MiCOM C264

Modular Substation Bay Controller

MiCOM C264 in 40TE

MiCOM C264 in 60TE

MiCOM C264 in 80TE

MiCOM C264 is the Schneider Electric modular substation bay controller for energy critical infrastructures and electrical distribution. In addition to the traditional bay control facilities, MiCOM C264 acts as an IEC61850 substation controller, a powerful RTU embedding fast automation and a measurement center.

MiCOM C264 is the compact solution simplifying operation and maintenance to energy applications installed in demanding electromagnetic conditions (HV/MV/LV substations and micro grids).

Seamless modernization of energy critical infrastructures

MiCOM C264 provides seamless integration to existing substation assets, thanks to its polyvalent interfaces and natural expandability. Its powerful processing, communication and configuration facilities make it the ideal brick for simplified substation supervision, automation and maintenance.

Robust and flexible platform to contribute to energy availability

MiCOM C264 offers a compact, modular, and flexible platform, designed for energy applications and demanding substation environment. It contributes to protect assets and optimize the energy availability at grid nodes.

Innovative and embedded cybersecurity

The innovative design of Cybersecurity embedded in MiCOM C264 contributes to improve its availability. By keeping simple the security administration for current staff, it contributes to respect the security recommendation and standards for critical infrastructures.

Easy and fast system integration

MiCOM C264 is designed to be easily integrated in systems leveraging the IEC61850 standard for substation automation. With its flexible communication and data modeling, it contributes to accelerate the project realization and simplifying maintenance.

Customer benefits

- To simplify the modernization of energy critical infrastructures
- To contribute to improve energy availability
- To help to respect latest security regulations for critical infrastructures thanks to embedded cybersecurity
- To simplify system integration, leveraging the IEC61850 substation automation standard

Schneider Electric

MiCOM C264 multi functional IED for energy applications:

Integrated in panels, MiCOM C264 is the ideal device to optimize energy availability acting as:

- Bay Controller Unit (BCU)
- Modular substation controller
- RTU and cata converter
- Measurement unit
- Automation device with embedded energy application

Example of Applications

Utility
MiCOM C264 as bay controller, substation controller and RTU, integrated in HV/MV Substations Automation Systems

Critical infrastructures
Healthcare, airports, high buildings, etc.: MiCOM C264 as bay controller with energy dedicated automation (Fast Self Healing)

Oil & Gas
Floating Platforms (FPSO), refineries, petro-chemical factories: MiCOM C264 as bay controller, load shedding unit, RTU

Mining, Mineral and Metal
C264 as smart RTU with energy dedicated automation (ATS).

Railways
High speed train, metro & tramways, traction substation: MiCOM C264 as bay controller and RTU/data converter integrated in a substation system.

Electro-intensive industry
MiCOM C264 Bay controller integrated in a substation automation system

MiCOM C264 exists in a tropicalized (coated) version for tropical, marine and petro-chemical environments.

MiCOM C264 automation facilities to maximize energy availability

Check of interlocks for improved security of commands

Commands on primary equipments (breakers, switches, disconnectors) can be configured with Interlock check. It contributes to protect assets and investments.

Auto-recloser to reduce outages on feeder and overhead lines

The MiCOM C264 can manage the bay auto-recloser with several steps. The auto-recloser operates for 1 Phase and/or 3 phases. Operator to tune the settings and the time delays. Auto recloser can be initiated either internally in the bay unit or via external protection devices using digital inputs.

Synchronization check for network connection and between lines (ANSI 25)

The synchro-check function is mandatory to secure the coupling of networks and lines. The function determines the difference between the amplitude, phase angles and frequencies of two voltage vectors before authorizing the coupling. Locking and coupling modes are available and a deadline and dead bus logic is also included. It can be used in conjunction with automatic or manual reclosure.

Fast self healing for HV/MV/LV micro-grids automatic loop reconfiguration

MiCOM C264 is contributing to automatic reconfiguration of MV electrical loops by offering powerful algorithm - Fast Self Healing (FSH) - for micro grids.

Automatic voltage regulation for transformer OLTC

The Automatic Voltage Regulation (AVR) function automatically maintains the correct voltage at the lower voltage of transformers. It sends controls to the On Line Tap Changer (OLTC).

The AVR scheme is able to control one transformer and up to three transformers in parallel (master/follower). It also considers compounding for long lines, and proposes tap changer data monitoring.

Trip circuit supervision

The purpose of this function is to supervise the continuity of the trip circuit of a circuit breaker.

Automatic Transfer Source (ATS), fast load shedding and open automation schemes

MiCOM C264 proposes open and flexible automation schemes with programmable control sequences (grafcet) and reflex automation. It is integrating automation workbench according the IEC61131-3 standard. Multiple automation schemes can be easily defined: Automatic Transfer Source (ATS), switching sequences, capacitor bank management, load shedding and many fast and user customized automation schemes.

Embedded cybersecurity measures

MiCOMC264 is designed for defense in depth of electrical infrastructures. With embedded security measures, it helps the staff in charge of critical infrastructures to comply with security recommendations, regulations and standards such as NERC-CIP, ANSII, BDEW White Book, IEC62351, IEEE 1686, WIB-IEC62443.

Users authentication and authorization with IEC62351-8 RBAC

The MiCOM C264 integrates users authentication facilities according IEC62351-8 RBAC (Role Based Access Control). It is associated to the intuitive Security Administration Tool (SAT) software for a simple and centralized definition of the security policy. Users are authenticated using a unique nominative login and password. Each user is having a well defined role authorizing (or not) to operate and maintain the device.

Hardening

The MiCOM C264 is hardened according the cyber security recommendations. It is regularly tested in hostile environment to improve its availability; MiCOM C264 firmware is part of the continuous improvement development program.

Security events logs

The purpose of this function is to locally record (in non-volatile memory) the security events such as login tentative, access failure, automatic disconnection, firmware or configuration updates (according IEEE1686). MiCOM C264 security events are available over ethernet with the SYSLOG popular format. Events can be centralized and securely stored on dedicated Security Administration Management device (SAM). Using the Ethernet or remote connection, the security administrator is helped to recover the security events and prepare security audits.

Security vulnerabilities and remediations

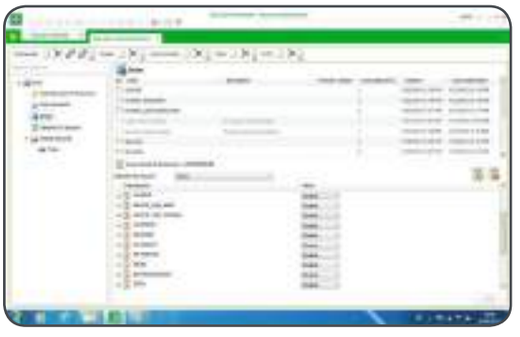
The eventual security vulnerabilities are continuously monitored by Schneider Electric CERT team and treated with adequate remediation; these information and recommendations are published on the Schneider-electric security support website:

http://www2.schneider-electric.com/sites/corporate/en/support/cybersecurity/cybersecurity.page

Ready for deployment of the security policy over the system

MiCOM C264 is ready for being integrated in systems requiring high level of cyber security. The global security policy can be easily deployed over the all system, thanks to the Security Administration Tool (SAT) software.

MiCOM C264 : local users login



Security administration tool

Innovative
Cybersecurity
approach helps you improve grid node reliability while respecting regulations

Integration of today's and tomorrow's communication protocols

MiCOM C264 is fully compatible with modern communication standards such as IEC 61850, IEC 60870-5-104, DNP3.0 & IP, IEC 60870-5-101/103, and MODBUS, offering advanced redundant ethernet interfaces such as IEC62439-3 PRP (Parallel Redundant Protocol) and HSR. Its modular design makes it easy to upgrade, in line with latest communication technologies.

With IEC 61850 protocol on the substation LAN, the substation modeled information is processed and transmitted on a client/server basis using "Reports" ,"Buffered Reports" and "Goose" messages for distributed automation.

Advanced I/Os and processing

MiCOM C264 substation controller offers advanced I/Os interfaces and processing facilities.

Wired I/Os can be used for primary device interface such as circuit breakers, switches, transformers, tap changers, motors, generators, auxiliary devices, measurement viewers.

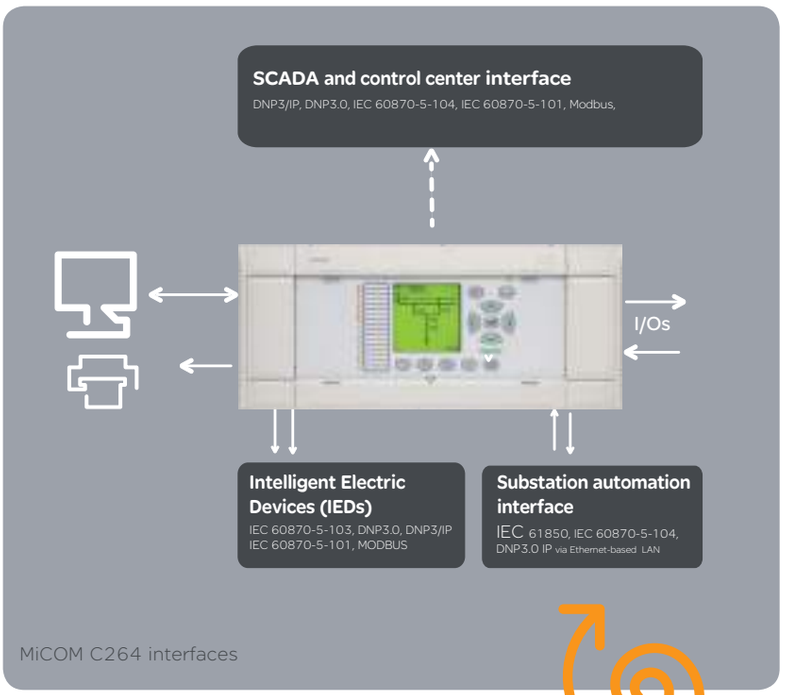
Digital input processing

MiCOM C264 offers multiple facilities and I/Os processing's

- Digital inputs (single point, double point, multiple point)
- Binary counters (single or double)

Inputs are acquired and time-stamped with a 1ms accuracy and discrimination.

In addition of the filtering treatment (toggling, persistence, undefined state), MiCOM C264 enables data grouping, data substitution & forcing, and integration in automation schemes to provide pertinent information.



MiCOM C264 interfaces

MiCOM C264: open & easy to integrate for seamless modernisation of installations

Analogue inputs processing

MiCOM C264 offers various interfaces for measurements:

- Analogue Inputs (AI)
- Digital Measurement (DM)
- Direct Measured-value (CT/VT)

Multiple values are derived from the direct measures (currents and voltages), such as: RMS currents and voltages, frequency, phase angle, Active & reactive power, energy, power factor, ΔF, ΔV, harmonics, THD, TDD.

Analogue outputs processing

On MiCOM C264, analog outputs can be efficiently used by taking benefits of the quality indication. The quality is given with "Read Inhibit output relay" associated to each analog output. The analog output values are maintained via an external power supply keeping the value even if the MiCOM C264 power supply is shut-down.

Digital outputs processing

Digital outputs are used to apply a switching voltage to an external device in order to execute single or dual, transient or permanent commands.

MiCOM C264 dedicated commands for HV & MV networks operation:

- Select Before Operate - once (SBO once) circuits breakers, switches, disconnectors
- Select Before Operate - many (SBO many) -> transformer tap changers
- Direct Execute (DE)

Additional facilities

Event logging and alarm management

The MiCOM C264 allows the storage of events in a non-volatile circular memory. The events are archived with their time stamp in chronological order. Up to 2000 of the latest events are stored.

Alarms can be configured for any of the events, offering local acknowledgment facilities.

IED gateway and data conversion

The MiCOM C264 provides a cost-effective device for interfacing and converting data from communicating devices (IEDs) to the substation automation system or to remote control centers. Also, it provides a tunneling mode to the IED remote engineering for monitoring and maintenance. IED integration can be done via ethernet-based links or serial links.

Local control, operation and display: easy operation and maintenance

The control of switching devices is possible using a graphical LCD and keypads. Operating actions are performed in a simple and intuitive way via switching between bay panels for switchgear control and dedicated panels for monitoring (i.e. measurements, events list, alarms, etc.), display and maintenance.

The operator panel can be mounted separately from the rack (up to five meters), to provide a high level of flexibility in mounting positions.

Local access can be protected according cyber security recommendations and standards: users are to be authenticated and authorized to perform actions according their Role (Role Based Access Control). It contributes to avoid malicious operations or inadvertent errors.

Waveform recording and power quality

The MiCOM C264 provides waveform recording:

- Fast Waveform Record (FWR), which stores samples at maximum sampling frequency
- Slow Waveform Record (SWR), which stores RMS measurements over a longer period

The triggers can be initiated internally or externally. Waveform records are stored using the COMTRADE 2001 binary format.

The MiCOM C264 provides the following power quality functions:

- Total Harmonic Distortion (%THD up to 15th harmonic)
- Total Demand Distortion (TDD) on voltage and currents

Ethernet communication and embedded redundant optical interfaces

MiCOM C264 is natively equipped with 2 Ethernet ports: 2 separate IP addresses can be freely configured and connected on separate LANs (Example: independent connections for local station bus and remote Scada).

The MiCOM C264 embeds (as an option) rugged and optical redundant ethernet interface supporting IEC62439-3 PRP and HSR. Embedded interfaces contributes to simplify the design of systems offering dual star architectures and optimized ring architectures; MiCOM C264 embeds also ethernet switches with RSTP (Rapid Spanning Tree Protocol), and cost effective SHP (Self Healing Protocol) and DHP (Dual Homing Protocol) with SNMP management.

MiCOM C264: Simple operator interface with graphical HMI

Time synchronization

The MiCOM C264 internal clock can be synchronized:

- by an operator, with C264 Administration Tool (CAT)
- by an IRIG–B GPS clock (via the IRIG-B input)
- by an ethernet SNTP server
- by a time telegram message issued by remote scada (DNP3.0, IEC60870-5-101 or IEC60870-5-104)

In addition the MiCOM C264 can be configured as an SNTP time server on ethernet.

Redundancy

At substation level and/or bay level an optional redundant controller can be used to avoid the loss of critical functions.

Simple settings with S1 software tool

It is possible to modify the C264's settings on line, with the MiCOM S1 setting tool (over ethernet).

Double configuration database

The MiCOM C264 provides dual configuration databases: one active and one reserved for fast switching in case of system configuration changes. For RTUs applications, in order to help operators to avoid any database loss, the source database can be saved in the MiCOM C264 non-volatile memory.

MiCOM C264: robust & flexible platform to optimize energy availability

Performances

I/O processing capacities including direct and IED points

- 2048 digital inputs (datapoints)
- 1024 digital outputs (datapoints)
- 1024 analogue inputs (datapoints)
- 128 binary count inputs (datapoints)
- 128 digital setpoints
- 4 CT (currents) and 5 VT
- Up to 28 typical IEC61850 IEDs
- Up to 40 serial IEDs (typical <16 IED per link)
- 64 Tap Position Indication

CAT: C264 Administration tool

Storage capacities

Records are stored in non-volatile memory

- 2000 events, 1ms time stamped in the sequence of event log,
- Up to 8 Slow or fast waveform records (5000 measures),
- Up to 5 records of disturbance files coming from IED devices,

Communication capabilities

Ethernet-based communication
(Station Bus, SCADA, IEDs):

- 2 ethernets ports: 10/100Base-TX,
- 100 base-FX (multi-mode or single mode)
- Protocols : IEC 61850, IEC 60870-5- 104 (Multi-client) or DNP3.0 IP
- Embedded redundant ethernet interface and ethernet switch module with up to six ports.

Serial communication (SCADAs & IEDs):

- Up to 4 serial links per C264 rack
- Up to 4 SCADA protocols among: DNP3.0, IEC 60870-5-101, MODBUS
- IED Protocol can be switched between: DNP3.0, IEC 60870-5-103, MODBUS, IEC 60870-5-101
- Transmission rate: up to 38.4 kbps

Compliance with standards

General & safety

- IEC 60255-27:2005,
- European Commission Low Voltage Directive 73/23/EEC,
- IEEE standards and CE mark.

Insulation

IEC 60255-5:2000:

- High voltage impulse test: 5 kV (1.2/50 µs), 0.5J
- Insulation voltage test: 2 kV rms, 1minute

EMC

- IEC 61000-4-12:1995 (IEC 255 Part 22-1) - High frequency disturbance: Class III (2.5 kV)
- IEC 61000-4-2-2:2002 (IEC 60255-22-2) - Electrostatic discharge: Level 4 (8kV contact, 15kV air)
- IEC 61000-4-3:2002 (IEC 60255-22-3) - Radiated immunity: Level 3 (10 V/m-1GHz)
- IEC 61000-4-4:2001 (IEC 60255-22-4) - Fast transient or burst: level 4
- IEC 61000-4-5:2001-Surge immunity: Level 4
- IEC 61000-4-6:2003 - High frequency conducted immunity: Level 3
- IEC 61000-4-8:1993 - Power frequency magnetic field immunity: Level 5 (100A/m for 1mn ; 1000A/m for 3s)
- IEC 61000-4-9:1993 - Impulse magnetic field immunity: Level 5 (1000A/m pulses)
- IEC61000-4-10:2001 - Damped oscillatory magnetic field immunity: Level 5 (100A/m at 100kHz and 1MHz)
- IEC 61000-4-16:1998 - Power frequency immunity: CM 500 V/DM 250 V via 0.1µF
- EN 55022:2003 (CISPR 22) - Conducted emission: Gr. I, class A (from 0.15 to 30 MHz)
- EN 55022:2003 (CISPR 22) - Radiated emission: Gr. I, class A (from 30 to 1000 MHz, 10m)

Environment (with coated option)

- IEC 60068-2-52: KB Salt Mist (Salty Air)
- IEC 60068-2-60: SO2,H2S, No2 f lowing mix 4 gas, 4 gas
- IEC 68260 : KE corrosion test
- IEC60068-2 : Heat and cold environment tests

Protocols

- IEC 61850 : Level A
- IEC 60870-5-104 Ed2
- IEC 60870-5-101 Ed2
- DNP3.0

Please contact Schneider Electric for the complete list of certificates and test reports

IEC 61850 Level A Certificate by KEMA

Technical data

Design

Surface mounting cases (4U, 40/60/80TE) are included, suitable for flush mounting on 19” cabinets and panels.

Degree of protection

- Front panel (LCD or Leds): IP 52 for all cases
- IP20 for the MiCOM C264 (60TE & 80TE) case
- IP50 for the MiCOM C264C (40TE) case body

Time synchronization

1 ms accuracy when synchronized via ethernet network or IRIG-B input.

Power supply

- Nominal auxiliary voltage:
  24 VDC, 48-60 VDC, 110-125 VDC, 220 VDC,
  and 110Vac, 230 VAC 50/60 Hz, ± 20%
- Stored-energy: up to 50 ms power supply interruption
- Dual source power supply with automatic source switch

Digital inputs

- 24VDC to 220VDC
- Multi voltage inputs with peak current (>25mA - 2ms) –
  to meet the retrofit demands
- Time tagging: 1 ms

AC measurement inputs

- Nominal frequency: 50/60 Hz
- Operating range: 45 to 66 Hz
- CT Measurements: nominal current: 1A or 5A
- VT Measurements : nominal voltage: 57.7 to 500 V
- 64 sampled values per period
- 0.2% accuracy for AI and RMS values full scale
- 0.5% accuracy for P, Q, S, power factor
- 0.01Hz accuracy for frequency
- 1° accuracy for phase angles

DC analogue inputs ranges (independently configurable):

- ±1.25, ±2.5, ±5 and ±10V
- ±1, ±5, ±10 and ±20 mA,0-1, 0-5, 0-10, 0-20 and 4-20 mA
- A/D converter resolution: 15 bits + sign
- Better than 0.1% in voltage or currents (full scale at 25 °C)

DC analogue outputs

Range (independently configurable):

- ±5, ±10, ±20 mA and 4-20 mA
- A/D converter resolution: 15 bits + sign

Control output relays:

- Operating time, typically <7ms.
- Continuous current: 5 A
- Short-duration current: 30A for 4s, 250 A for 30ms
- Breaking capacity (Double pole contacts wired in serial) :
  DC: 100W resistive,
  30W inductive (L/R=40ms)
  AC: 2000 VA (cos Phi = 0,7)

Environmental conditions

- Operating temperature: -25°C to +70°C
  (-13°F to +158°F)
- Storage temperature:
  -40°C to +70°C (-40°F to +158°F)
- Ambient humidity range:
  ≥75 % relative humidity (annual mean),
  up to 56 days at = 93% relative humidity
  and 40 °C, condensation not permissible.

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