MAIN COMPONENTS

INTELLIGENT INTEGRATED POWER UNIT PCU WITH HIGH POWER DENSITY

PCU is a high voltage and high power IGBT single-phase converter device. Modular packaging technology makes it small and light weight. Power Electronic Building Blocks (PEBB) allow a flexible configuration. By combining the PCU with information technology and big data application, we can carry out on-line monitoring and off-line refactoring of chip status to solve the technical problems associated with device life prediction and PHM and to meet a range of requirements, such as high efficiency, energy conservation, light weight and intelligence for the future of rail transit.

MAIN TECHNICAL FEATURES

HIGH INTEGRATION
Integrated with "customized" power chips, intelligent controller, high performance radiator, low-inductance busbar, multi-type sensors, etc.

INTELLIGENT DIAGNOSIS
Detects，records and diagnoses key data such as collector voltage, grid voltage and emitter current to achieve the life prediction and PHM of the device;

HIGH POWER DENSITY
Compared with conventional power modules. the power density of this power module with 4 PCU is 1.8 times higher;

EASY APPLICATION
Applies book type structure design and supports plug-play of electrical and hydraulic connectors.

MAIN PERFORMANCE PARAMETERS

Collector-emitter voltage	6,500V
Continuous collector current (DC)	750A
Rated operating voltage	3,600V
Rated output current	400Arms
Cooling method	Water cooling
Weight	7.5kg

Note：4 PCU power modules have a capacity of 2MVA. They have a power density 1.8 times higher than conventional power modules, whiles size is reduced by 55% and weight by 85%.

WORKING WITH YOU TO
CONNECT THE WORLD

CRRC

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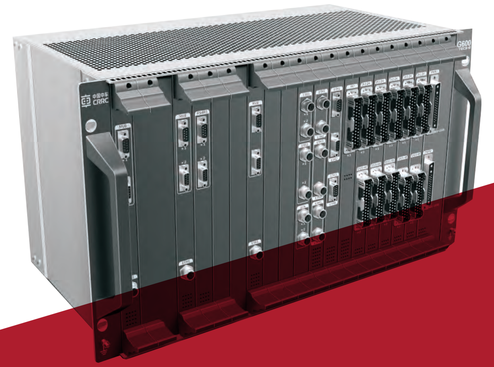
CRRC



INTELLIGENT CONTROL PLATFORM OF TRAIN

A smarter control system for better operation

CRRC INTELLIGENT CONTROL PLATFORM OF TRAIN

OVERVIEW

Our intelligent train control system features high performance power converting, intelligent converter control strategy, safe and high-speed on-board network control, innovative HMI, and on-board real-time data processing. The system is integrated with mobile Internet, big data and other cutting-edge technologies, and provides solutions for efficient traction, optimal energy-saving operation, PHM, intelligent maintenance and preparation, etc.

MAIN FEATURES

SAFETY&SECURITY

High-level information security mechanism;
Safe data transmission over MVB and TRDP;
Fail-safe design;
Adaptability to harsh environments.

HIGH EFFICIENCY

Ethernet based train control and management system, fully compliant to IEC61375;
Supports digital and networked intelligence applications;
Provides face and voice recognition and fatigue monitoring for drivers;
Mobile tool kit for system maintenance and diagnosis.

ENVIRONMENTALLY FRIENDLY

High integration, high power density, light weight and small size;
C-DAS supports optimal energy-saving operation.

INTELLIGENCE

CRRC's Train Control System supports self-diagnosis, remote expert diagnosis, online fault prognostics, as well as life prediction and PHM for core components;

It also supports automatic product identification, large data storage，as well as data acqusition，processing and transmission. The system features the integrated application of intelligent control technologies such as converter model predictive control and active suppression of line-side harmonic.

HIGH PERFORMANCE DCU GENERAL CONVERTER CONTROL UNIT

DCU is a new generation of high performance converter control unit designed for locomotive, EMU and urban mass transit vehicles. It features high speed real-time data processing, advanced motor control, large capacity data storage, intelligent fault diagnosis and product traceability of full lifecycle, supports graphic development and provides software tools with flexible configurations. Its ergonomic design uses a standard industrial chassis structure.

MAIN TECHNICAL CHARACTERISTICS

- **HIGH PERFORMANCE AND HIGH INTEGRATION**
  Has ultra-high performance processor, high speed data interaction, and high integration of control function;
- **FAULT DIAGNOSIS:**
  Supports system self-check and self-diagnosis, intelligent fault diagnosis and online alarm;
- **SECURITY AND RELIABILITY**
  Applies data encryption and authentication design, and hardware reliability design for harsh environments;
- **FULL LIFE CYCLE TRACEABILITY**
  Supports automatic product identification, large data storage, and data acquisition and recording of the whole process.
- **EXPANDABILITY**
  Applies the universal backplane bus, and supports ETH/MVB/CAN communication and flexible configuration for single board;
- **INTUITIVE HUMAN-MACHINE INTERACTION**
  Provides all-graphic environmentfor development, convenient application debugging tools, and mobile App for device diagnosis and maintenance;
- **ADVANCED CONTROL TECHNOLOGY**
  High performance control algorithm including the 4-quadrant rectification control for line side, adhesion control and motor control such as the stator flux trajectory tracking control, position and speed sensorless control technology, online parameter identification, load torque observer, etc.

MAIN PERFORMANCE PARAMETERS

Logic control cycle	5ms
Torque step response	<4ms
Storage capacity	512GB
External interface	23 current / voltage sensor inputs 14 Pt100 sensor inputs(4line) 4 pressure sensor inputs 20-way PWM outputs 27-way IGBT state feedback inputs 4 motor speed sensor inputs (isolated) 4 position sensor inputs 20-way 110V digital input channels 12-way 110V digital output channels 1 pair of optical fiber
IP rating	IP20
Dimensions	480mmX285mmX310mm（L×W×H）

SAFETY TCMS SCCU

SCCU is a TCMS platform with SIL 2 certification. Its functionalities are train control, event log, WTB/MVB communication, ETB/ECN communication, I/O, etc., as well as intelligent functions such as hardware identification, data encryption, fault diagnosis, etc. 2X2oo2 and 1oo2D safety computer architecture are used for I/O signal processing unit and vehicle control unit respectively.

MAIN TECHNICAL CHARACTERISTICS

- High performance safety processing;
- 2X2oo2 safety computer architecture for I/O signal processing unit which has fail-safe design;
- Compliant to IEC61375, including WTB/MVB, ETB/ECN, CANOpen, etc.;
- Redundancy design for vehicle control, communication, power supply, IO channels, etc.;

- Compliant to IEC61131, and supports online debugging and remote monitoring of application programme;
- Compliant to En50159;
- Product development life cycle is compliant to V model of En50129;
- Intelligent functionalities such as hardware identification, fault alarm and life prediction, data tracing of full life cycle, etc.

MAIN PERFORMANCE PARAMETERS

Safety integrity level	SIL2
Safe digital output channels	10*N (N<=3) channels
Safe digital input channels	24*N (N<=7) channels
Safe analog input channels	2 channels
ETB/ECN bandwidth	100Mbps
Control cycle	1ms (minimum value)
Event log storage capacity	16GB
External interface	2 ETB communication nodes 2 ECN looped network communication nodes 12 Ethernet ports for terminals 2 WTB communication nodes 4 MVB communication nodes 4-way CANOpen communication nodes 6-way RS485 communication nodes (supporting HDLC) 2-way analog input 4-way analog output 1-way power voltage collection input 2-way PT100 collection input 2-way PWM collection input 48*N (N≤7) - way universal digital input 21*N(Ns7) - way universal digital output
Dimensions	482.6mm×240mm×265.9mm（L×W×H）

TRAIN HMI PLATFORM

Our train HMI platform is a new rail transit-oriented human-machine interaction equipment that features a high performance and flexible configuration, which provides better guarantee for railway transport safety and a better experience of human machine interaction for the driver.

The high-performance processing of HMI makes its audio and video function powerful, its easy graphical programming function allows parameterized configuration, visual drive configuration, variable management, and online debugging and remote monitoring of application programmes, and its intelligent function supports multiple modes of human-machine interaction and enhances safety of train operation.

MAIN TECHNICAL CHARACTERISTICS

- **CONFIGURATION**
  Supports graphic and configurable programming, online debugging and remote monitoring;
- **HIGH PERFORMANCE**
  High quality audio/video play, and supports synchronous play of multi-channel HD video;
- **SAFETY**
  Applies safe display technology to ensure the display accuracy of key information;
- **INTEGRATION**
  Applies a front panel integration design for a better human-machine interaction experience;
- **INTELLIGENCE**
  Supports face recognition for driver identification, voice recognition for better interaction between driver and train, and driver fatigue detection for improved safety guarantee, etc.

MAIN PERFORMANCE PARAMETERS

LCD dimensions	12.1"
Display resolution	1,024*768
Button	Membrane button (optional)
Touch screen	5-wire resistive touch screen
Communication interface	MVB EMD (MVB and ESD being optional), 2 x RS-422/RS-485，2 x USB, 2 x10/100M Ethernet
Audio interface	1-way audio analog signal
Video interface	4-way video display
IP rating of front panel	IP65
Input voltage	38-180VDC
Working temperature	-25°C~70°C
Dimensions	340*250*65mm

OCS ON-BOARD DATA CENTER

The OCS On-board data center has a high-speed processor, large capacity storage, high-speed WLAN communication, 4G/3G communications and GPS/BD positioning function. It provides on-board data storage and processing services through a standardized service interface so as to allow the integration with big data ground centers, and supports intelligent services such as PHM, life prediction, etc.

MAIN TECHNICAL CHARACTERISTICS

- Supports data storage and processing for 500 on-board devices;
- SOA architecture service interface;
- 1,000Mbps network access bandwidth;
- 1TB data storage capacity;
- Compliant to IEEE 802.11a/b/g/n/ac, and supports mobile communication network 4G/3G/2G;
- Positioning and timing service (BD/GPS/Glonass/Galileo).

MAIN PERFORMANCE PARAMETERS

Equipment access support ability	500 pieces
Data storage capacity	1TB
Positioning accuracy	1.5m
Network access bandwidth	1000Mbps
WLAN communication rate	867Mbps
Mobile communication mode	GSM,WCDMA, TD-SCDMA,HSPA, HSPA+,TDD-LTE, FDD-LTE
Dimensions	247.3mm×279.4mm ×132.6mm（L×W×H）

CURRENT APPLICATIONS OF CRRC INTELLIGENT TRAIN CONTROL SYSTEM

- China Stardardized EMU
- Honghe low floor tram
- Changsha Metro
- Changsha Low/Medium maglev