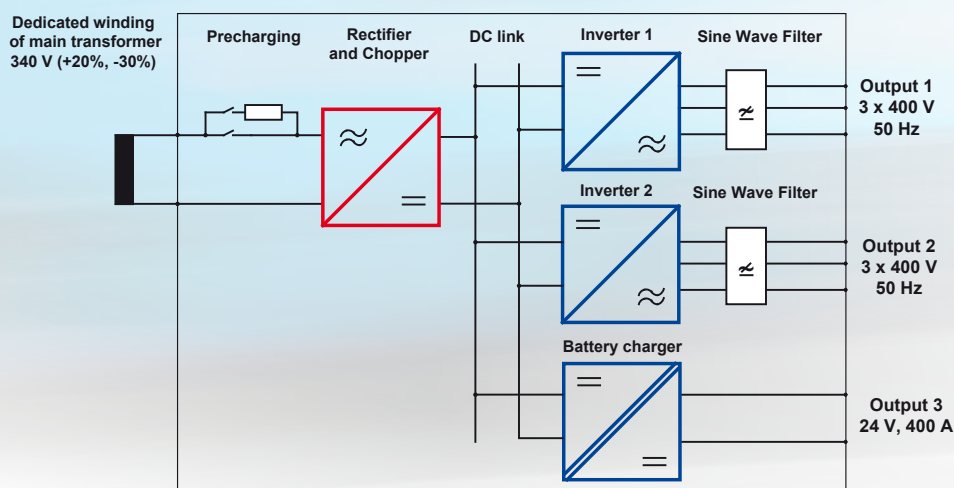
KONTRAC PN110AC is used as an auxiliary converter in a low-floor KONČAR electric multiple unit built and delivered for Croatian Railways. The electric multiple unit which is distinguished by its modern and attractive design, superior technical characteristics and comfortable ride, is intended for regional passenger transport in Croatia. These modern vehicles significantly contribute to efficient and comfortable passenger commute in urban and regional transport.

BASIC TECHNICAL DATA

| | |
|----------------------|------------------------------|
| Input voltage | 340 V, 50 Hz |
| AC outputs | 3 x 400 V, 50 Hz, 2 x 60 kVA |
| DC output | 24 VDC, 12 kW |
| Cooling | Forced air-cooling |
| Size (W x D x H) | 1250 x 820 x 2085 mm |
| Weight | 990 kg |
| Mounting position | Machine room |
| Connecting interface | CAN / MVB / Ethernet |



KONČAR electric multiple unit for Croatian Railways



Block diagram of the converter

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KONTRAC GP550DE

Propulsion and auxiliary converter for diesel-electric multiple units

*KONTRAC GP550DE
for diesel-electric multiple units*



KONTRAC GP550DE converts the variable voltage from diesel generator into drive power for the traction motors, three-phase auxiliary power supply for the train onboard consumers and into DC auxiliary power supply for charging train batteries and supplying of all DC consumers on board the vehicle.

KONTRAC GP550DE is a robust and solid unit incorporating modern IGBT technology.



Power unit of propulsion converter

Features

- Modular design of power units
- High energy efficiency
- Roof mounting
- Easy maintenance
- Motor friendly
- Integrated auxiliary converter
- Integrated battery charger
- Latest IGBT technology
- Liquid cooling system
- Galvanic isolated output

KONTRAC GP550DE consist of

- Input contactor and precharging circuit
- Propulsion inverter
- Auxiliary converter with three-phase output and battery charger
- Liquid cooled cooling system
- Output transformer
- Traction control unit

KONTRAC GP550DE

Traction control unit

Traction control unit (TCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

TCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Special care is put on obsolescence issues and modularity.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics. Remote diagnostic functions allow monitoring of all intelligent units from one connection point.

Mechanical design and cooling system

The converter is designed for roof mounting with IP54 protection. Modular design of the converter allows an easy maintenance access enabling that each module could be very easily replaced. The increased power density of the power modules enables compact and light-weighted converter design.

The efficient cooling system is completely integrated in converter box achieving a high degree of functional integration. It uses water to cool the converter power modules - a feature contributing to the converter's very compact design. The water itself is cooled by an internal air-to-water heat exchanger.

Application examples

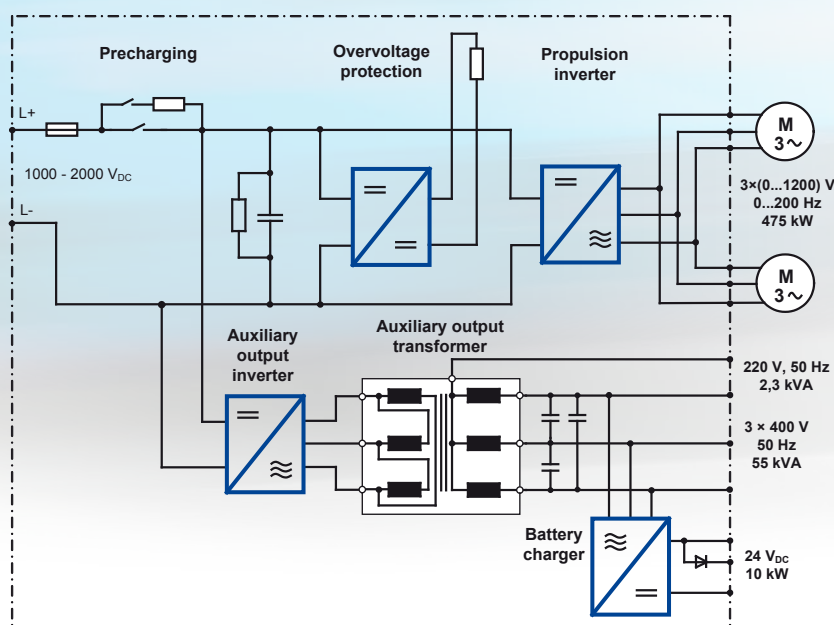
KONTRAC GP550DE is mounted on roof of the low-floor diesel-electric multiple unit built and delivered for Croatian Railways. The diesel-electric multiple unit, which is distinguished by its modern and attractive design, superior technical characteristics and comfortable ride, is intended for regional passenger transport in Croatia.

BASIC TECHNICAL DATA

| | |
|----------------------|---|
| Input voltage | 1000 VDC - 2000 VDC |
| Propulsion output | 475 kW |
| Braking chopper | 730 kW |
| AC outputs | 3 x 400 V, 50 Hz, 55 kVA 230 V, 50 Hz, 2,3 kVA |
| DC output | 24 Vdc, 10 kW |
| Cooling | Liquid cooled |
| Size (L x W x H) | 3000 x 1800 x 735 mm |
| Weight | 1485 kg |
| Mounting place | Roof |
| Connecting interface | CAN / MVB / Ethernet |



Diesel-electric multiple unit for Croatian Railways



Block diagram of the converter

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KONTRAC PN6MS

Multi-system battery charger for passenger coaches

*KONTRAC PN6MS
for passenger coaches*



KONTRAC PN6MS is a multi-system battery charger which serves as the source of electric energy for charging batteries and for supplying of all DC consumers on board the passenger coach. It is powered by any of four UIC voltages. Switching to another UIC system is performed automatically, without supervision. Modular design enables easy access and low maintenance costs.



Battery charger module

Features

- Four input voltages i.e. supply systems
- Microprocessor control and diagnostics
- Input / output galvanic insulation
- Easy maintenance
- Modular design
- Flat-battery power supply
- Disconnecting and earthing device integrated inside the converter enclosure
- Automatic switching to another input voltage i.e. supply system

KONTRAC PN6MS consists of

- Disconnecting and earthing device
- Input contactors
- Input filter
- High-voltage converter
- Battery charger and module with reactors
- Flat battery power supply
- Control unit

KONTRAC PN6MS

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

Mechanical design and cooling system

The converter is designed for under-floor mounting with IP54 protection. Modular design of the converter allows an easy maintenance access enabling easy replacement of each power module. The increased power density of the power modules enables compact and light-weighted converter design. The converter is efficiently cooled by natural convection.

Application example

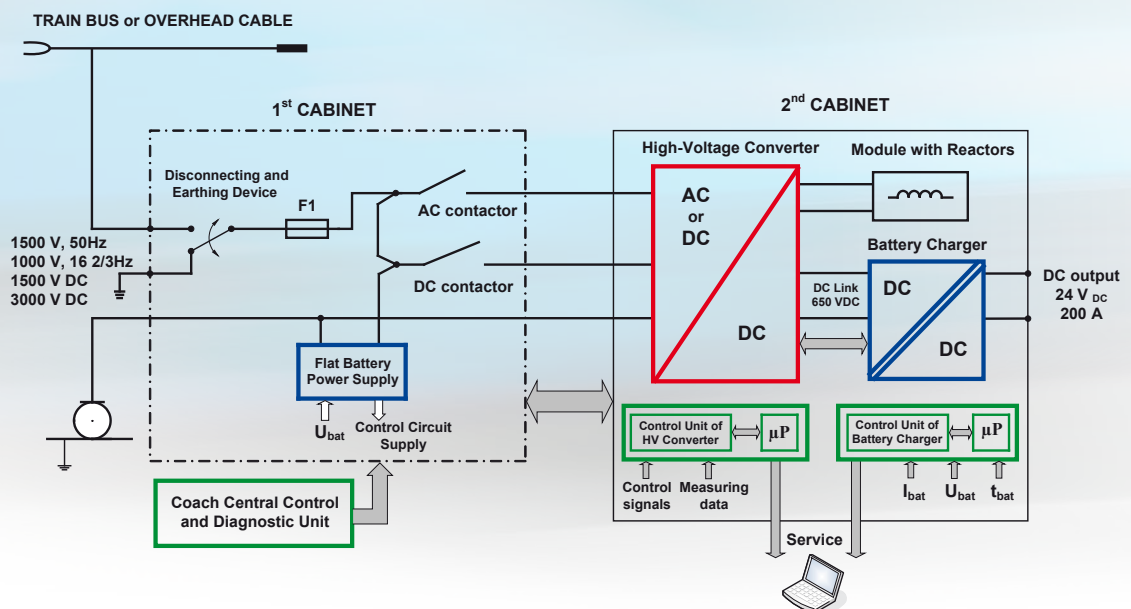
As a part of modernization of passenger coaches for local transport, passenger coaches series Bee 20-00 and 29-00 have been equipped with multi-system battery charger KONTRAC PN6MS. The converter is used for supplying of all DC consumers onboard the coach as well as for charging coach battery.

BASIC TECHNICAL DATA

| | |
|----------------------|---|
| Input voltage | 1000 / 1500 V, 16-51 Hz 1500 / 3000 VDC |
| DC output | 30 VDC, 6 kW |
| Cooling | Natural convection |
| Size (L x W x H) | 1 st Cabinet 1940 x 895 x 580 mm 2 nd Cabinet 920 x 535 x 560 mm |
| Weight | 300 kg |
| Mounting place | Under-floor |
| Connecting interface | CAN / MVB / Ethernet |



Modernized passenger coach series Bee 29-00 for local passenger transport in Croatia.



Block diagram of the converter

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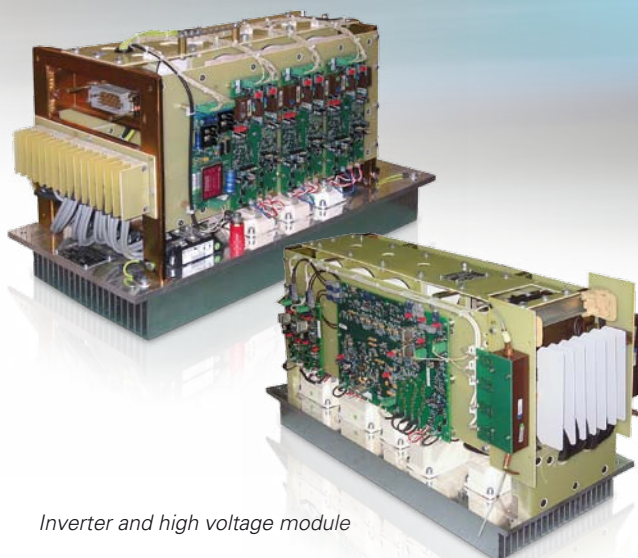
KONTRAC PN30MS

Two-system converter for passenger coaches

*KONTRAC PN30MS
for passenger coaches*



KONTRAC PN30MS serves as a power supply for air conditioned passenger coaches. It can be supplied from two conventional UIC voltages (1500 V, 50 Hz or 1500 V DC) used by European railways, contributing significantly to passengers comfort.



Inverter and high voltage module

Features

- Two input voltages
- Microprocessor control and diagnostics
- Input / output galvanic insulation
- Active control of input impedance
- Easy maintenance
- Modular design
- Integrated disconnecting and earthing device
- Flat-battery power supply
- Automatic switching to another input voltage i.e. supply system

KONTRAC PN30MS consists of

- Disconnecting and earthing device
- Input contactor and precharging circuit
- Input filter
- High-voltage modules
- Output inverter module and a battery charger
- Flat battery power supply
- Air system ventilation
- Control unit

KONTRAC PN30MS

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

Mechanical design and cooling system

The converter is designed for under-floor mounting with IP54 protection. Modular design of the converter allows an easy maintenance access enabling easy replacement of each power module. The increased power density of the power modules enables compact and light-weighted converter design. The converter is efficiently cooled by forced air.

Application example

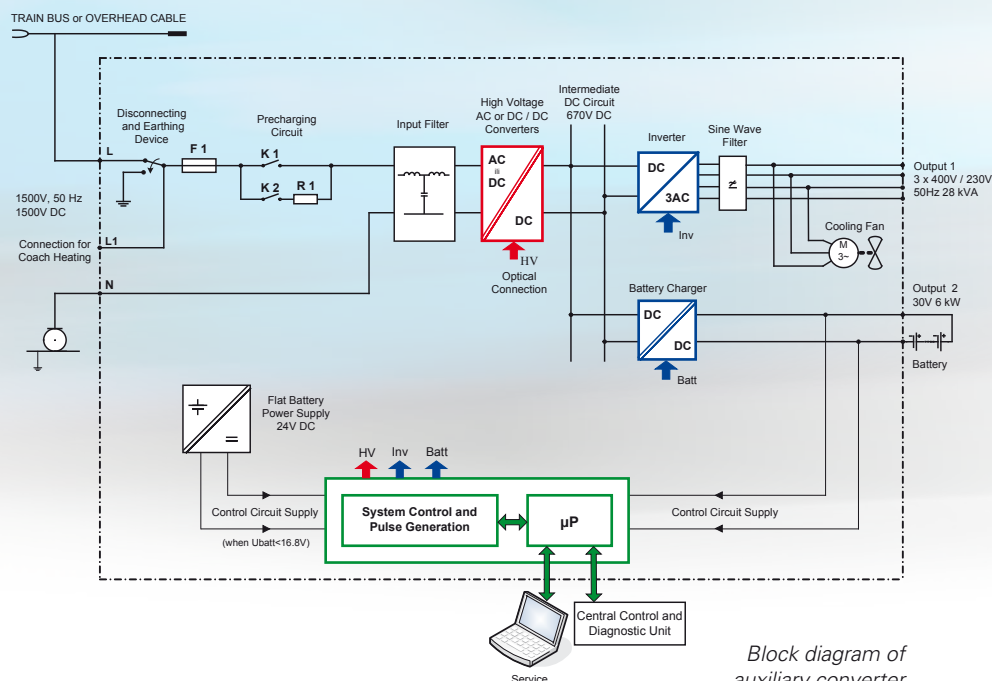
As a part of a large modernization project of passenger coaches owned by Croatian Railways, passenger coaches for local traffic have been equipped with dual system static converter KONTRAC PN30MS. The converter is used as a power supply for air conditioning unit, all single-phase and three-phase consumers, all DC consumers and for charging the coach battery. In this way it significantly contributes to pleasant and comfortable ride to different suburban destinations.

BASIC TECHNICAL DATA

| | |
|----------------------|---|
| Input voltage | 1500 V, 50 Hz 1500 VDC |
| AC output | 3 x 400 V, 50 Hz, 25,5 kVA 230 V, 50 Hz, 2,5 kVA |
| DC output | 30 VDC, 5 kW |
| Cooling | Forced air-cooling |
| Size (L x W x H) | 1660 x 1900 x 600 mm |
| Weight | 1020 kg |
| Mounting place | Under-floor |
| Connecting interface | CAN / MVB / Ethernet |



Croatian Railways passenger coach for local traffic equipped with the converter KONTRAC PN30MS



Block diagram of auxiliary converter KONTRAC PN30MS

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KONČAR - Electronics and Informatics Inc.

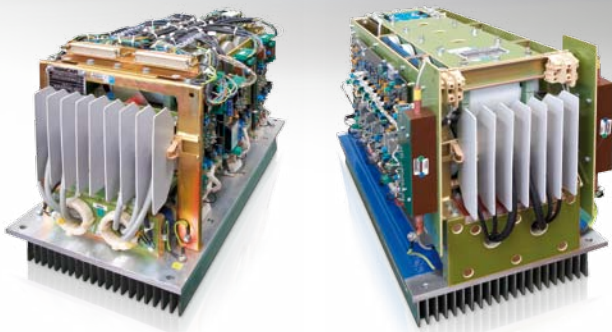
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KONTRAC PN50MS / PN60MS Multi-system converter for passenger coaches

*KONTRAC PN50MS / PN60MS
for passenger coaches*



KONTRAC PN50MS / PN60MS is used as the power supply for all consumers in modern air-conditioned coaches on European railways. It is powered by any of four UIC voltages and serves as the source of electric energy for the coach air-conditioning system, all single-phase and three-phase consumers, as well as for charging batteries and power supply of all DC consumers onboard a passenger coach. Switching to another UIC system is performed automatically and without external supervision.



Inverter and high voltage module

Features

- Four input voltages i.e. supply systems
- Microprocessor control and diagnostics
- Input / output galvanic insulation
- Active control of input impedance
- Easy maintenance
- Modular design
- Integrated disconnecting and earthing device
- Flat-battery power supply
- Automatic switching to another input voltage i.e. supply system

KONTRAC PN50MS / PN60MS consists of

- Disconnecting and earthing device
- Input contactor and precharging circuit
- Input filter
- High-voltage modules
- Output inverter modules and a battery charger
- Flat battery power supply
- Air system ventilation
- Control unit

KONTRAC PN50MS / PN60MS

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks. Special care is put on obsolescence issues, and modularity.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

Mechanical design and cooling system

The converter is designed for under-floor mounting with IP54 protection. Modular design of the converter allows an easy maintenance access enabling easy replacement of each power module. The increased power density of the power modules enables compact and light-weighted converter design. The converter is efficiently cooled by forced air.

Application example

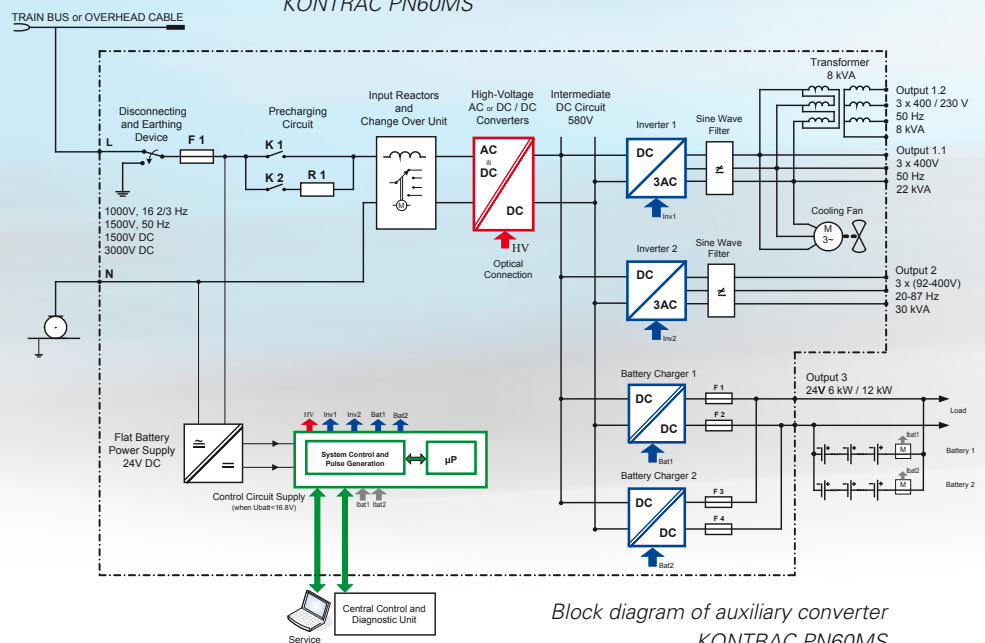
As a part of a large modernization project of passenger coaches owned by Croatian Railways, couchette coaches of 2nd class have been equipped with multi-system static converter KONTRAC PN60MS. The converter is used as a power supply for air conditioning unit, all single-phase and three-phase consumers, all DC consumers and for charging the coach battery. In this way it significantly contributes to pleasant and comfortable ride to different European destinations.

BASIC TECHNICAL DATA

| | PN50MS | PN60MS |
|----------------------|--|----------------------|
| Input voltages | 1000 V, 16 2/3 (22, 50) Hz, 1500 V, 50 Hz 1500 / 3000 Vdc | |
| AC outputs | 3 x 400 V, 50 Hz, 30 kVA + 22 kVA 3 x 400 / 230 V, 50 Hz, 8 kVA | |
| DC output | 30 Vdc, 6 kW | 30 Vdc, 12 kW |
| Cooling | Forced air-cooling | |
| Size (L x W x H) | 2360 x 1900 x 600 mm | 2590 x 1900 x 600 mm |
| Weight | 1630 kg | 1802 kg |
| Mounting place | Under-floor | |
| Connecting interface | CAN / MVB / Ethernet | |



Croatian Railways couchette coach equipped with the converter KONTRAC PN60MS



Block diagram of auxiliary converter KONTRAC PN60MS

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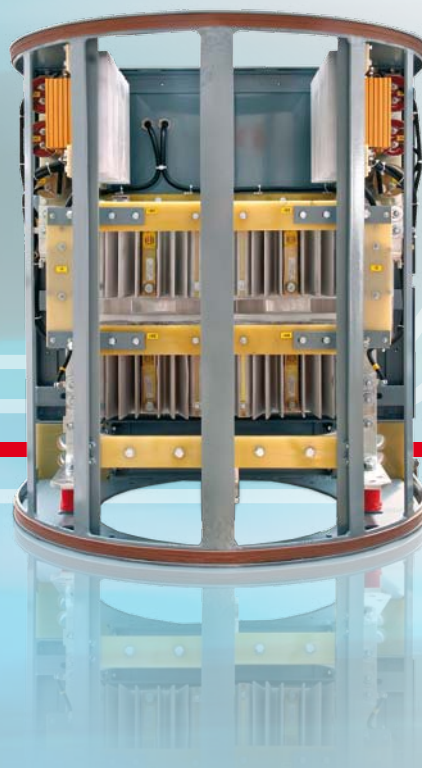
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KONTRAC GP1000AC

Propulsion converter for locomotives

*KONTRAC GP1000AC
for locomotives*



KONTRAC GP1000AC is a thyristor propulsion converter which converts AC network electric power fed from a transformer output into propulsion power for DC traction motors. The converter is used in the process of modernization of old diode locomotives into thyristorized locomotives as well as for building new locomotives.

Replacement of diode converters with thyristor converters and implementation of vehicle control unit for traction application (VCU) ensures conversion of old diode locomotives to modern thyristor locomotives with superior traction and exploitation characteristics:

- Continuous speed and torque control of traction motors (both at traction and braking mode) which optimizes adhesion, saves energy, decreases wear of vital parts and provides electronic overload, sliding and torsion vibrations protection.
- Sequential control of thyristor bridges limits consumption of reactive power.

Features

- Easy maintenance
- Machine room mounting
- Robust and powerful semiconductors
- Air cooled cooling system
- Electrically and mechanically compatible with the existing diode locomotive power supply equipment

KONTRAC GP1000AC

Overvoltage protection

A good protection of semi-conductor valves against transient voltages is very important for reliable and safe operation of a thyristor converter supplied by contact line. The overvoltages are the result of atmospheric discharges and switching of the inductive circuits in the contact line. The overvoltage protection, in two equal cubicles, contains units for the overvoltage protection of the whole thyristor converter of the locomotive.

Mechanical design and cooling system

The converter KONTRAC GP1000AC is designed for mounting in ventilation tunnel in a locomotive's machine room. The converter is efficiently cooled by forced air. The cubicles with overvoltage protection are put next to the main transformer and protection circuits are connected directly to secondary terminal blocks of the main transformer.

Application examples

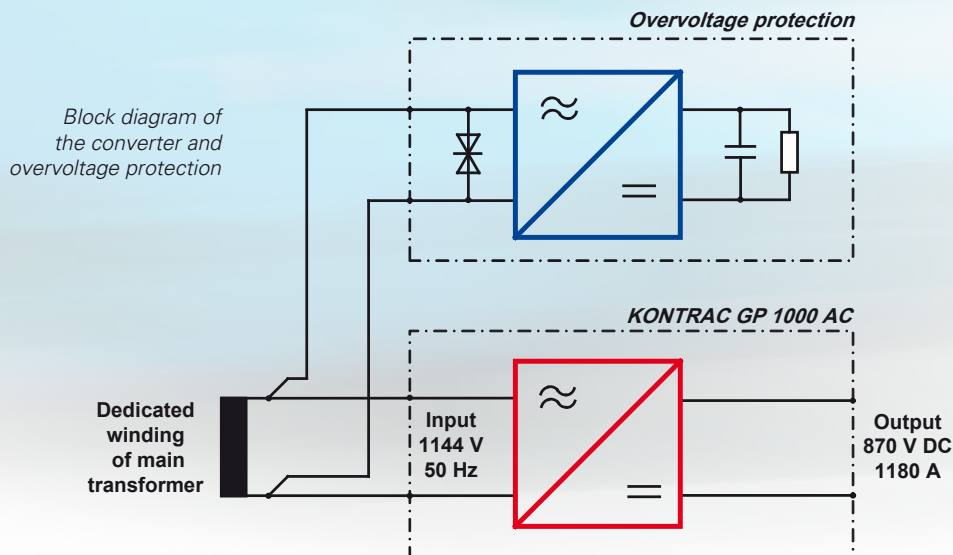
KONTRAC GP1000AC is used as a propulsion converter in numerous locomotives which have been modernized and delivered for Croatian Railways, Railways of the Federation of Bosnia and Herzegovina, Macedonian Railways, Serbian Railways, Bulgarian State Railways, etc. The photo shows modernized 4-axle locomotive type Bo' Bo' series 1.141.300 for Croatian Railways, equipped with KONTRAC GP1000AC.

BASIC TECHNICAL DATA

| | |
|-------------------|--------------------|
| Input voltage | 1144 V, 50 Hz |
| Propulsion output | 1000 kW |
| Cooling | Forced air-cooling |
| Size (W x D x H) | 770 x 575 x 840 mm |
| Weight | 150 kg |
| Mounting position | Machine room |



Thyristorized Bo' Bo' locomotive for Croatian Railways



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KONTRAC PN170AC

Auxiliary converter for electric locomotives

*KONTRAC PN170AC
for electric locomotives*



KONTRAC PN170AC is used as the auxiliary power supply converter in electric locomotives. It is fed from a dedicated winding of the main transformer, converts single-phase voltage into three-phase stabilized voltage and supplies electrical loads such as traction motor blowers, brake resistor blowers, transformer oil cooler blowers, pump, compressors, HVAC etc. The battery charger which is integral part of converter is used for charging locomotive batteries and for supplying of all DC consumers on board the vehicle.

Features

- Modular design of power units
- High energy efficiency
- Machine room mounting
- Easy maintenance
- Latest IGBT technology

KONTRAC PN170AC consists of

- Input contactor and precharging circuit
- Input rectifier module
- DC link choke
- Four or five output inverter modules
- Battery charger
- Cooling system
- Control unit



Inverter module and rectifier module

KONTRAC PN170AC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs).

DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks. Special care is put on obsolescence issues and modularity.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

Mechanical design and cooling system

The converter is designed for mounting in machine room with IP54 protection. The modular design of the converter allows an easy maintenance access enabling easy replacement of each power module. The converter is efficiently cooled by forced air.

Application examples

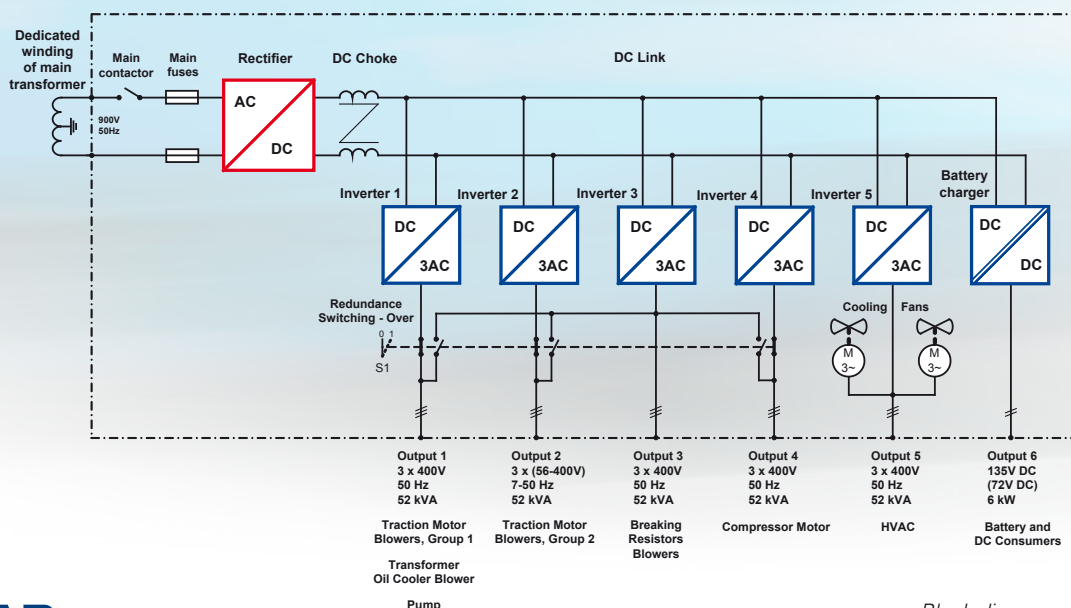
KONTRAC PN170AC in its several variants, is used as an auxiliary converter in numerous locomotives which have been modernized and delivered for Croatian Railways, Railways of the Federation of Bosnia and Herzegovina, Macedonian Railways, Serbian Railways, Bulgarian State Railways, etc. The photo shows modernized 6-axle locomotive type Co' Co' series 46200 for Bulgarian Railways, equipped with KONTRAC PN170AC.

BASIC TECHNICAL DATA

| | |
|----------------------|----------------------------------|
| Input voltages | 900 V, 50 Hz |
| AC outputs | 3 x 400 V, 50 Hz, 4 (5) x 52 kVA |
| DC output | 72 / 135 VDC, 6 kW |
| Cooling | Forced air-cooling |
| Size (W x D x H) | 900 x 1360 x 1675 mm |
| Weight | 1450 kg |
| Mounting position | Machine room |
| Connecting interface | CAN / MVB / Ethernet |



Thyristorized Co'Co' locomotive for Bulgarian Railways



Block diagram of the converter

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KONTRAC PN30AC

Auxiliary converter for substations

*KONTRAC PN30AC
for substations*



KONTRAC PN30AC is a trackside auxiliary power supply converter fed by 25 kV, 50 Hz overhead line. It is used in order to supply various loads inside the substation facilities (power supply for integrated lighting and information systems, railway signaling and protection systems, etc.). Overhead line might generate spikes, sags and surges caused by the current drawn from locomotives. Those are likely to damage the input stages of conventional converters.

In order to provide a trackside noise filtered power source, we use the same technology as for our rolling stock converters.

The converter is primarily intended to be used as a backup energy source (in case of power outage from the distribution network). However, in projects where poor or no distribution network is available at site, this converter can be implemented as a primary power source as well.

Features

- Rolling stock converter technology
- Robust input rectifiers
- Nearly sinusoidal input current, in phase with the input voltage
- Output transformer ensures galvanic isolation
- Sine wave output filter
- EMC output filter
- Easy maintenance
- Modular design of power unit
- Air cooling

KONTRAC PN30AC consists of

- Input contactor and precharging circuit
- Input rectifier, chopper and inverter power module
- Output sine wave filter
- Output EMC filter
- Output transformer
- Air ventilation system
- Control unit

KONTRAC PN30AC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs). DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

Mechanical design and cooling system

The converter has IP54 mechanical protection and it is designed for mounting inside the traction substations. The modular design of the power module allows an easy maintenance. The converter is efficiently cooled by forced air.

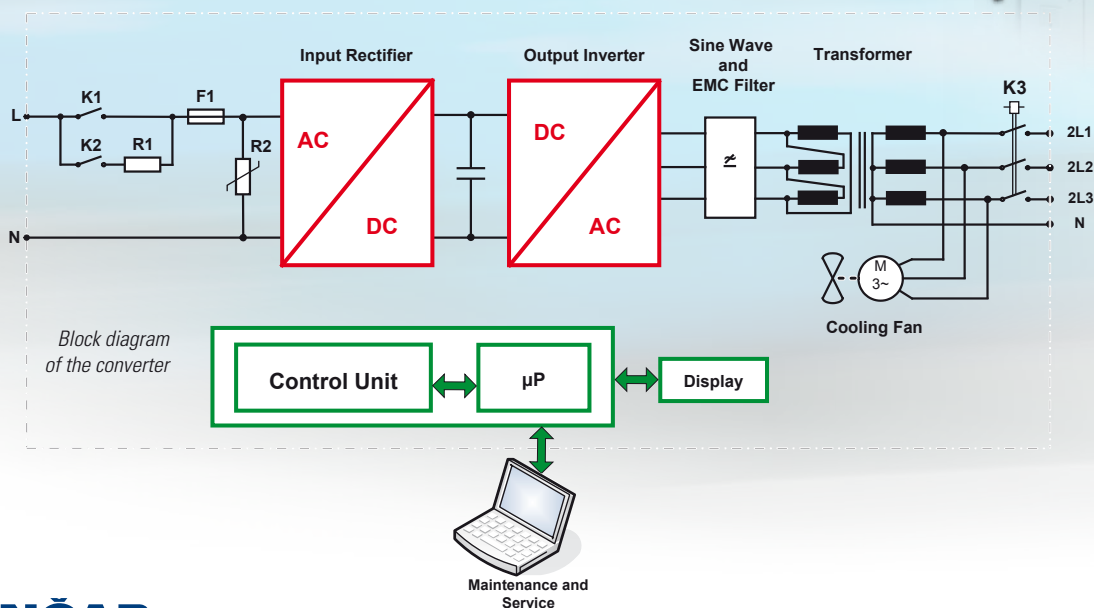
Application examples

Two converters KONTRAC PN30AC are installed in Drivenik Railway Station in Croatia. The converters are used as a primary auxiliary power supply of all single-phase and three-phase AC consumers. The input circuits of the converters are resistant to spikes, sags and surges in overhead line caused by the current drawn from locomotives. The converter KONTRAC PN30AC is also installed in Center for remote control of electric system for rail transportation in Rijeka, Croatia where it is used as a backup auxiliary power supply in case of power outage from the distribution network.

BASIC TECHNICAL DATA

| | |
|-----------------------|--|
| Input voltage | 230 V, 50 Hz over transformer 25 kV / 230 V |
| Minimum input voltage | 160 V (equivalent to 17,5 kV of overhead line voltage) |
| Maximum input voltage | 270 V (equivalent to 29 kV of overhead line voltage) |
| AC output | 3 x 400 / 230 V, 50 Hz, 30 kVA |
| Cooling | Forced air-cooling |
| Size (W x D x H) | 600 x 600 x 2000 mm |
| Weight | 504 kg |
| Mounting place | Substation |
| Connecting interface | CAN / MVB / Ethernet |

Two converters KONTRAC PN30AC installed in Drivenik Railway Station, Croatia



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KONTRAC PN50DC / PN100DC Auxiliary converter for substations

*KONTRAC PN100DC
for substations*



KONTRAC PN50DC / PN100DC is a trackside auxiliary power supply converter fed by 3 kV DC overhead line. It is used in order to supply various loads inside the substation facilities (power supply for integrated lighting and information systems, railway signaling and protection systems, etc.). Overhead line might generate spikes, sags and surges caused by the current drawn from locomotives. Those are likely to damage the input stages of conventional converters.

In order to provide a trackside noise filtered power source, we use the same technology as for our rolling stock converters.

The converter is primarily intended to be used as a backup energy source (in case of power outage from the distribution network). However, in projects where poor or no distribution network is available at site, this converter can be implemented as a primary power source as well.

Features

- Rolling stock converter technology
- Robust input high-voltage inverter
- Output transformer ensures galvanic isolation
- Sine wave output filter
- EMC output filter
- Easy maintenance
- Modular design of power unit
- Flat battery power supply for initial start (optional)
- Air cooling

KONTRAC PN50DC / PN100DC consists of

- Input contactors and precharging circuit
- Input filter
- Input high-voltage inverter power module
- Output sine wave filter
- Output EMC filter
- Output transformer
- Integrated battery charger for control circuit power supply
- Air ventilation system
- Control unit

KONTRAC PN50DC / PN100DC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, tramways, EMUs, DMUs). DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

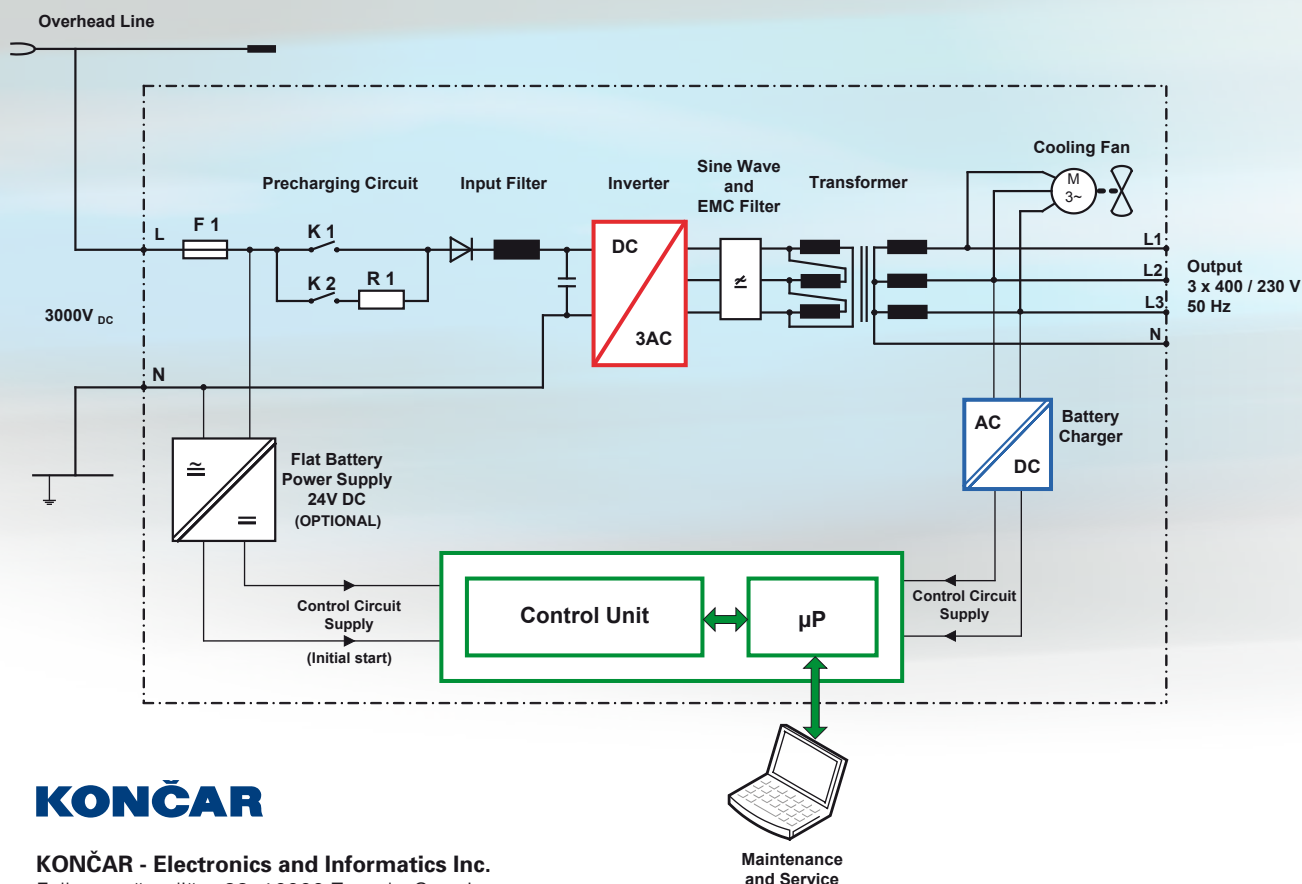
Mechanical design and cooling system

The converter is designed for roof mounting with IP54 protection. Modular design of the converter allows an easy maintenance access enabling that each module could be very easily replaced. The increased power density of the power modules enables compact and light-weighted converter design. The efficient cooling system is completely integrated in converter box achieving a high degree of functional integration. It uses water to cool the converter power modules - a feature contributing to the converter's very compact design. The water itself is cooled by an internal air-to-water heat exchanger.

KONTRAC PN50DC

KONTRAC PN100DC

| | | |
|-----------------------|------------------------|-------------------|
| Input voltage | 3,0 kV DC | |
| Minimum input voltage | 2,0 kV DC | |
| Maximum input voltage | 3,6 kV DC | |
| AC output voltage | 3 x 400 / 230 V, 50 Hz | |
| AC output power | 50 kVA | 100 kVA |
| Cooling | Forced air-cooling | |
| Size (WxDxH) | 1200x1000x2200 mm | 2000x1000x2200 mm |
| Weight | < 700 kg | < 1000 kg |
| Mounting place | Outdoor or substation | |
| Connecting interface | CAN / MVB / Ethernet | |



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KONTRAC PN225AC Converter for dynamic reactive power compensation

KONTRAC
PN225AC



KONTRAC PN225AC is a trackside converter which is used for dynamic reactive power compensation. It is used in substation facilities 110kV/25kV in which devices for fixed reactive power compensation have already been installed. The converter compensates variable amount of reactive power which can fluctuate considerably during a given time period. The range of compensated reactive power of each converter is from 225 kVAr capacitive to 225 kVAr inductive. If a higher range of compensated reactive power is needed, it can be accomplished by parallel connection of several converters. The input stage of the converter is made of robust components dimensioned for rolling stock converter applications which makes this converter KONTRAC PN225AC resistant to spikes, sags and surges that are likely to appear in overhead lines.

This proven and reliable technical solution enables significant energy savings, thus making it a perfect solution for sustainable development.

Features

- Rolling stock converter technology
- Robust input stage of converter
- Nearly sinusoidal current, in phase with the voltage
- Line friendly
- Latest IGBT technology
- Easy maintenance
- Modular design of power units
- Air cooling

KONTRAC PN225AC consists of

- Input contactors and precharging circuit
- Input filter
- Two input chokes
- Two four quadrant converters
- Two DC links with overvoltage protections
- Air ventilation system
- Control unit

KONTRAC PN225AC

Digital control unit

Digital control unit (DCU) is based on proprietary embedded control platform which has been used for years in our rail solutions (locomotives, coaches, trams, EMU, DMU). DCU is responsible for all sequence control, regulation, protection, communication, supervision and diagnostics tasks.

Diagnostic and visualization

Proprietary powerful diagnostic and visualization tool (ZZT) is compatible with all our platforms through many generations of control electronic solutions. Configurable event-driven data logging and event recording is integrated in the control electronics.

Mechanical design and cooling system

The converter has IP54 mechanical protection and it is designed for mounting inside the traction substations. The modular design of the power modules allows an easy maintenance. The converter is efficiently cooled by forced air.

Application examples

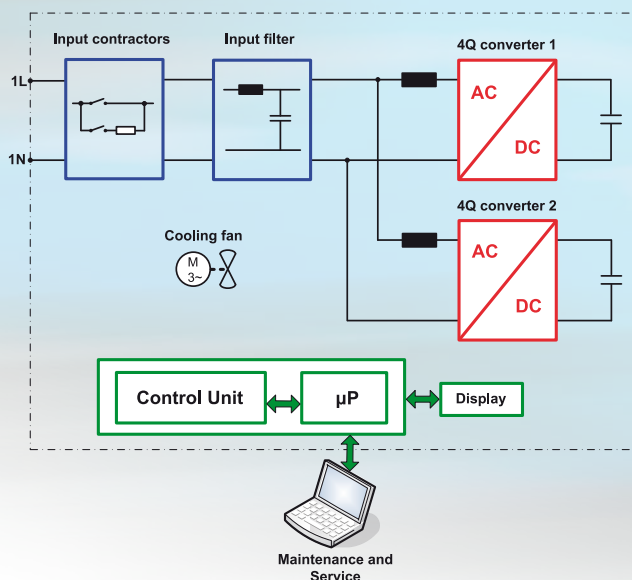
Two converters KONTRAC PN225AC are planned to be installed in substation Mrzlo polje in Croatia. Two other converters will be installed in substation Oštarije, also in Croatia. The converters will be used for dynamic reactive compensation in overhead lines. This proven and reliable technical solution enables significant energy savings which also has a positive effect on nature as well as on material costs.

BASIC TECHNICAL DATA

| | |
|-----------------------|---|
| Input voltage | 400 V, 50 Hz over transformer 25 kV / 400 V |
| Minimum input voltage | 280 V (equivalent to 17,5 kV of overhead line voltage) |
| Maximum input voltage | 480 V (equivalent to 29 kV of overhead line voltage) |
| Nominal power | ± 225 kVAr |
| Cooling | Forced air-cooling |
| Size (W x D x H) | 1200 x 800 x 2100 mm |
| Weight | 700 kg |
| Mounting place | Substation |
| Connecting interface | CAN / Ethernet |



Two converters KONTRAC PN225AC will be installed in Mrzlo polje, Croatia.



Block diagram of the converter

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