

INOVANCE

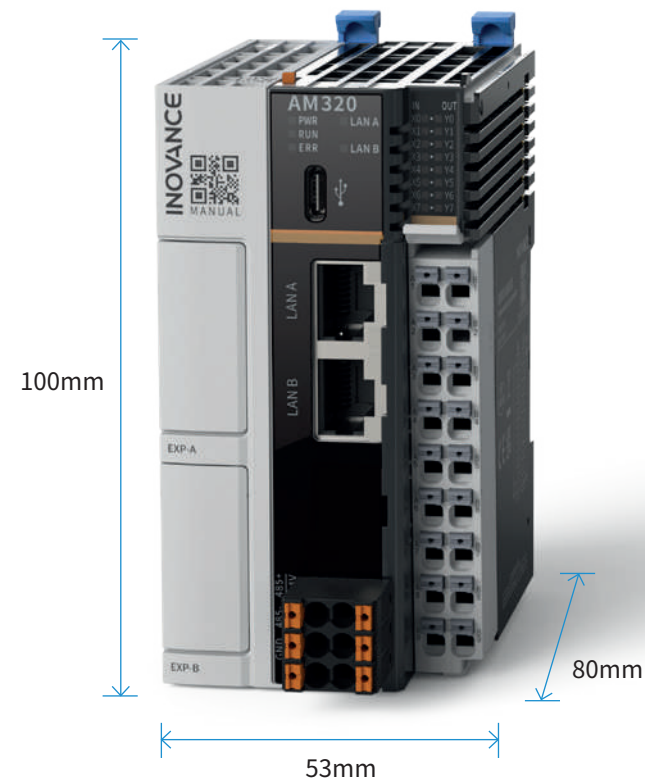
AM320 & AM521/ AM522 Controllers

High performance, compact EtherCAT - enabled CODESYS controller



- Compact footprint
- PLCopen compliant axis control
- EtherCAT real-time and multiprotocol
- Quad-core processor
- IEC 61131-3 compliant CODESYS software

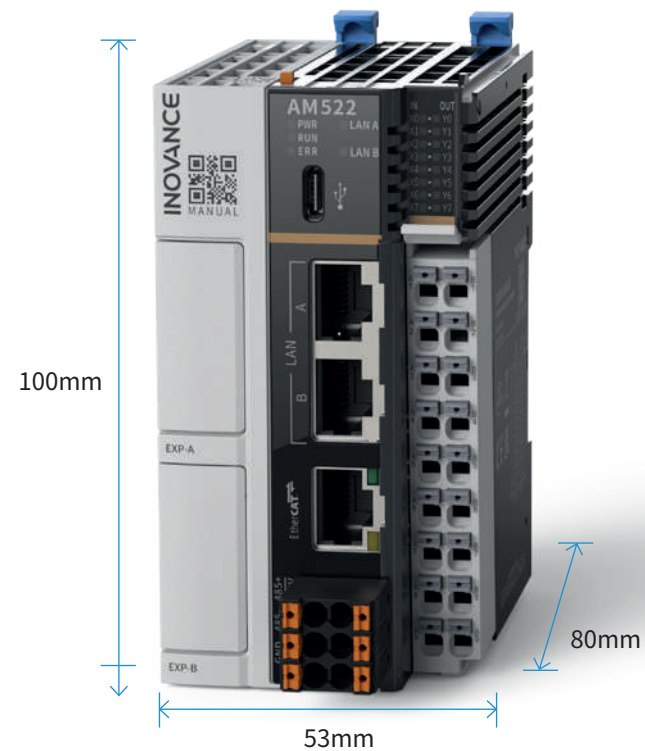
AM320/AM522 Controllers Overview



AM320

CPU with dual Ethernet port

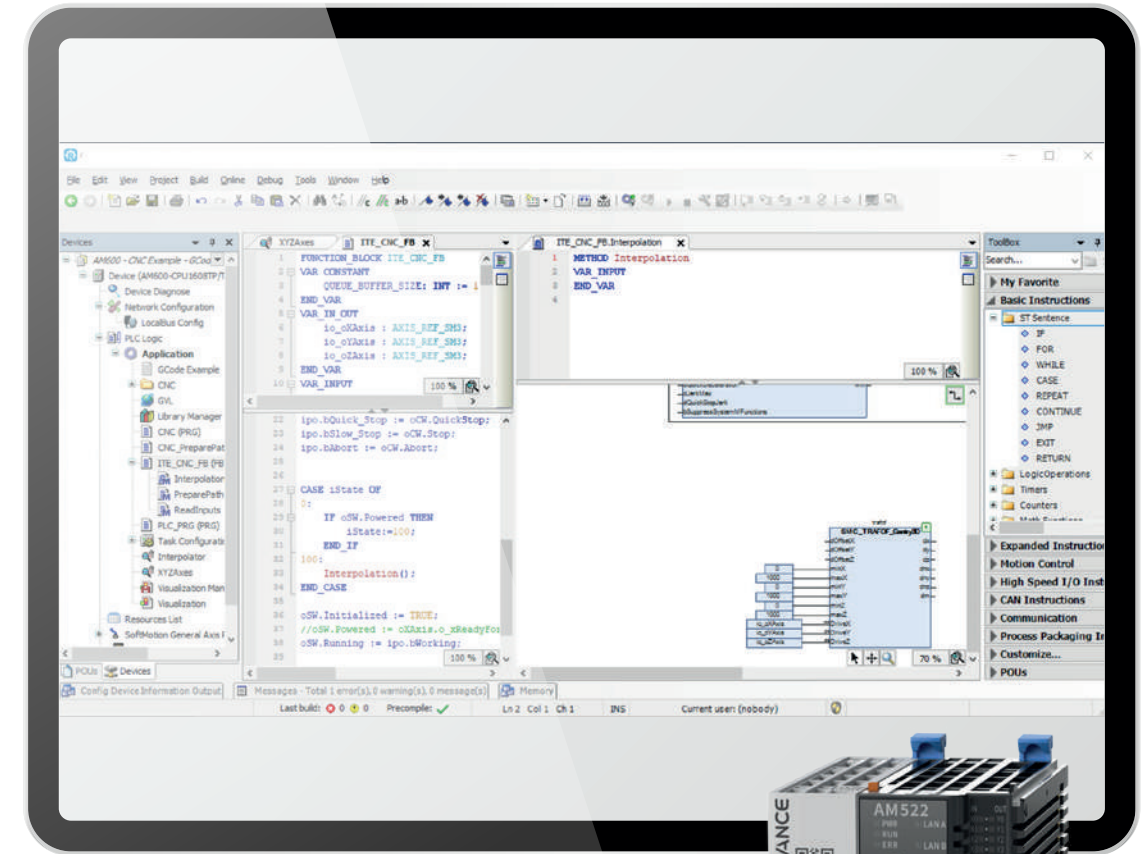
- Quad-core processor
- Dual network port with independent IP Address
- 2 expansion slots
- 30 CANopen axes for PTP movements (optional card required)
- 4 pulse axes
- 4 encoder inputs (8x high speed inputs, up to 200 kHz)
- Supports up to 16 GL20 local expansion modules



AM521/AM522

Motion control CPU

- Quad-core processor
- EtherCAT real-time network
- 2 expansion slots
- 8 (AM521) or 16 (AM522) EtherCAT synchronized axes
- Up to 127 EtherCAT slaves)
- 30 CANopen axes for PTP movements (optional card required)
- 4 pulse axes
- Axis group for lineal and circular interpolation
- 4 encoder inputs (8x high speed inputs, up to 200 kHz)
- Supports up to 16 GL20 local expansion modules
- Supports up to 8 (AM521) or 16 (AM522) EtherCAT axes
- I/O can be expanded by using EtherCAT bus coupler GL20-RTU-ECT



CODESYS based platform

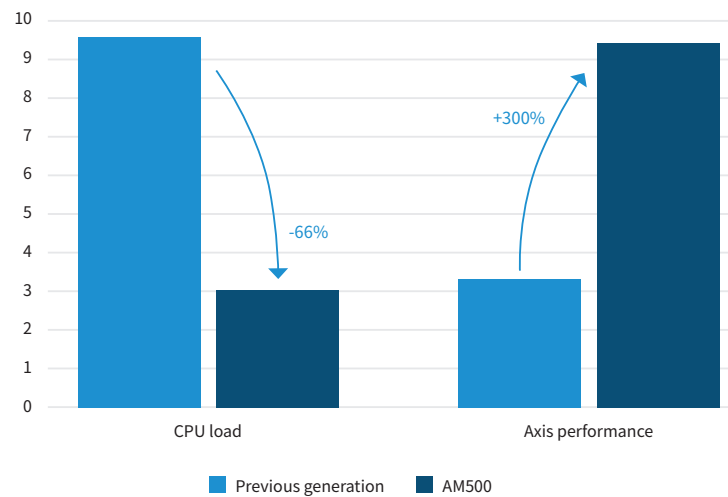
- InoProShop PC-tool
- IEC 61131-3 compliant CODESYS software
- PLCopen compliant
- Programming languages LD, ST, SFC
- Intuitive axis and local/remote I/O configuration
- Easy to integrate INOVANCE servos and AC drives
- CAM table can be easily configured by using the graphical editor
- Monitor, trace and gather any program variable with the virtual oscilloscope function

Higher performance than previous generation



SINGLE CORE

QUAD CORE



- 1ms EtherCAT cycle with 4 synchronized axes (AM521/AM522)
- Supports up to 127 EtherCAT slaves (AM521/AM522)
- Supports up to 63 Modbus TCP and Ethernet/IP slave stations
- Supports up to 16 OPC UA clients
- Supports up to 31 Modbus RTU nodes
- Supports up to 30 CANopen slaves

Easier installation, commissioning and maintenance



The USB type-C port allows the connection of the PC to upgrade the firmware and/or uploading/downloading/debugging of the application program



Easy wiring with spring clamp terminals.



Slim and compact I/O expansion modules (GL20). Easy to plug in and remove for fast replacement.

Compact design and tool-free wiring

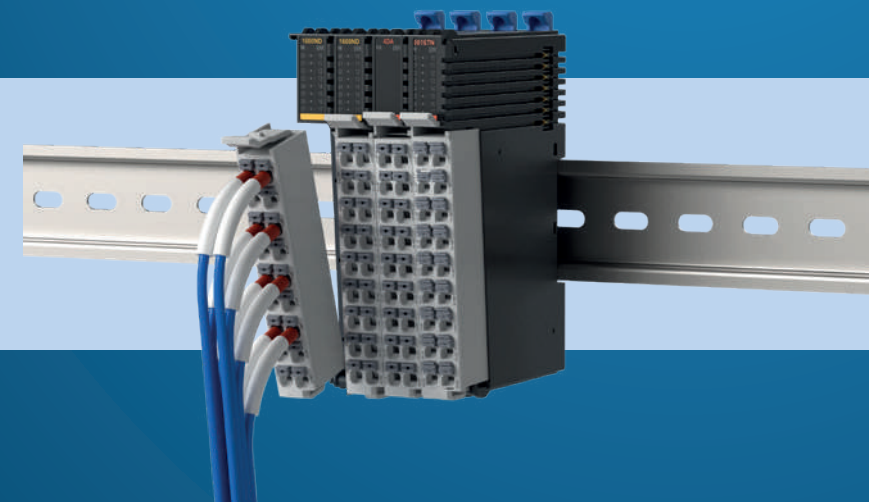


Simple lever system allows easy removal of individual modules from the DIN rail



Easy wiring with spring-type terminals, with large 1.5mm² apertures

Easy module removal



Removable terminals minimizes installation errors

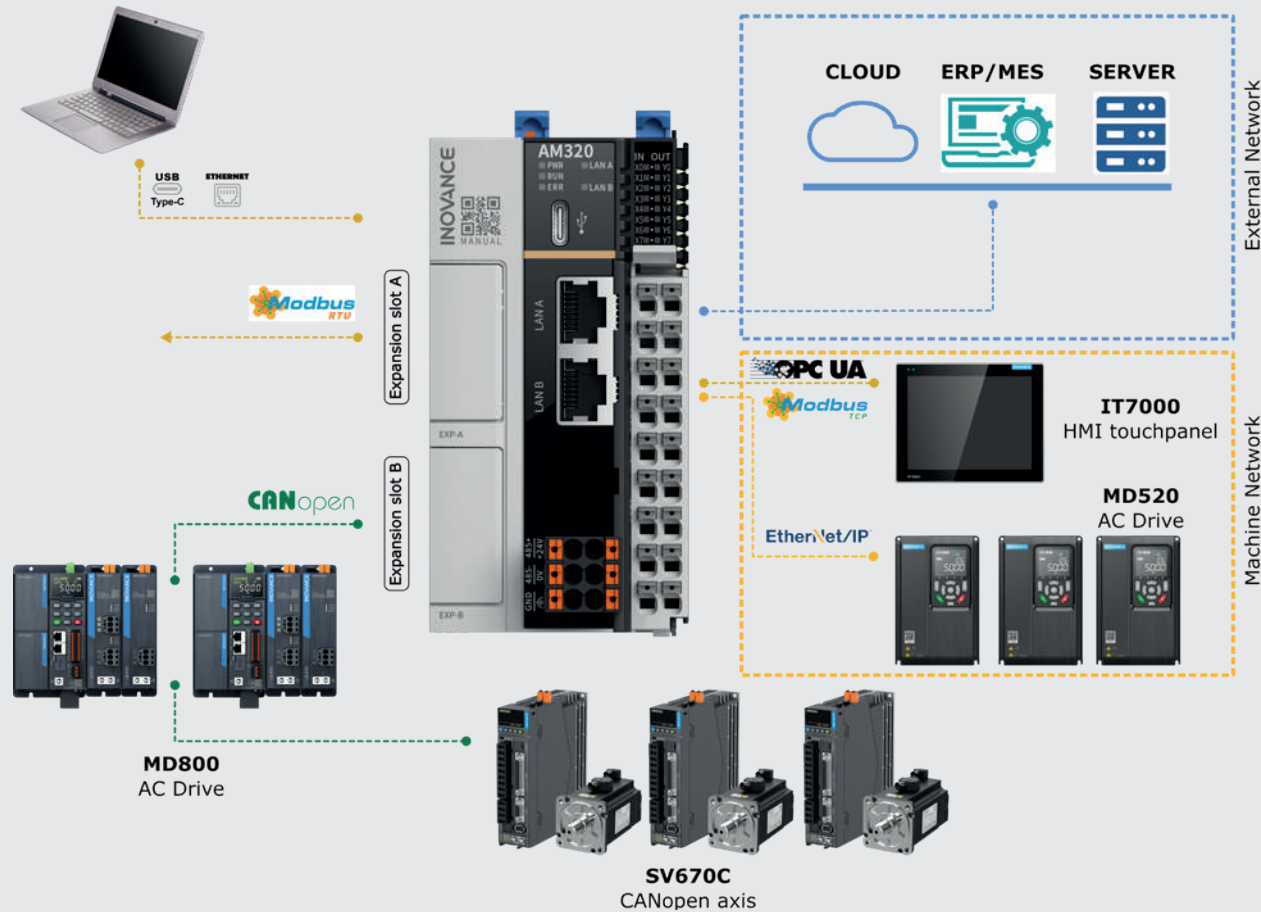
Scalable system architecture

Multiple configurations

The AM320 and AM521/AM522 controllers can cover anything from the simplest PLC application to the most complex motion control application using EtherCAT servo drives. In addition, they support a wide variety of industrial protocols such as Modbus TCP, Ethernet/IP, CANopen, OPC-UA.

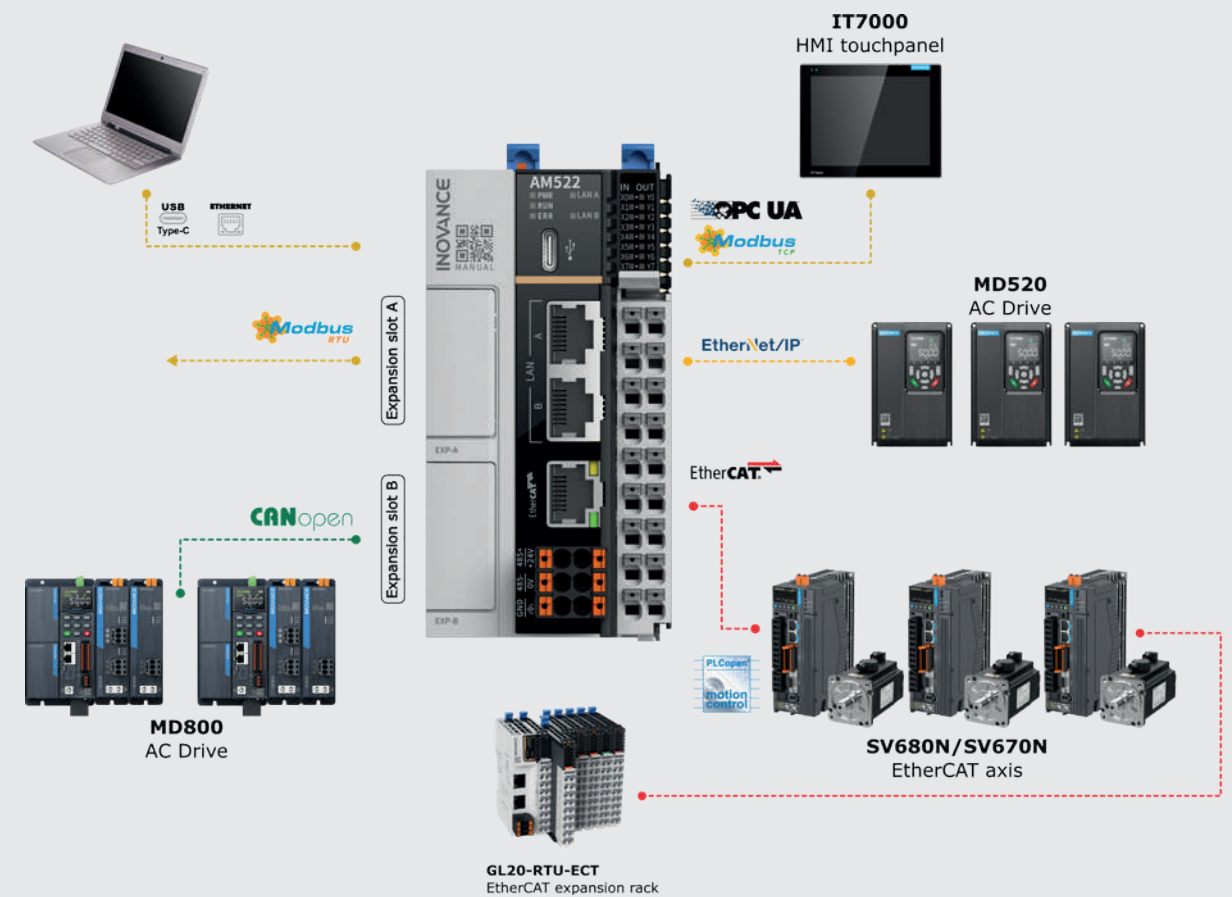
AM320

CPU with two independent IP addresses network ports.
It supports two Modbus TCP or Ethernet/IP master-slave communication.
Machine network isolated from external network.
Redundant Ethernet network.



AM521/AM522

CPU with real-time EtherCAT interface.
Motion control for up to 16 EtherCAT synchronized axes.
Single or multi-axis movements with PLCopen motion POU's.
Linear and circular interpolation and CAM functionality.



Specifications

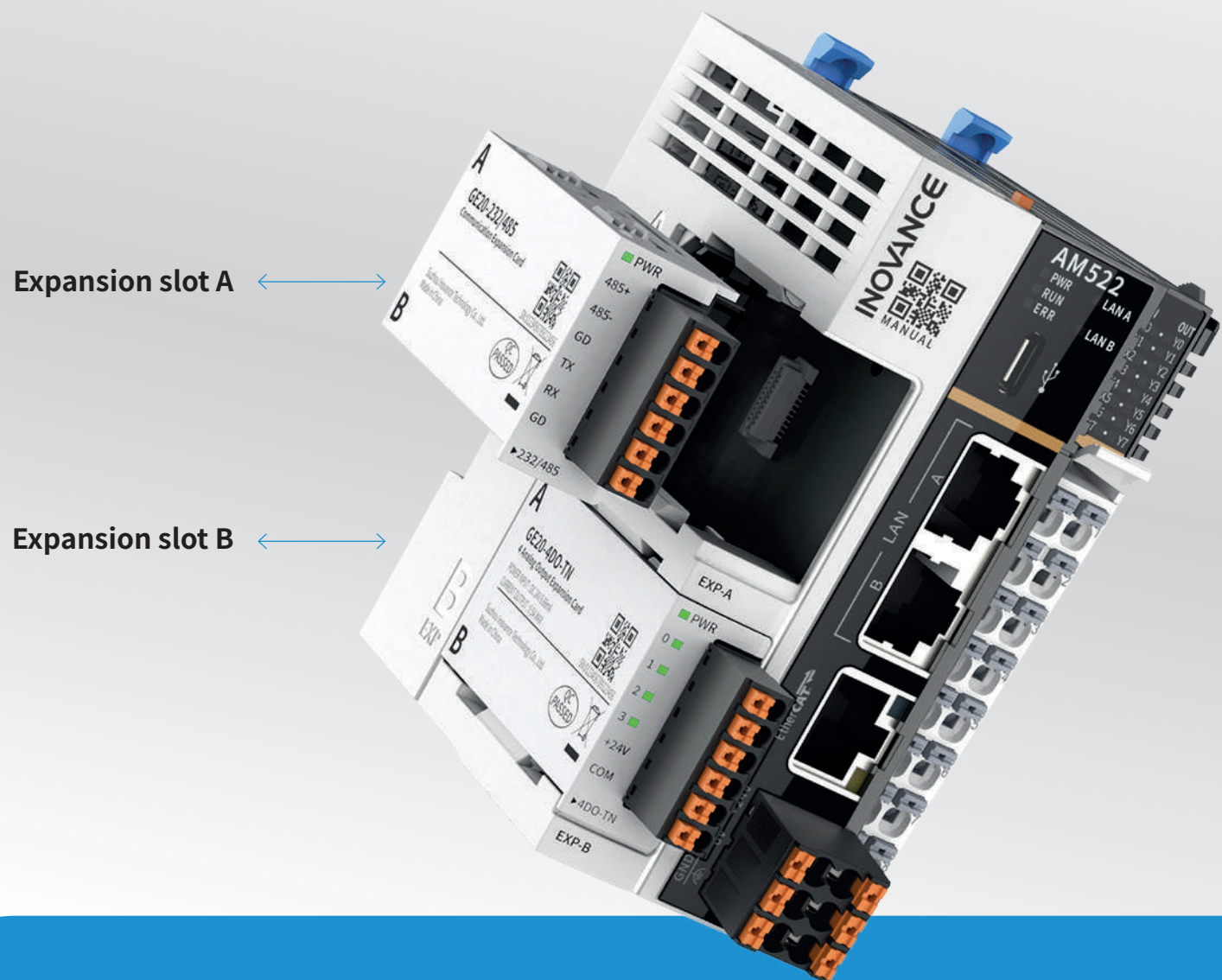
Basic specifications of easy series controller

Item	AM320-0808TP-INT	AM320-0808TN-INT	AM521-0808TP-INT	AM522-0808TP-INT	AM521-0808TN-INT	AM522-0808TN-INT
Part Number	01440809	01440698	01440805	01440807	01440697	01440696
Motion Axis	4 pulse axes		8 EtherCAT axes + 4 pulse axes	16 EtherCAT axes + 4 pulse axes	8 EtherCAT axes + 4 pulse axes	16 EtherCAT axes + 4 pulse axes
Expansion modules (GL20)	The main body can be expanded with the full range of GL20 modules (16)					
Expansion slots (GE20)	Supports 2 slots for GE20 expansion cards (serial port/CAN, digital, analog, TF card, RTC clock)					
Ethernet	2x Ethernet ports (2 independent IP Addresses)		2x Ethernet ports (built-in switch)			
EtherCAT	EtherCAT not supported		Supports up to 127 EtherCAT slaves 1ms cycle 4 axes synchronization			
Serial communication	1x RS485 Supports 2x RS232/485 expansion cards Supports free protocol, 31 Modbus RTU/ASCII slaves (recommended)					
CAN communication	1 (requires expansion card), supports CANlink/CANopen master/slave (up to 30 CANopen or 62 CANlink slaves)					
Program storage	10M program capacity					
Data storage	20M data capacity (512kB Non-volatile)					
Instruction execution time	Bit processing instruction: 9.9 ns Word processing instruction: 14.3 ns Arithmetic operation: 16.2 ns					
Dimensions (WxHxD: mm)	53 mm × 100 mm × 80 mm					
Other interfaces	USB type-C (host power supply, program upload and download, debugging, firmware upgrade)					
CAM and interpolation	Support CAM and interpolation motion					
Encoder axis	4 channel encoder axis (8 x high speed inputs, up to 200 kHz)					
Built in I/Os	8 inputs (selectable sink/source) 8 outputs (source type)	8 inputs (selectable sink/source) 8 outputs (sink type)	8 inputs (selectable sink/source) 8 outputs (source type)	8 inputs (selectable sink/source) 8 outputs (sink type)		
Programming languages	IEC 61131-3 standard: Structured Text (ST), Ladder Diagram (LD), Sequential Function Chart (SFC), Continuous Function Chart (CFC)					
Power supply	DC 24V±10%, 1A short circuit and reverse polarity protection					

Note: In case of more than 16 EtherCAT synchronized axes please contact with your local Inovance representative.

Expansion capability

GE20 Expansion cards



Communication capabilities

- RS485 connection - up to 31 slaves
- CANopen - up to 30 slaves (requires expansion card)
- Modbus TCP - up to 63 slaves
- Ethernet/IP - up to 63 slaves
- Up to 11 serial ports – one onboard (RS485), two GE20 expansion cards (RS232/485) and four GL20-2SCOM expansion modules (RS232/485)
- OPC-UA up to 16 clients

Product appearance	Expansion card	Product code	Description	Slot A	Slot B
	GE20-4DO-TN-INT	01480058	4 channel sink outputs	✓	✓
	GE20-4DI-INT	01480065	4 channel source/sink inputs	✓	✓
	GE20-2AD1DA-I-INT	01480066	2 analog inputs and 1 analog current output	✓	✓
	GE20-2AD1DA-V-INT	01480067	2 analog inputs and 1 analog voltage output	✓	✓
	GE20-232/485-RTC-INT	01480059	RS232/485 expansion card with RTC		✓
	GE20-232/485-INT	01480064	RS232/485 expansion card	✓	✓
	GE20-CAN-485-INT	01480063	CAN/RS485 expansion card with RJ45 interface	✓	
	GE20-RTC-INT	01480061	RTC expansion card		✓
	GE20-TF-INT	01480062	TF expansion card		✓
	GE20-TF-RTC-INT	01480060	TF and RTC expansion card		✓

Expansion card size: 54*30*1.2 (mm)

Expansion capability

GE20 Expansion cards

Digital expansion card

Material code	01480058	Material code	01480065
Appearance		Appearance	
Model	GE20-4DO-TN-INT	Model	GE20-4DI-INT
Description	4 channel output module	Description	4 channel input module
Slot	A/B	Slot	A/B
IP level	IP20	IP level	IP20
Operational temperature	-20 °C ~ 55 °C	Operational temperature	-20 °C ~ 55 °C
Output type	Digital transistor	Input type	Digital transistor
Source/sink (PNP/NPN)	Sink (NPN)	Source/sink (PNP/NPN)	Source/sink
Channels	4	Channels	4
Output voltage	24 V DC (20.4 V DC ~ 26.4 V DC)	Input voltage	24 V DC ± 10% (21.6 V DC ~ 26.4 V DC)
Output (resistance load)	0.5 A/point, 1 A/common point	Input resistance	5.6 kΩ
Output (inductance load)	6 w/24 V DC (in total)	ON current	>3.5 mA
Output (lamp load)	1 w/24 V DC (in total)	OFF current	<1.5 mA
Hardware ON/OFF response	Within 100 us	Input response	≈15 ms (hardware RC filter)
Leakage current (ON->OFF)	10 uA below	ON voltage	≥15 V DC
Frequency	Resistance load: 100 Hz, inductance load: 0.5 Hz, lamp load: 10 Hz	OFF voltage	≤5 V DC
Isolation	Opto-isolation	Software filter	NOT support
Protection function	Surge suppression	Isolation	Opto-isolation

Analog expansion card

Material code	01480067		
Appearance			
Model	GE20-2AD1DA-V-INT		
Description	2 channel analog inputs plus 1 channel analog input, voltage type		
Slot	A/B		
IP level	IP20		
Operational temperature	-20 °C~55 °C		
Input type	Analog input	Output type	Analog output
Input mode	Current/voltage	Output mode	Voltage
Input channels	2	Output channel	1
Resolution	12 bit	Resolution	12 bit
Conversion time	6 ms/channel	Conversion time	1 ms/channel
Input range	0 ~ 10 v/0 mA ~ 20 mA	Output range	0 ~ 10 v
Current input resistance	250 Ω	Voltage output resistance	>2 KΩ
Input accuracy (25 °C)	Voltage ±1%, Current±1% (full range)	Output accuracy (25 °C)	±1% (full range)
Input accuracy (-20 °C ~ 55 °C)	Voltage ±3%, Current±3% (full range)	Output accuracy (-20 °C ~ 55 °C)	±5% (full range)
Digital input range	0 ~ 20,000	Digital output range	0 ~ 20,000

Material code	01480066		
Appearance			
Model	GE20-2AD1DA-I-INT		
Description	2 channel analog inputs plus 1 channel analog input, current type		
Slot	A/B		
IP level	IP20		
Operational temperature	-20 °C ~ 55 °C		
Input type	Analog input	Output type	Analog output
Input mode	Current/ voltage	Output mode	Current
Input channels	2	Output channel	1
Resolution	12 bit	Resolution	12 bit
Conversion time	6ms/ channel	Conversion time	1 ms/channel
Input range	0 ~ 10 v/ 0 mA ~ 20 mA	Output range	0 mA ~ 20 mA
Current input resistance	250 Ω	Current output resistance	0 Ω ~ 500 Ω
Input accuracy (25 °C)	Voltage ±1%, Current ±1% (full range)	Output accuracy (25 °C)	±1% (full range)
Input accuracy (-20 °C ~ 55 °C)	Voltage ±3%, Current ±3% (full range)	Output accuracy (-20 °C ~ 55 °C)	±5% (full range)
Digital input range	0 ~ 20,000	Digital output range	0 ~ 20,000

Expansion capability

GE20 Expansion cards

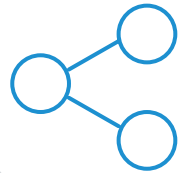
Communication expansion card

Material code	01480059	01480064	01480063
Appearance			
Model	GE20-232/485-RTC-INT	GE20-232/485-INT	GE20-CAN-485-INT
Description	RS232/RS485 communications card with RTC	RS232/ RS485 communications card	CAN/RS485 communications card
Slot	B	A/B	A
IP level	IP20	IP20	IP20
Operational temperature	-20 °C ~ 55 °C	-20 °C ~ 55 °C	-20 °C ~ 55 °C
RS485/RS232	1	1	1
Terminal resistor	Set via DIP switch	Set via DIP switch	NO terminal resistor for RS485 Built-in terminal resistor for CAN
Communications ability	Up to 31 slaves Distance between adjacent slaves not over 3m	Up to 31 slaves Distance between adjacent slaves not over 3 m	Up to 31 slaves(RS485) Distance between adjacent slaves not over 3 m Up to 63 slaves (CAN)
Baud rate of RS485/RS232	9600/19200/38400/57600/115200 bit/s	9600/19200/38400/57600/115200 bit/s	9600/19200/38400/57600/115200 bit/s
Baud rate of CAN	/	/	1 Mbit/s: distance < 20 m 500 kbit/s: distance < 80 m 250 kbit/s: distance < 150 m 125 kbit/s: distance < 300 m 100 kbit/s: distance < 500 m 50 kbit/s: distance < 1,000 m
RTC accuracy	120 sec/ month	/	/
RTC format	YYYY/MM/DD/HH/MM/SS	/	/
In-built lithium battery	CR2302, 3 year life cycle, removable	/	/

Material code	01480061	01480062	01480060
Appearance			
Model	GE20-RTC-INT	GE20-TF-INT	GE20-TF-RTC-INT
Description	RTC extension card	TF card extension card	TF and RTC expansion card
Slot	B	B	B
IP level	IP20	IP20	IP20
Operational temperature	-20 °C ~ 55 °C	-20 °C ~ 55 °C	-20 °C ~ 55 °C
RTC accuracy	120 sec/month		120 sec/month
RTC format	YYYY/MM/DD/HH/MM/SS		YYYY/MM/DD/HH/MM/SS
In-built lithium battery	CR2302, 3 year life cycle, removable		CR2302, 3 year life cycle, removable
SD card capacity		NOT over 32 G	NOT over 32 G
SD card type		TransFlash (Micro SD)	TransFlash (Micro SD)

Expansion capability

GL20 expansion modules



Great performance with ultra fast response

Microsecond level response | Synchronous control



Compact size and wiring without tools

Compact size | Fast installation | Fast replacement



Stable and reliable design

Stable connection | Gold plating process | Safety and reliability



Many variants to suit different systems

Multiple protocols | Many variants

Applicable to either bus coupler or CPU

NEW generation distributed I/O system



GL20 slim and compact I/O modules



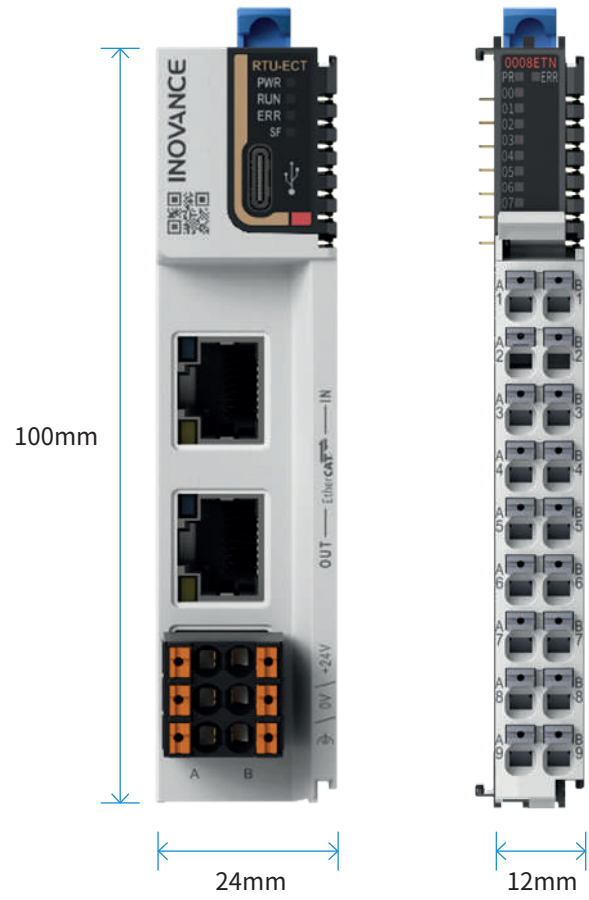
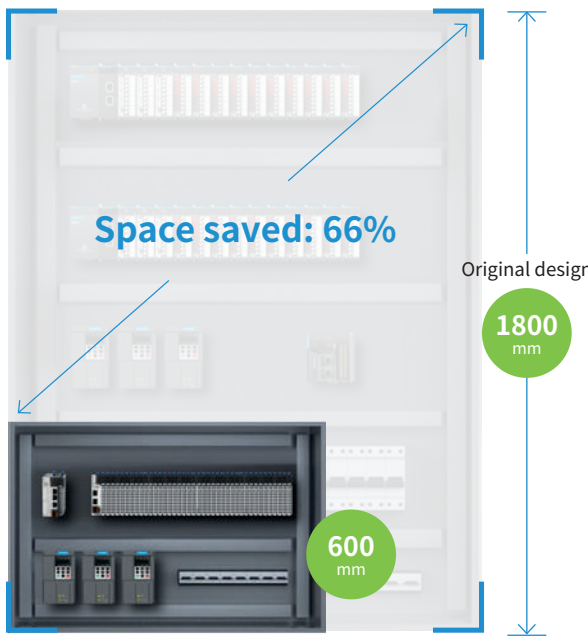
Expansion capability

GL20 expansion modules



Compact Size
Saves 2/3 of the space in the cabinet compared to the previous generation I/O series

Space utilisation maximised
Thickness reduced to **12mm**
2/3 cabinet space saved



Expansion capability

GL20 modules – EtherCAT bus coupler



EtherCAT

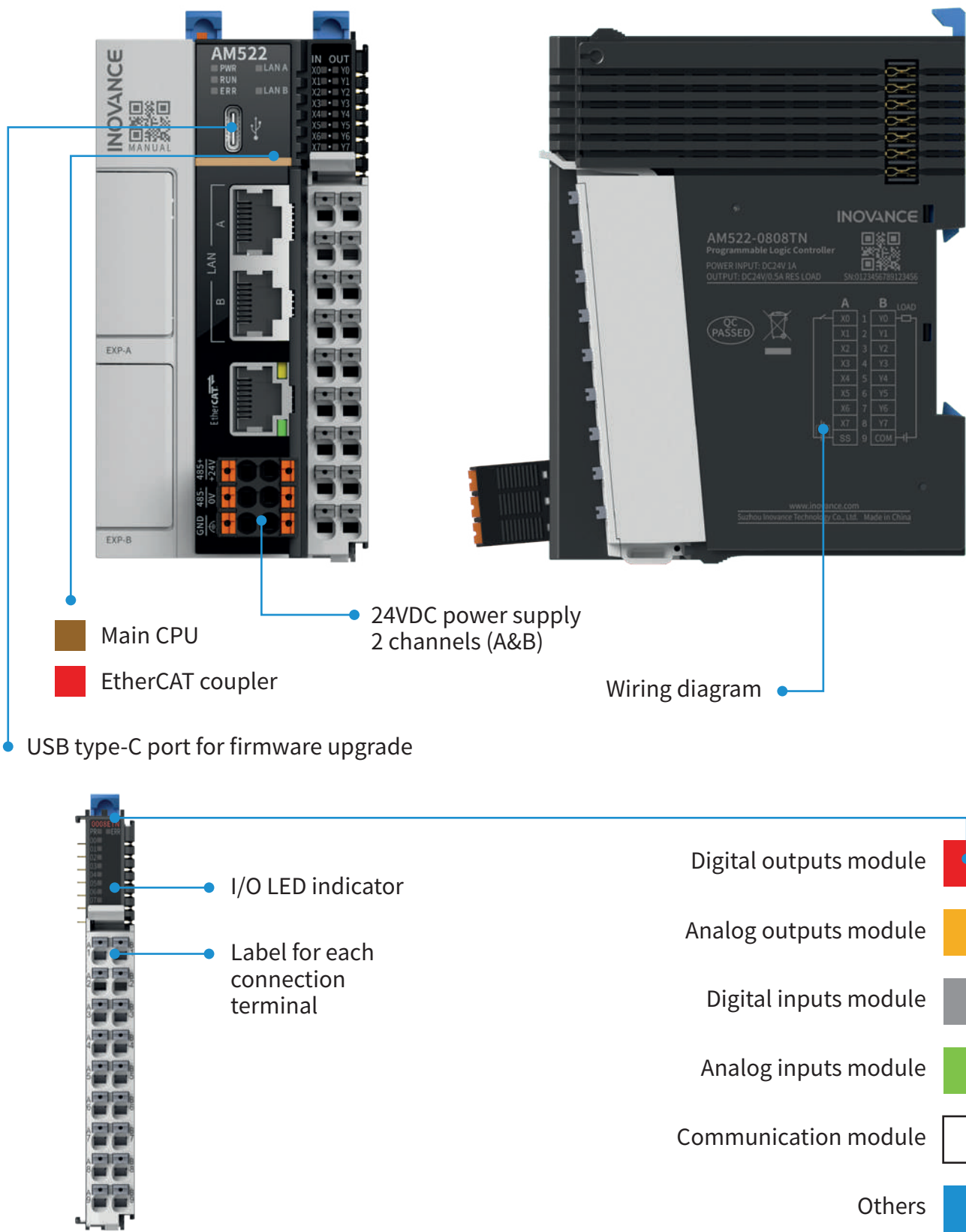
- ✓ Min. cycle time of 125 microseconds
- ✓ Allows EtherCAT alias configuration
- ✓ USB type-C port for firmware upgrade

The bus coupler module supports up to 16 I/O expansion modules. If more than 16 modules are required, an additional GL20-PS2 power supply module is needed. To find the optimal solution, please consult with your local Inovance representative.

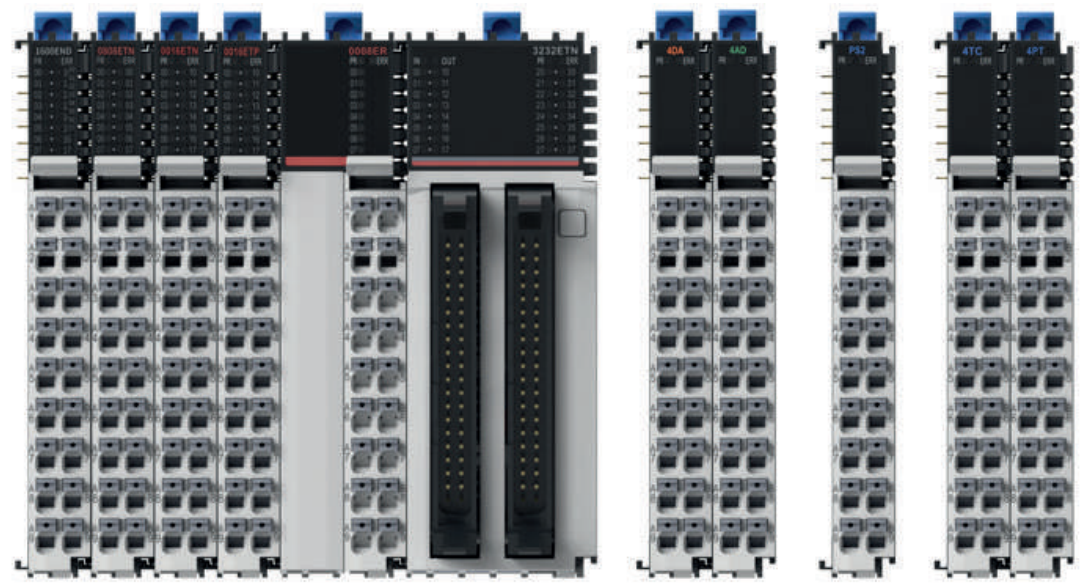
Specification	Description
Dimensions (WxHxD:mm)	24×100×83
Max. number of expansion modules	16 (up to 32 using GL20-PS2 power supply module)
Protection	Overcurrent, reverse-connection and surge protection
Operating ambient temperature	-20~55°C
Operating ambient humidity	Less than 95% and no condensation
IP rating	IP20
Power supply	+24 VDC
Process data	Up to 1,024 input bytes and 1,024 output bytes
Mailbox size	Up to 256 input bytes and 256 output bytes
Alias	It admits the configuration of EtherCAT aliases through the master. Expansion modules connected behind ECT do not support alias access and configuration. Range: 1~65535
EtherCAT cycle	Min. cycle time of 125 microseconds
EtherCAT port	2 x RJ45
Communication rate	100 M, full duplex
Transmission distance	100 meters
Firmware update port	USB type-C port for firmware upgrade

Expansion capability

GL20 expansion modules



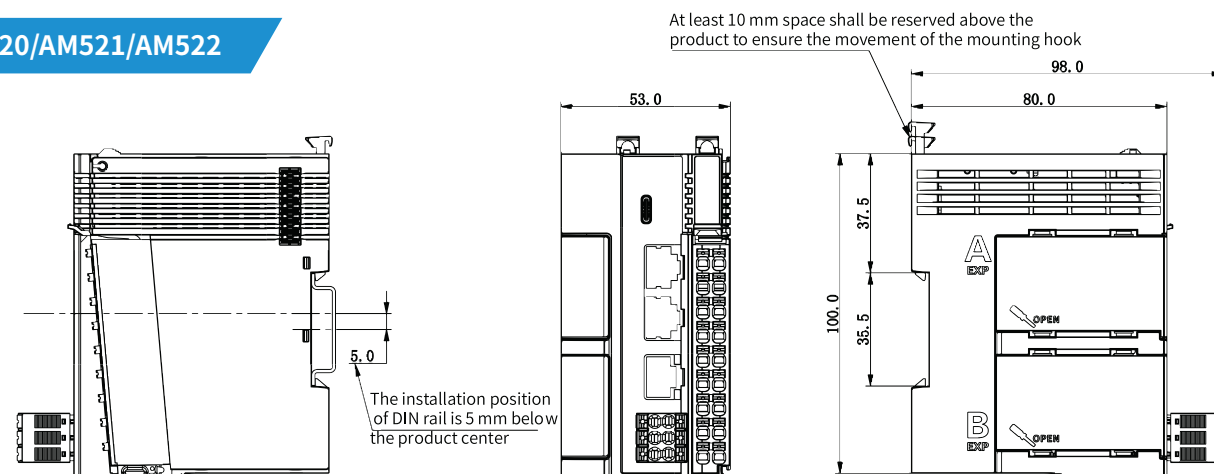
Please note: the colour codes specify the module type



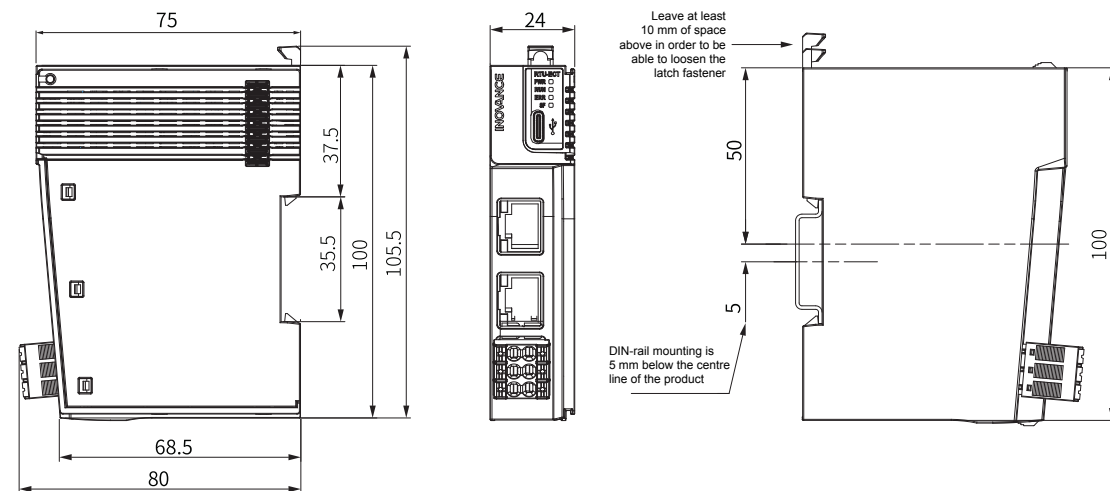
Type of module	Model	Product code	Description
Bus coupler	GL20-RTU-ECT32-INT	01440654	EtherCAT slave bus coupler. Up to 16 (up to 32 using GL20-PS2 power supply module) expansion modules can be added
	GL20-1600END-INT	01440737	16 x source (PNP)/sink (NPN) digital inputs module. Input filter from 0.25 ms to 32 ms
Digital inputs	GL20-0800END-INT	01440771	8 x source (PNP)/sink (NPN) digital inputs module. Input filter from 0.25 ms to 32 ms
	GL20-3200END-INT	01440739	32 x source (PNP)/sink (NPN) digital inputs module. Input filter from 0.25 ms to 32 ms
	GL20-3200END-M-INT	01440778	32 x source (PNP)/sink (NPN) digital inputs module. Input filter from 0.25 ms to 32 ms (Requires T024-K terminal block and extension cable)
Digital outputs	GL20-0008ETP-INT	01440780	8 x source (PNP) transistor outputs module. Response time 100 µs
	GL20-0008ETN-INT	01440775	8 x sink (NPN) transistor outputs module. Response time 100 µs
	GL20-0016ETP-INT	01440776	16 x source (PNP) transistor outputs module. Response time 100 µs
	GL20-0016ETN-INT	01440735	16 x sink (NPN) transistor outputs module. Response time 100 µs
	GL20-0032-ETN-INT	01440740	32 x sink (NPN) transistor outputs module. Response time 100 µs
	GL20-0032ETN-M-INT	01440773	32 x sink (NPN) transistor outputs module. Response time 100 µs (Requires T024-K terminal block and extension cable)
Relay outputs	GL20-0008ER-INT	01440772	8 x relay outputs module. Response time 15 ms
Digital inputs & outputs	GL20-0808ETN-INT	01440769	8 x sink (NPN) digital inputs and 8 x sink (NPN) transistor outputs module. Response time 100 µs. Input filter from 0.25 ms to 32 ms
	GL20-3232ETN-M-INT	01440777	32 x source (PNP)/sink (NPN) digital inputs and 32 x sink (NPN) transistor outputs module. Response time 100 µs. Input filter from 0.25 ms to 32 ms (Requires T024-K terminal block and extension cable)
Analog inputs	GL20-4AD-INT	01440736	4 x analog inputs module (resolution 16 bits, sampling time 250 µs)
Analog outputs	GL20-4DA-INT	01440741	4 x analog outputs module (resolution 16 bits, sampling time 250 µs)
Temperature detection	GL20-4PT-INT	01440781	4 x channel thermal resistance inputs temperature detection module (Pt100, Pt500, Pt1000, Cu100, KTY84, NTC5K, NTC10K)
	GL20-4TC-INT	01440784	4 x channel thermocouple inputs temperature detection module (thermocouple type: B,E,N,J,K,R,S,T)
Power supply expansion	GL20-PS2-INT	01440767	Power supply expansion module. The rated current of the internal bus of the coupler is 2 A. If a higher current is required, a combination of the bus coupler and the power supply expansion module GL20-PS2 should be used
Accessories	XA3210A-40-L0.5M-01	015310167	I/O extension cable - 0.5 m length with 2 FCN connectors (required for GL20-3200END-M/GL20-0032ETN-M/GL20-3232ETN-M. Details are available in the separate GL20 brochure)
	XA3210A-40-L2M-01	015310166	I/O extension cable - 2 m length with 2 FCN connectors (required for GL20-3200END/GL20-0032ETN-M/GL20-3232ETN)
	T024-K	015020452	40PIN MIL screw terminal block (Required for GL20-3200END-M/GL20-0032ETN-M/GL20-3232ETN-M. Details are available in the separate GL20 brochure)

Dimensions

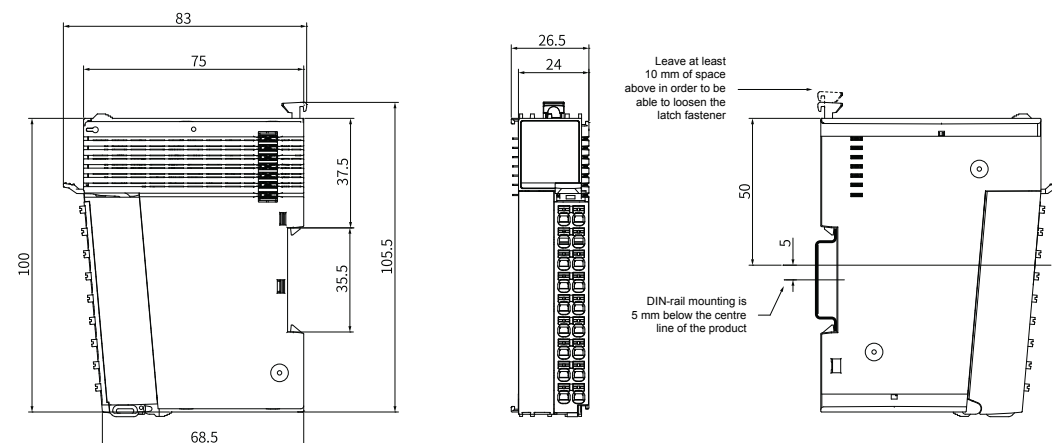
AM320/AM521/AM522



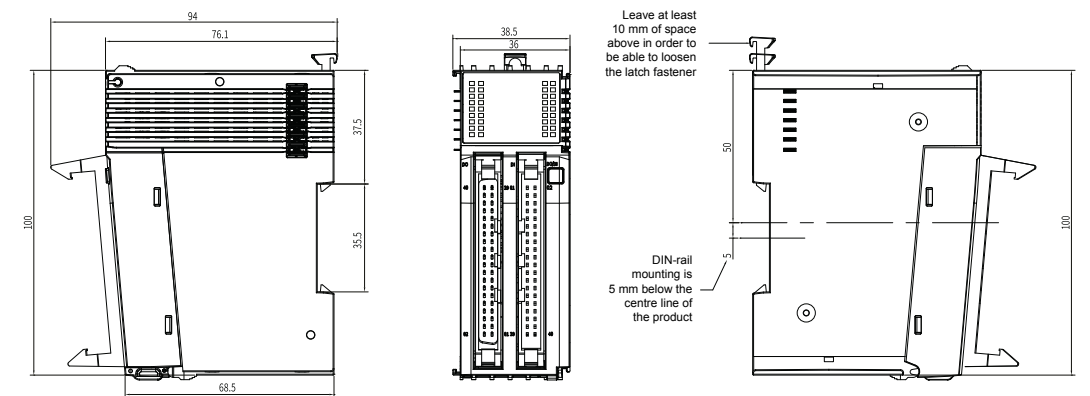
GL20-RTU-ECT32-INT



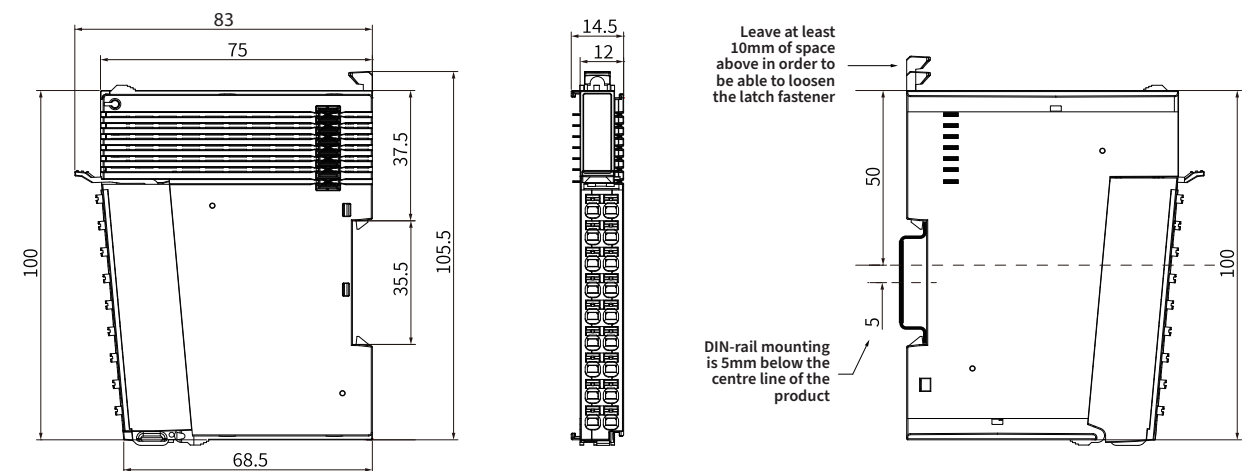
GL20-0008R-INT, GL20-3200END-INT, GL20-0032ETN-INT



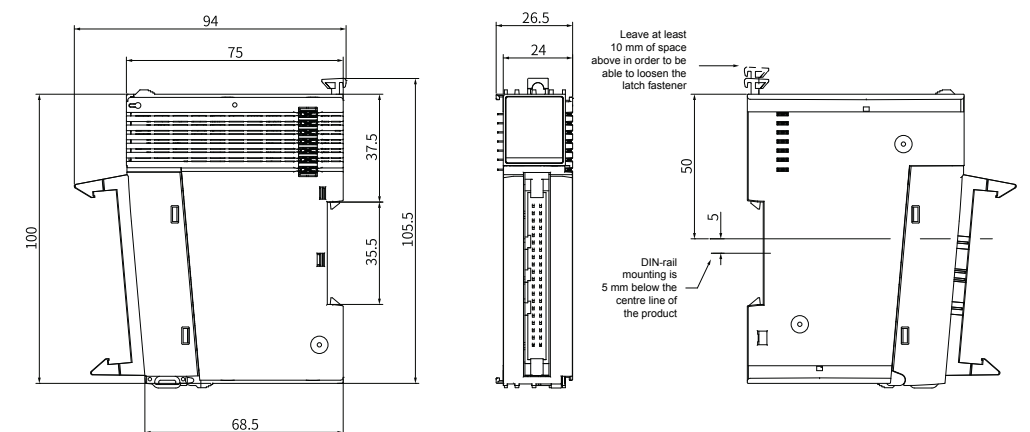
GL20-3232ETN-M-INT



GL20-1600END-INT, GL20-0800END-INT, GL20-0008ETP-INT, GL20-0016ETP-INT, GL20-0016ETN-INT, GL20-0808ETN-INT, GL20-4AD-INT, GL20-4DA-INT, GL20-4PT-INT, GL20-4TC-INT, GL20-PS2-INT



GL20-3200END-M-INT, GL20-0032ETN-M-INT

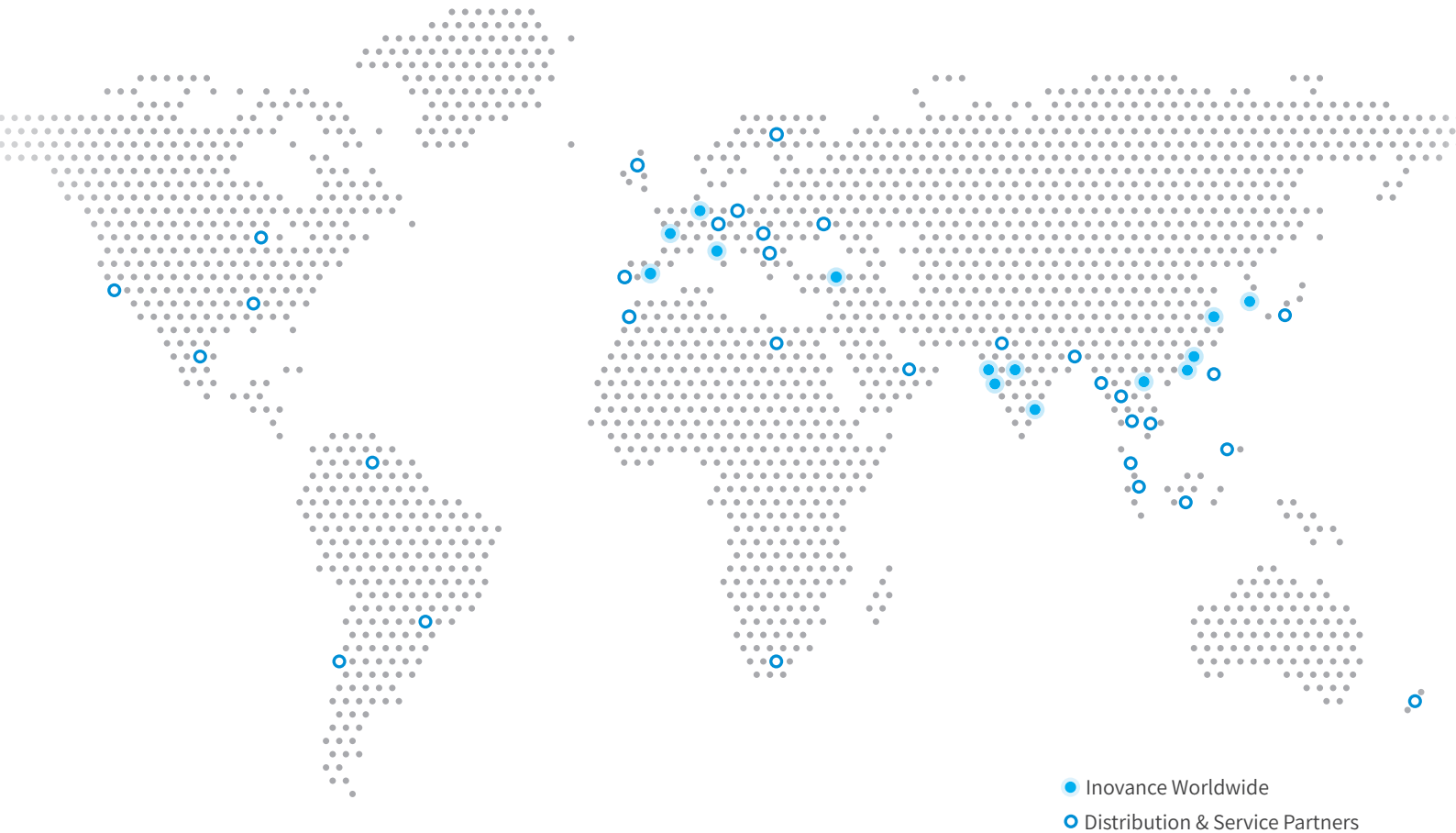


Please note: GL20-3200END-M, GL20-0032ETN-M, GL20-3232ETN-M require T024-K terminal block and extension cable. Details are available in the separate GL20 brochure.



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