

PPC Power Plant Controller CCI Controllore Centrale Impianto CEI* 0-16 annexes O-T



The CCI/PPC is a Gateway for Electricity Production Plants monitoring. Equipment prescribed by ARERA** with resolution 36/2020/R/EEL and described by the CEI 0-16 V1 of 2020 and V2 of 2021 in annexes O and T. It collects all the information of the system and transmits them securely to the Distributor (DSO***) or to another authorized Operator. To comply with the regulation, the performance of the CCI according to the functional specification must develop as follows:

- "mandatory" functional performance, inherent to the data exchange between producer and **DSO** (observability);
- "optional" functional performances, relating to voltage regulation and power limitation at the delivery point of the system;
- "optional" functional services, relating to the participation of the plant in the **Dispatching Services Market**, the optimal management of the plant, **RiGeDi******, etc.

DIN Plastic base mechanics:

DIN Metallic base mechanism:

Connections:

RS-485 (ModBus RTU) connection and wiring examples:

Diagram of Connections and Functional Interfaces:

Modules description:

Below is the description of the PPC/CCI modules:

- CPU iMX6D ARM Cortex-A9, 1GB DDR3, 4GByte eMMC, 800Mhz, CAAM, CSU, A-HAB SHA-256.
- Cyber Security: Secur Boot, Trusted Platform Module 2.0, FIPS 140-2 Level 3, RBAC, TRNG.
- Hardware Anti-Tamper with switch connected to the cover and anti-tamper X-Y-Z accelerometer.
- IEC-62443-4-1/2 compliant.
- 4-Port 10/100Mbps Ethernet Switch:
 - One port dedicated to DSO (ETH_A) and one port dedicated to Authorized Operator (ETH_B).
 - Two ports for connections to Plant Elements.
 - RJ45 8/8 connectors.
- Two opto-isolated Serial ports with RS-232 and RS-485 connection on standard ModBus RJ45 8/8 connectors.
- One USB 2.0 port for Local Configuration and Maintenance Console.
- Two USB 2.0 ports for connection to Plant Elements.

Managed Protocols (Serial ports configured as RS232 or RS485):

- IEC 61158-15 ModBus-RTU.
- IEC 60870-5-101 Balance and Unbalance.
- IEC 60870-5-103.

Managed Protocols (Ethernet Ports):

- IEC 60870-5-104 Slave/Reverse/Redundancy (Armament Management with Multicast and Unicast).
- IEC-61850 Server/Client/Goose.
- IEC 61158-15 ModBus-TCP/IP Master and/or Slave.
- DNP 3.
- S7-Comm.
- OPC-UA Client.
- C37.118 Client.
- IEC 62056-21 (DLMS/COSEM).

Secure protocols:

- IEC 62351 (crypto/cyber security).
- Part 3 per IEC-60870-5-101/4 and DNP3.
- Part 4 per IEC-61850.
- Part 5 per IEC-60870-5-101/4 and DNP3.
- Part 6 per IEC 61850.
- Part 7 per SNMP.
- Part 8,9 for IEC-60870-5-101/4, IEC-61850 e DNP3.
- Part 14 Syslog.

Services:

- http(s), sftp, ssh, snmp v2, v3 trap.
- ntpd, client-ptp o server-ptp (IEEE-1588) (power profile).
- Redundancy cover system.
- Firewall.
- Accesso con RBAC.
- Tasks ladder IEC 61131-3.
- Web Interface for diagnostics, logs management and SCADA.

Others:

- N°5 opto-coupled Digital Inputs 10Vdc ... 120Vdc to be energized with EXTERNAL power supply (from the field).
- N°3 digital relay outputs 250Vac 3A.
- Integrated GPS/GLONASS module for time synchronization from satellites. SMA Female connector for external active antenna connection (5Vdc OUT). Antenna supplied with 5m of RG174 cable.
- Integrated modem for 2G / 3G / 4G / LTE Cat. 1 connections. SMA Female connector for external stylus antenna connection.
- 1" OLED display for local diagnostics.
- Slot with MicroSD card up to 632Gb for Storage and Log files.
- Input power supply from 12Vdc to 24Vdc +/- 20% 5W.
- Operating temperature -5°C ...+45°C.

Reference Regulations:

- CEI 0-16 annexes O-T
- CEI EN 61557-12:2018
- ARERA 540/2021
- FIPS 140-2
- IEC 62351-3/-4/-5/-6

Document revisions:

Rev. N°	Date	Author	Description
0	02/12/21	M.Maioli	First draft, prototype description and connections
1	24/02/22	M.Maioli	Document review
2	22/04/22	M.Maioli	Update
3	20/05/22	G.Vianelli	Typos on protocol and services
4	15/07/22	M.Maioli	Image update
5	29/09/22	M.Maioli	Regulatory update
6	21/11/22	M.Maioli	Digital input polarization revision
7	04/02/23	M.Maioli	Update of images and order code
8	11/04/23	M.Maioli	Correction of SMA connectors and temperature
9	08/06/23	M. Bianchetti	Regulatory/references update, image update

Requests:

Code	Description
AP-KIT-CCI-CEI-016	marco.bianchetti@ailux.eu

Acronyms:

* CEI: Italian Electrotechnical Committee

** **ARERA**: Italian Regulatory Authority for Energy, Networks and the Environment

*** **DSO**: Distributor System Operators

**** RiGeDi: Reduction of Distributed Generation

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