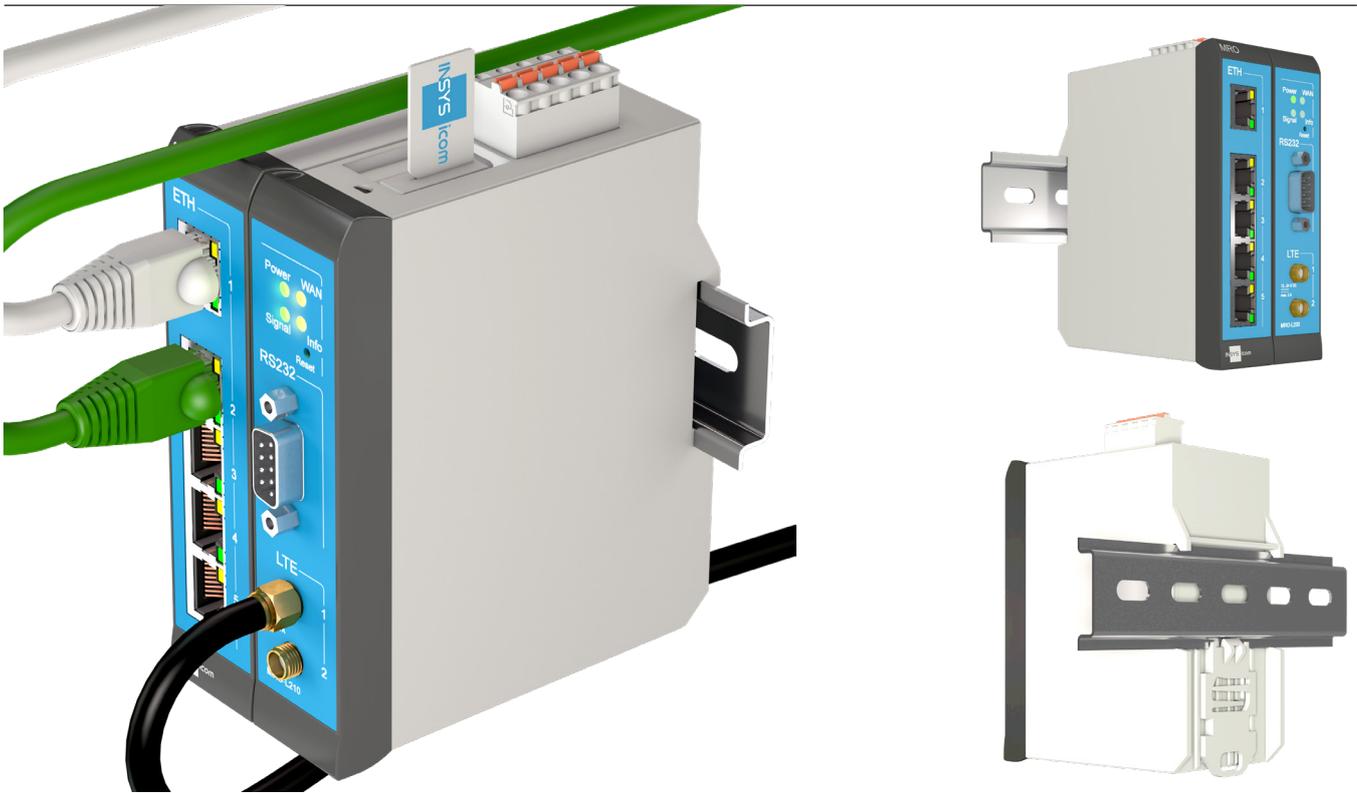


MRO - the compact 4G power



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A powerhouse for mobile radio applications

MRO routers are characterised by their high performance and extensive interfaces in a slim housing. They are suitable both for secure remote maintenance and for recording and processing application data (edge computing). Like all routers from INSYS icom, the devices of the MRO series stand out for their high system stability, durability and uniform user guidance.

	<p>Serial interface RS232 interface for connecting external devices</p>		<p>Ethernet and I/O Five RJ45 ports; two digital inputs and one digital output</p>
	<p>Network Comprehensive network functionality with multiple IP networks</p>		<p>Easy remote access & device updates Plug & play connection of VPN service and central device management</p>
	<p>High security levels Hardened operating system, extensive monitoring and security functions</p>		<p>IoT-ready Local data processing as well as connection to IoT platforms and cloud systems</p>

Technical Data

Mobile communication	
Frequency bands MRO-L200 ab Vers. 1.1 (worldwide)	<p>4G/LTE: 1 (2100 MHz), 2 (1900 MHz), 3 (1800 MHz), 4 (2100/1700 MHz, AWS), 5 (850 MHz), 7 (2600 MHz), 8 (900 MHz), 12 (700 MHz), 13 (700 MHz), 18 (850 MHz), 19 (850 MHz), 20 (800 MHz), 26 (850 MHz), 28 (700 MHz), 38 (2600 MHz), 40 (2300 MHz), 41 (2500 MHz), 66 (2100 MHz) LTE Cat. 4 (DL: 150 Mbps, UL: 50 Mbps)</p> <p>3G/UMTS/HSPA: 1 (2100 MHz), 2 (1900 MHz), 3 (1800MHz), 4 (2100/1700 MHz AWS), 5 (850 MHz), 6 (800 MHz), 8 (900 MHz), 19 (850 MHz) HSDPA, HSUPA (DL Cat. 10, UL Cat.6)</p> <p>2G/GPRS/EDGE: 850, 900, 1.800, 1.900 MHz; GPRS/EDGE class 12</p>
Frequency bands MRO-L200 1.0*	<p>4G/LTE*: 1 (2100 MHz), 3 (1800 MHz), 7 (2600 MHz), 8 (900 MHz), 20 (800 MHz); LTE Cat. 3 (DL: 100 Mbps, UL: 50 Mbps)</p> <p>3G/UMTS/HSPA: 1 (2100 MHz), 3 (1800 MHz), 8 (900 MHz) ; UMTS, HSPA+ (DL: max. 42 Mbps, UL: max. 5,76 Mbps)</p> <p>2G/GPRS/EDGE: 900, 1.800 MHz; GPRS/EDGE Class 12</p>
Frequency bands MRO-L210 1.0 (USA/Canada- version)	<p>4G/LTE: 2 (1900 MHz), 4 (2100/1700 MHz AWS), 5 (850 MHz), 13 (700 MHz), 17 (700 MHz); LTE Cat. 3 (DL: 100 Mbps, UL: 50 Mbps)</p> <p>3G/UMTS/HSPA: 2 (1900 MHz), 4 (2100/1700 MHz AWS), 5 (850 MHz) ; UMTS, HSPA+ (DL: max. 42 Mbps, UL: max. 5,76 Mbps)</p> <p>2G/GPRS/EDGE: 850, 900, 1.800, 1.900 MHz; GPRS/EDGE Class 12 (DL: max. 237 kbps, UL: max. 237 kbps)</p>
Antenna connection	2x SMA female (2G/3G/4G: Main, 3G: Rx Diversity, LTE: MIMO)
SIM	Slot for 1 Mini-SIM card (2FF), locked Provider redundancy with multi-roaming SIM cards (see section "Suitable accessories")
Dual APN	Splitting of mobile data traffic over 2 APNs, e.g. separation of user and management data
Cellular Status	Signal field strength, RSSI, RSCP / Ec/No, RSRP / RSRQ, Cell-ID, Location-ID
Hardware interfaces	
Ethernet ports	5 x RJ45 shielded, 10/100 MBit/s, Full/half duplex, Auto MDI-X, 1.5 kV isolation voltage
Ethernet function	Assignment to IP network freely configurable per port, link up/down detection, configuration port
RS232 (serial1)	1 x RS232 / D-Sub-9 (m)
Functions Serial interface	Serial Ethernet gateway (incoming and outgoing connections, Modbus TCP/RTU gateway, modem emulation, editable AT answer list, translation of phone numbers to IP addresses)
Digital Inputs	2 digital inputs, status can be monitored: 1x low active (connection to GND) 1x high active (connection to 10...24 VDC as per EN 61131-2, type 1)
Digital Outputs	1 open collector output
Displays (LEDs)	Power, WAN (Internet connection), Info (configurable), Signal
Network	
Network functions	5 local IP networks, IP static/DHCP,TCP, UDP, IPv4, IPv6, NTP, DHCP, DNS, HTTP/S, ARP, SSH, 802.1Q VLAN incl. tags and trunk ports
Service	DHCP Server v4/v6 per IP network, DHCP relay, NTP server, DNS, DynDNS, IPv6 Router Advertiser
Routing	Static routing, routing priority, RSTP, dynamic routing (OSPF, BGP, RIPv1, RIPv2, RIPv6)
WAN redundancy/failover	Several WAN connections configurable also in parallel operation, fallback level for connection breakdown (failover), event-based WAN changeover (see events)
Connection check	Periodic, ping/icmp, DNS request, link up/down
DSL	PPPoA and PPPoE (MRX3/5 DSL und MRcard PD-A/B); external DSL modems: PPPoE
NAT/PAT	SNAT/DNAT (masquerade, netmapping, port forwarding, IP forwarding) unlimited number of rules

Technical Data

VPN	
icom Connectivity Suite	Supports VPN service for remote maintenance, remote access and M2M-communication
OpenVPN	Client/server, several parallel tunnels, server with up to 20 clients, tls-auth/tls-crypt, dead peer detection (DPD)
OpenVPN encryption	Blowfish 128 Bit, DESX 192 Bit, DES 64 Bit, DES EDE 128 Bit, DES EDE3 192 Bit, AES 128-256 Bit, RC2 40-128 Bit, IDEA 128, CAST5 128 Bit, SHA1, SHA 224-512
IPsec	IKEv1, IKEv2 (automatic, fix), several parallel tunnels, pre-shared keys, certificates, tunnel mode, transport mode, dead peer detection (DPD)
IPsec encryption	DES EDE3 192 Bit, AES 128-256 CBC/GCM, SHA1, MD5, SHA 256-512, DH-Group 1-31 (Diffie-Hellman 768 - 25519), ChaCha20-Poly1305
GRE	GRE via IPsec, point-to-point, multipoint
PPTP	PPTP client/server; PAP/CHAP/MS CHAP/MS CHAP V2; MPPE 40-128
Dynamic VPN	Dynamic multipoint VPN (GRE, IPsec, NHRP, EIGRP, OSPF, RIPv1/v2, BGP)
IT security	
Authentication	Pre-shared key, X.509 certificates, RADIUS, access rights (read, write, status)
Firewall / netfilter	IP filters (stateful firewall) also in VPN tunnel; packet filter: TCP, UDP, ICMP, ESP, AP, GRE; MAC filter; pre-defined firewall rules can be activated
Security	Bootimg signed firmware, HTTP/HTTPS attack prevention; response upon events: configuration change, link up/down, restart, login attempt, netfilter violation, password hashing
IoT and Cloud (icom Data Suite, license required)	
Function	Machine connection and data processing; connection to cloud and SCADA Systems;
icom Data Suite	arithmetic & logic functions; data logger; dashboard
Data acquisition	CODESYS, Modbus TCP/RTU, MQTT, Siemens S7, OPC UA Client, IEC 60870-5-101, digital input, analogue input (if present)
Data transmission	MQTT, OPC UA Server, IEC 60870-5-104, Modbus TCP/RTU, e-mail, SMS, SFTP, digital input, analogue input (if present)
IoT platforms	MQTT compatibility: Thingsboard, Cumulocity, AnyViz, Azure IoT Hub, Bosch IoT Suite, AWS IoT Core
Events & Actions	
Event & Action Handler	Notification, alarming, diagnosis, attack detection, fault handling, operation and commissioning logic
Events / alarms (selection)	Change: digital input, Ethernet port, WAN chain, profile status, supply input (with MRX), cellular field strength; timer expired, firewall violation, login attempt detection, pulse sequence on digital input, counter, netfilter rule
Event-triggered actions (selection)	Messages via e-mail, SMS (only LTE variants), SNMP traps, MCIP; switch profile, switch connection, change modem state, start timer, switch output or pulse sequence, activate firmware, reset, restart container
Programming environment/scripting	
Container environment	Installation of several application containers, container with own IP end point, assignment to IP networks - full firewall and routing transparency; access control, SDK available
Container Resources	CPU: 50% of ARMv7 (720 MHz), RAM: 448 MB, Flash: 3 GB eMMC
Lua scripting	Lua interpreter for own scripts
Monitoring and Management	
Monitoring	SNMP traps and agent, configurable system logs, remote syslog, link up/down detection, netfilter violation
Certificate management	SCEP, CRL
icom Router Management	Supports central router management for FW updates, configuration management, connection monitoring, container updates, mass rollout, certificate management, available as public/private cloud (server) installation or onPremises

Technical Data

Administration	
Configuration	Web Interface HTTP(S) with session management, command line interface (CLI), Telnet, SSH, configuration profiles as ASCII and binary file, ample configuration profiles event-triggered, REST API
Diagnosis tools	Ping/icmp, tcpdump, traceroute, DNS lookup, AT commands, port mirroring
FW update	Incremental, failsafe, update server (HTTP, FTP, HTTPS, FTPS), icom Router Management (WebSocket)
System time	NTP client and server, buffered real time clock
Help	Web interface: inline help, online help; example profiles, plausibility check, Configuration Guides
Supply	
Voltage	12 ... 24 V DC ($\pm 20\%$), 2 supply connections with changeover detection, reverse-polarity protected
Terminals	5-pin push-in terminal connectors (maintenance free), rigid/flexible conductors up to 2.5 mm ²
Power consumption	typical approx. 2,5 W, max. 8,0 W
Ambient conditions	
Dimensions	54 x 117 x 88 mm (W x D x H)
Weight	280 g
Mounting	DIN rail mounting, horizontal pitch (HP) on DIN rail: 3,5 HP
Operating temperature	-30...+75 °C ²
Humidity	0 ... 95 % (non-condensing)
IP rating	Housing: IP40
Approvals & Standards	
Certifications	MRO-L200 1.0: CE, UKCA MRO-L200 1.1: CE, FCC part 15 class B, IC, UKCA MRO-L210 1.0: FCC part 15 class B, IC, UL 62368-1
EMC	Emission: EN 55032 Class B, EN 61000-6-2; Immunity: EN 55035 (replaces EN 55024)
Safety	IEC/EN 62368
Environmental conditions	Vibration/shock as per PLC standard EN 61131-2 and EN 60068-2-6, EN 60068-2-27; Temperature tests as per EN 60068-2-1, EN 60068-2-2, EN 60068-2-14, EN 60068-30
Operating time	MTBF 880,000 h (25 °C), according to SN 29500 standard (according to IEC 61709)

* Please check the availability of the Mobile communication frequencies in the planned operating area.
Above specified frequencies are currently used in Europe, Middle East, Africa and, to some extent, in the Asia-Pacific region and South America.

² +70 ... +75 °C: extended temperature range (refer to www.insys-icom.com/en/extended-temperature-range/)

Order Numbers and Accessories

Available Variants

Product description	Features	Art.-nr
MRO-L200 1.0	4G router (frequencies for Europe/Middle East/Africa, amongst others), 5 Ethernet ports, 2 inputs, 1 output, 1x RS232	10019400
MRO-L200 1.1	4G router (worldwide frequencies), 5 Ethernet ports, 2 inputs, 1 output, 1x RS232	10023602
MRO-L210 1.0	4G router (Frequency bands for North America) 5 Ethernet ports, 2 inputs, 1 output, 1x RS232	10019403

Suitable accessories

Product description	Description	Art.-nr
Magnetic Antenna 4G/3G/2G SMA	Magnet mounting, height 72 mm, 3 m cable, SMA (m), IP rating IP65	10019504
Outdoor Wall Antenna 4G/3G/2G SMA	Wall mounting incl. bracket, height 220 mm, 5 m cable, SMA (m), IP rating IP65	10020596
Allround Antenna 5G/L4G/3G/2G	Screw or wall mounting, incl. steel angle, height 82 mm, 5 m cable, SMA (m), protection class IP66	10022961
Roof mount antenna 4G/3G/2G SMA	Screw mounting, height 15 mm, 3 m cable, SMA (m), IP rating IP67	10022309
Magnetic Antenna MIMO 5G/4G/3G/2G SMA	Dual antenna MIMO, magnetic mounting, height 61 mm, width 150 mm, 2x 5 m cable, SMA (m), protection class IP65	10022963
Outdoor Panel Antenna MIMO 5G/4G/3G/2G SMA	Dual antenna MIMO, wall- / pole- / desk mounting, height/width 155 mm, 2x 5 m cable, SMA (m), protection class IP65	10022962
Panel Antenna 4G/3G/2G MIMO SMA	Dual antenna MIMO, mounting with suction cups, height 84 mm, width 184 mm, 2x 2 m cable, SMA (m), protection class IP67	10020565
Antenna extension cable 5 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10015193
Antenna extension cable 10 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10018607
Antenna extension cable 15 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10000735
Power supply 24V 15W	Power supply unit for DIN rail, wide-range input voltage AC/DC protection against short circuit / overload / over voltage	10022848
Wall power supply 24V 25W international	Power supply AC/DC with mains plug, suitable for desktop use, wide input, voltage range, protection against short circuit/overload/over voltage	10022849
icom Connectivity Suite - VPN	Supports VPN service for remote maintenance, remote access and M2M communication www.insys-icom.com/en/products/managed-services/vpn-service/	various
icom Connectivity Suite - M2M SIM	Industrial SIM cards, multi-roaming, pooling, management portal www.insys-icom.com/en/products/managed-services/m2m-sim-service/	various
icom Router Management	Supports central router management for FW updates, configuration management, connection monitoring, container updates, mass rollout, certificate management; available as public/private cloud (server) installation or onPremises www.insys-icom.com/en/products/managed-services/device-management/	various