



PS00006443A06

GE20 Series Expansion Cards User Guide

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Fundamental Safety Instructions

■ Safety Precautions

- This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to comply with the safety instructions may result in death, severe personal injuries, or equipment damage.
- "CAUTION", "WARNING", and "DANGER" items in the guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper use.

■ Safety Levels and Definitions



DANGER

Indicates that failure to comply with the notice will result in death or severe personal injuries.



WARNING

Indicates that failure to comply with the notice may result in death or severe personal injuries.



CAUTION

Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

■ General Safety Instructions

- The drawings in the guide are shown for illustration only and may be different from the product you purchased.
- Users must take mechanical precautions to protect personal safety and wear protective equipment, such as anti-smashing shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

Unpacking



WARNING

- Do not install the equipment if you find damages, rust, or signs of use on the equipment or accessories upon unpacking.
- Do not install the equipment if you find water seepage or missing or damaged components upon unpacking.
- Do not install the equipment if you find the packing list does not conform to the equipment you received.



CAUTION

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package by following the unpacking sequence. Do not strike the package violently.
- Check whether there is damage, rust, or injuries on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation



CAUTION

- Store and transport the equipment based on the storage and transportation requirements. Failure to comply will result in equipment damage.
- Avoid storing or transporting the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the equipment for more than three months. Long-term storage requires stricter protection and necessary inspections.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport the equipment with other equipment or materials that may harm or have negative impacts on this equipment.

Installation



DANGER

- The equipment must be operated only by professionals with electrical knowledge. Non-professionals are not allowed.



WARNING

- Read through the guide and safety instructions before installation.
- Do not install this equipment in places with strong electric or magnetic fields.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in an electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not retrofit the equipment.
- When the equipment is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing devices with strong electromagnetic interference, such as a transformer, install a shielding device for the equipment to prevent malfunction.



CAUTION

- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal shavings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper on the top of the equipment to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed executes variable speed operations. In this case, install the vibration-proof rubber under the motor frame or use the vibration suppression function to reduce resonance.

Wiring



DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Before wiring, cut off all the power supplies of the equipment, and wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. After waiting for the designated time, measure the DC voltage in the main circuit to ensure the DC voltage is within the safe voltage range. Failure to comply will result in an electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply will result in an electric shock.
- Check that the equipment is grounded properly. Failure to comply will result in an electric shock.



WARNING

- Do not connect the input power supply to the output end of the equipment. Failure to comply will result in equipment damage or even a fire.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- After wiring is done, check that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply may result in an electric shock or equipment damage.



CAUTION

- During wiring, follow the proper electrostatic discharge (ESD) procedure, and wear an antistatic wrist strap. Failure to comply will damage the equipment or the internal circuits of the equipment.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply will result in equipment malfunction.

Power-on



DANGER

- Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before power-on to prevent equipment damage or a fire.
- After power-on, do not open the cabinet door or protective cover of the equipment, touch any terminal, or disassemble any unit or component of the equipment. Failure to comply will result in an electric shock.



WARNING

- Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation



DANGER

- The equipment must be operated only by professionals. Failure to comply will result in death or personal injuries.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply will result in an electric shock.



WARNING

- Do not touch the equipment casing, fan, or resistor with bare hands to feel the temperature. Failure to comply may result in personal injuries.
- Prevent metal or other objects from falling into the equipment during operation. Failure to comply may result in a fire or equipment damage.

Maintenance



DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply will result in an electric shock.
- Before maintenance, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- In case of a permanent magnet motor, do not touch the motor terminals immediately after power-off because the motor terminals will generate induced voltage during rotation even after the equipment power supply is off. Failure to comply will result in an electric shock.



WARNING

- Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.

Repair



DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Do not repair the equipment with power ON. Failure to comply will result in an electric shock.
- Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.



WARNING

- Require repair services according to the product warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injury or equipment damage.
- When the equipment is faulty or damaged, the troubleshooting and repair work must be performed by professionals that follow the repair instructions, with repair records kept properly.
- Replace quick-wear parts of the equipment according to the replacement instructions.
- Do not use damaged equipment. Failure to comply may result in death, personal injuries, or severe equipment damage.
- After the equipment is replaced, check the wiring and set parameters again.

Disposal



WARNING

- Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in property damage, personal injuries, or even death.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

■ Safety label

For safe equipment operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. See the following table for descriptions of the safety labels.

Safety Label	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result in death, personal injuries, or equipment damage. • Do not touch the terminals or remove the cover with power ON or within 10 min after power-off. Failure to comply will result in an electric shock.

1 GE20-TF Memory Expansion Card User Guide

1.1 Preface

■ About this Guide

Thank you for purchasing the GE20-TF expansion card independently developed and produced by Inovance Technology. The GE20-TF can be used with Easy300/Easy500/AM300/AM500 series PLC for upgrade of the user program and firmware.

This guide describes the product information, mechanical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-TF Memory Card User Guide	PS00006434	Describes the product information, mechanical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections
September 2023	A04	Minor corrections
July 2023	A03	Added <i>"1.4.2 InoProShop Programming (When used with AM522)" on page 18.</i>

Date	Version	Revision
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install the app, where you can search for and download manuals.



■ Warranty Agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail. For details, see Product Warranty Card.

1.2 Product Information

1.2.1 Model and Nameplate

■ Model description

$$\frac{\text{GE20}}{\text{①}} - \frac{\text{TF}}{\text{②}}$$

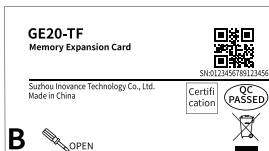
① Product Series

GE20 series general-purpose expansion card

② Product Code

TF card

■ Nameplate

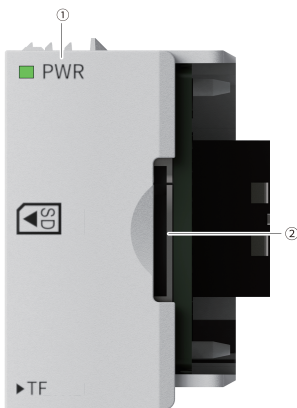


Note

The letter “B” on the nameplate indicates that only the card slot B of the PLC is supported.

Model	Description	Code
GE20-TF	GE20-TF expansion card for the upgrade of user programs and firmware.	01480030

1.2.2 Components



No.	Component	Mark	Definition	Indicator Color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
②	TF card slot	TF	-	-	-

1.2.3 Product Specifications

1.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	53.5 mm × 29.5 mm × 23 mm
Weight	Approx. 12 g

1.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	100 mA (max@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

1.2.3.3 TF Card Specifications

Item	Specification
Capacity	Max. 32 GB
File format	FAT32
Installation mode	Self-eject

1.3 Mechanical Installation

1.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions

Item	Specification
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

1.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



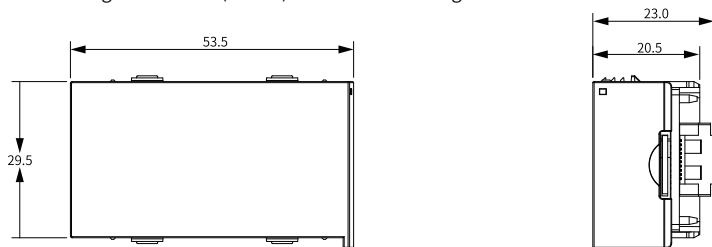
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

1.3.3 Mounting Dimensions

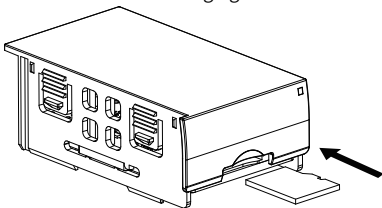
The mounting dimensions (in mm) are shown in the figure below.



1.3.4 Installation Method

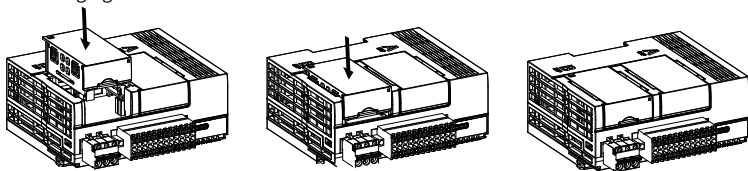
■ Installing the TF card

Align the TF card with the TF card slot of the expansion card and insert the TF card in the direction indicated by the arrow. The TF card is fixed in place when it does not rebound obviously, as shown in the following figure.



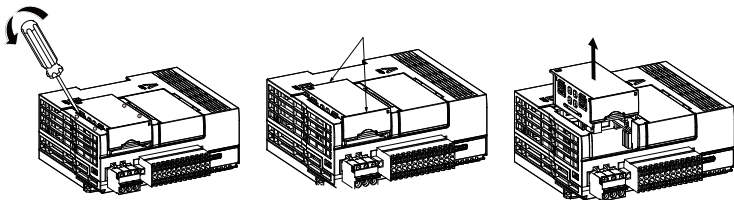
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



1.4 Programming Examples

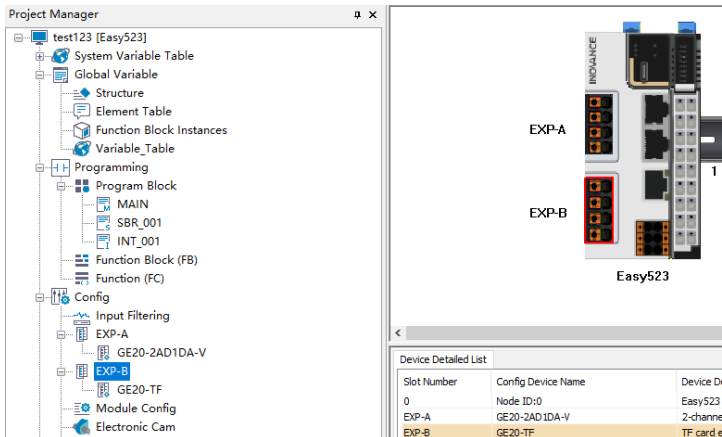
1.4.1 Autoshop Programing (When used with Easy523)

Note:

- The type ID of the GE20-TF expansion card is 1. The configured expansion card type must be consistent with the actually installed expansion card type. You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".
- The GE20-TF expansion card only supports EXP-B.

Operating procedure:

1. Create a project.
2. In the Project Manager, go to **Config**, right-click on **EXP-B** and select "GE20-TF", or right-click on **Module Config** and select **Auto Scan** to add the GE20-TF expansion card, as shown in the figure below.



3. After successful compiling, download the project and run it.

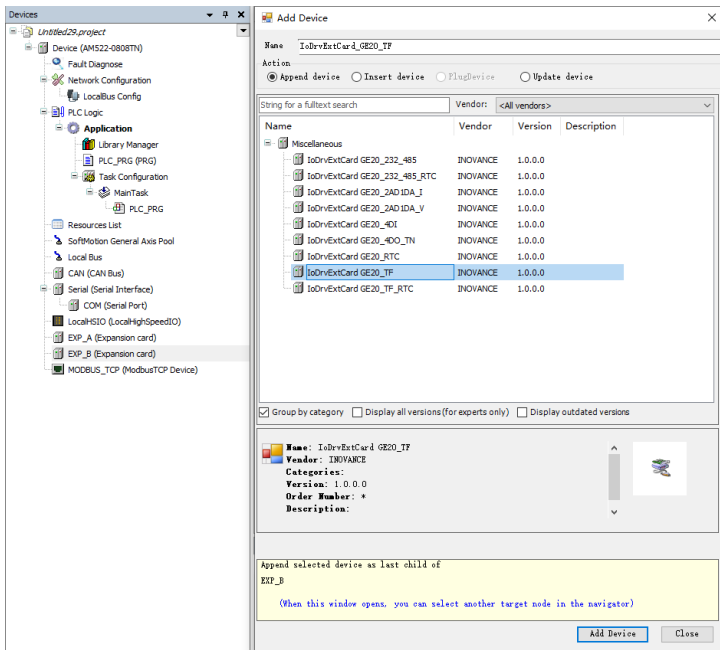
1.4.2 InoProShop Programming (When used with AM522)

Note:

- The configured expansion card type must be consistent with the actually installed expansion card type.
- The GE20-TF expansion card only supports EXP-B.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-B" and select **Add Device**.
3. In the pop-up **Add Device** dialog, select "GE20_TF" and click **Add Device**, as shown in the figure below.



4. After successful compiling, download the project and run it.

2 GE20-RTC Series Clock Expansion Card User Guide

2.1 Preface

■ About this Guide

Thank you for purchasing the GE20-RTC clock expansion card independently developed and produced by Inovance Technology. The GE20-RTC can be used with Easy300/Easy500/AM300/AM500 series PLC to provide RTC function.

This guide describes the product information, mechanical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-RTC Clock Expansion Card User Guide	PS00006435	Describes the product information, mechanical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections
September 2023	A04	Minor corrections
July 2023	A03	Added <i>"2.4.2 InoProShop Programing (When used with AM522)" on page 29.</i>

Date	Version	Revision
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

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- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install InoHome app. In this app, you can search and can download the guide.



■ Warranty Agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail. For details, see Product Warranty Card.

2.2 Product Information

2.2.1 Model and Nameplate

■ Model description

GE20 – RTC
 ① ②

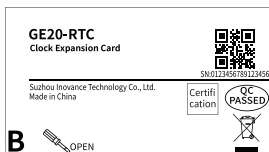
① Product Series

GE20 series general-purpose expansion card

② Product Code

RTC clock card

■ Nameplate



Note

The letter “B” on the nameplate indicates that only the card slot B of the PLC is supported.

Model	Description	Code
GE20-RTC	GE20 series real-time clock card	01480031

2.2.2 Components



No.	Component	Mark	Definition	Indicator Color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.

2.2.3 Product Specifications

2.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	53.5 mm × 29.5 mm × 23 mm
Weight	Approx. 16 g

2.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	10 mA (typical@5 V)

Item	Specification
Input short-circuit protection	Supported
Hot swap	Not supported

2.2.3.3 Clock Specifications

Item	Specification
Communication port	I ² C
Clock accuracy	120 seconds/month
Time format	YYYY-MM-DD hh-mm-s
Battery specifications	CR2032 coin cell battery, 5 year life, replaceable

2.3 Mechanical Installation

2.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total

Item	Specification
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

2.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



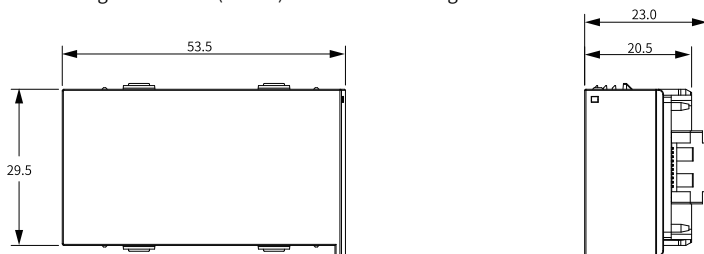
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

2.3.3 Mounting Dimensions

The mounting dimensions (in mm) are shown in the figure below.

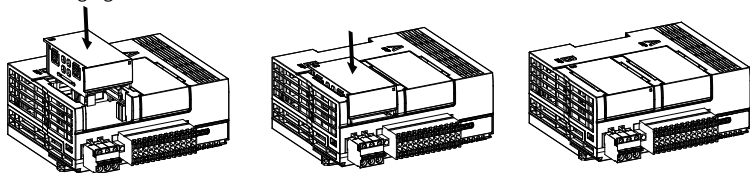


2.3.4 Installation Method

■ Installing the Expansion Card

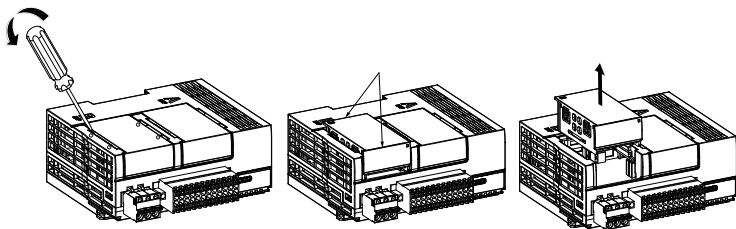
The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot B vertically along the guide ribs, and press the

expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



2.4 Programming Examples

2.4.1 Autosop Programing (When used with Easy523)

Note:

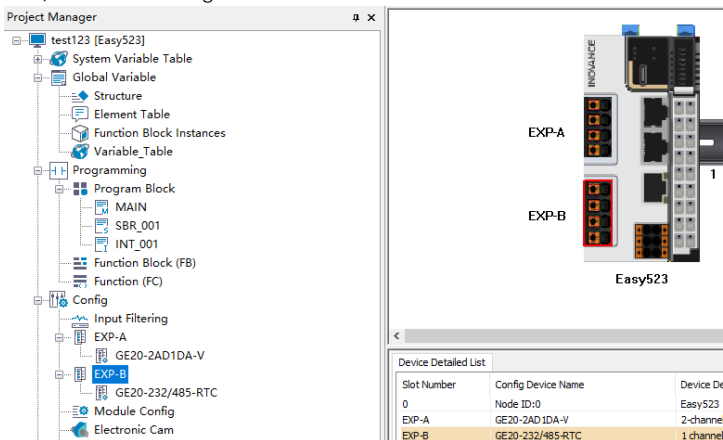
- The type ID of the GE20-RTC expansion card is 9. The configured expansion card type must be consistent with the actually installed expansion card type. You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-

INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

- The GE20-RTC expansion card only supports EXP-B.

Operating procedure:

1. Create a project.
2. In the Project Manager, go to **Config**, right-click on **EXP-B** and select "GE20-RTC", or right-click on **Module Config** and select **Auto Scan** to add the GE20-RTC expansion card, as shown in the figure below.



3. After successful compiling, download the project and run it.

2.4.2 InoProShop Programing (When used with AM522)

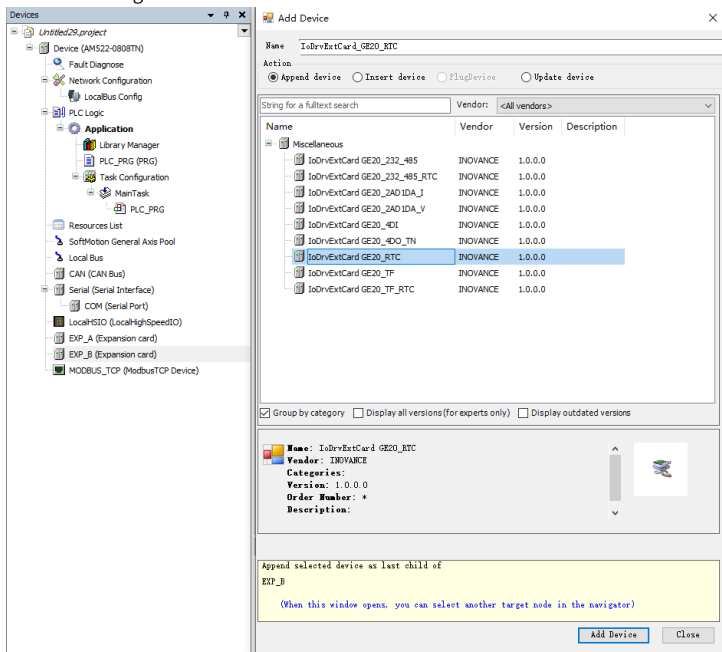
Note:

- The configured expansion card type must be consistent with the actually installed expansion card type.
- The GE20-RTC expansion card only supports EXP-B.

Operating procedure:

1. Create a project.

- In the **Devices** pane, right-click on "EXP-B" and select **Add Device**.
- In the **Add Device** pop-up dialog, select "GE20_RTC" and click **Add Device**, as shown in the figure below.



- After successful compiling, download the project and run it.

2.5 Appendix: Maintenance of Backup Battery

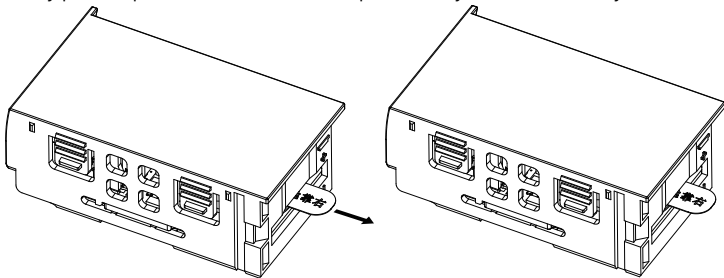
The backup battery supplies power to the product when PLC is out of power, with a maximum battery life of 5 years, depending on the use environment. When the backup battery runs out of power, replace it promptly.



Caution

The replacement of the backup battery must be completed within 15 seconds (excluding the time taken to remove the expansion card), otherwise the RTC clock will be lost.

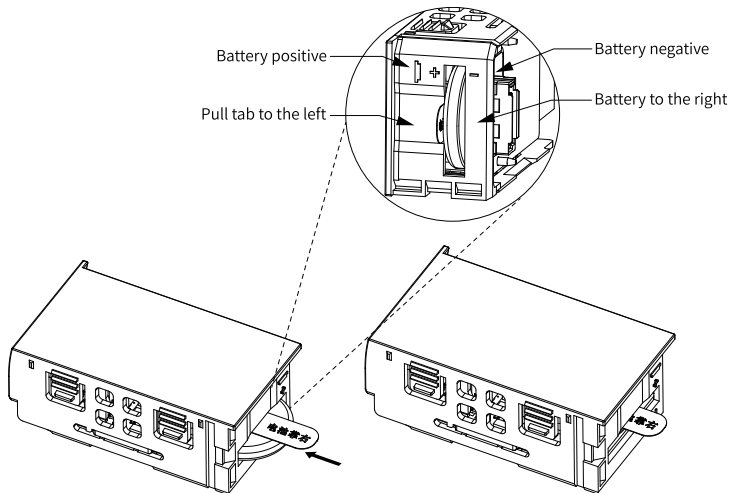
1. Remove the expansion card as described in "Removing the Expansion Card" in ["2.3.4 Installation Method" on page 27](#).
2. Gently pull the pull tab and take out the spare battery when it is halfway out.



Caution

Do not pull the pull tab forcibly to prevent it from breakage.

3. Push the replacement battery into the battery holder.



3 GE20-4DO-TN Sink-Type Transistor Output

Expansion Card User Guide

3.1 Preface

■ About this Guide

Thank you for purchasing the GE series GE20-4DO-TN sink transistor output expansion card independently developed and produced by Inovance Technology. The GE20-4DO-TN can be used with Easy300/Easy500/AM300/AM500 series PLCs and supports 4-channel sink-type transistor outputs.

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-4DO-TN Sink-Type Transistor Output Expansion Card User Guide	PS00006439	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections
September 2023	A04	Minor corrections
July 2023	A03	Added <i>"3.5.2 InoProShop Programming (When used with AM522)" on page 46.</i>

Date	Version	Revision
March 2023	A02	Updated the description of nameplate description, terminal wiring drawings, and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install InoHome app. In this app, you can search and can download the guide.



■ Warranty Agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.

- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail. For details, see Product Warranty Card.

3.2 Product Information

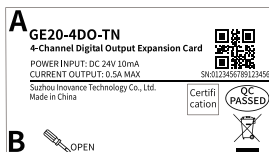
3.2.1 Model and Nameplate

■ Model description

$$\frac{\text{GE20}}{\text{①}} - \frac{\text{4DO}}{\text{②}} - \frac{\text{TN}}{\text{③}}$$

① Product Series GE20 series general-purpose expansion card	③ Product Code Sink transistor
② Product Code 4-channel digital output card	-

■ Nameplate

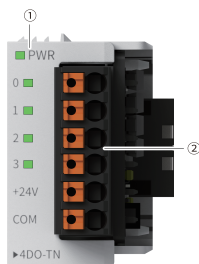


Note

The letters "A" and "B" on the nameplate indicate that the card slots A and B of the PLC are supported.

Model	Description	Code
GE20-4DO-TN	GE20 series 4-channel digital sink-type transistor output card	01480033

3.2.2 Components



No.	Component	Mark	Definition	Indicator color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
	Output indicator	0, 1, 2, 3	Output status display	Yellow green	ON when output is active.
②	User terminals	-	-	-	See details in "3.4.2 Terminal Definition" on page 43.

3.2.3 Product Specifications

3.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	69.5 mm × 29.5 mm × 23 mm
Weight	Approx. 18 g

3.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	40 mA (max@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

3.2.3.3 Output Specifications

Item		Specification
Output type		Digital output, low side
Number of output channels		4
Output voltage class		24 VDC (21.6 VDC to 26.4 VDC)
Common output	Output load (resistive load)	0.5 A/point, 1 A/common terminal
	Output load (inductive load)	6 W/24 VDC(in total)
	Output load (lamp load)	1 W/24 VDC(in total)
	ON/OFF hardware response time	$\leq 100 \mu\text{s}$ (OFF $\rightarrow$ ON, ON $\rightarrow$ OFF)
	Load current requirements	Load current $\geq 5 \text{ mA}$
	Max. output frequency	100 Hz with resistive load, 0.5 Hz with inductive load, 10 Hz with lamp load
Leakage current at OFF		Less than 10 μA
Max. residual voltage during ON		Less than 0.5 VDC
Isolation method		Optocoupler isolation
Common terminal mode		4-point/common terminal ("- of power supply)
Surge suppressor		Zener diode

Item	Specification
Short circuit protection action	/
Output action display	The output indicator lights up (controlled by hardware) when the output is in drive state.

3.3 Mechanical Installation

3.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

3.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



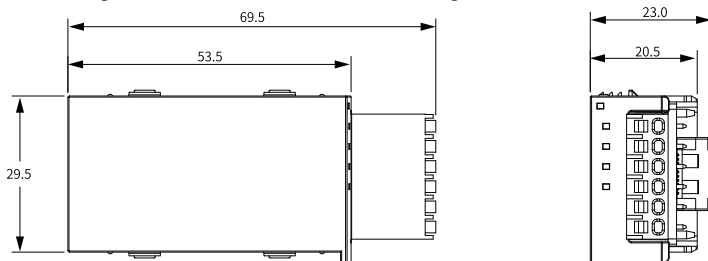
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

3.3.3 Mounting Dimensions

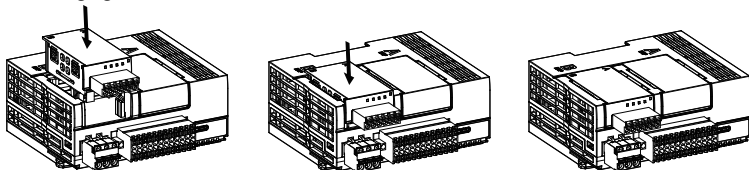
The mounting dimensions (in mm) are shown in the figure below.



3.3.4 Installation Method

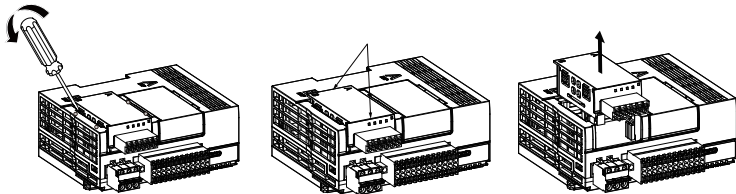
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot A or B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion card vertically.



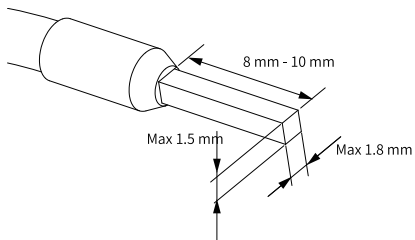
3.4 Electrical Installation

3.4.1 Cable Selection

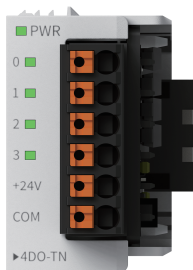
The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping pliers	Model	Crimping pliers
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.

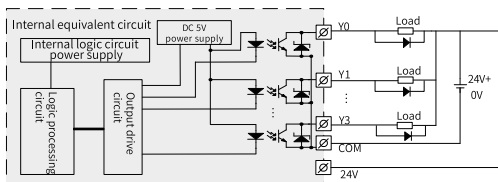


3.4.2 Terminal Definition



Name	Description
0	Y0 output
1	Y1 output
2	Y2 output
3	Y3 output
+24V	Input voltage
COM	Common terminal for output

3.4.3 Terminal Wiring



Note

Connect a flywheel diode when connecting the external inductive load. Diodes can be 1N4001 or similar.

3.4.4 Cable Connection

Select tubular cables referring to ["3.4.1 Cable Selection" on page 42](#) and insert the cables into the input and output ports.

3.5 Programming Examples

3.5.1 Autoshop Programing (When used with Easy523)

Note:

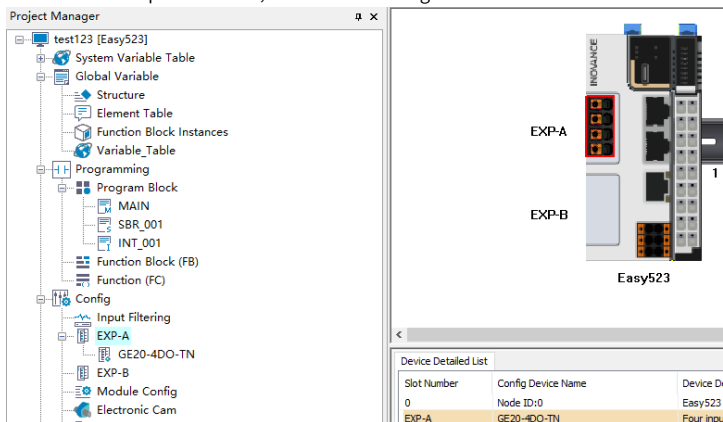
The type ID of the GE20-4DO-TN expansion card is 5. The configured expansion card type must be consistent with the actually installed expansion card type.

You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

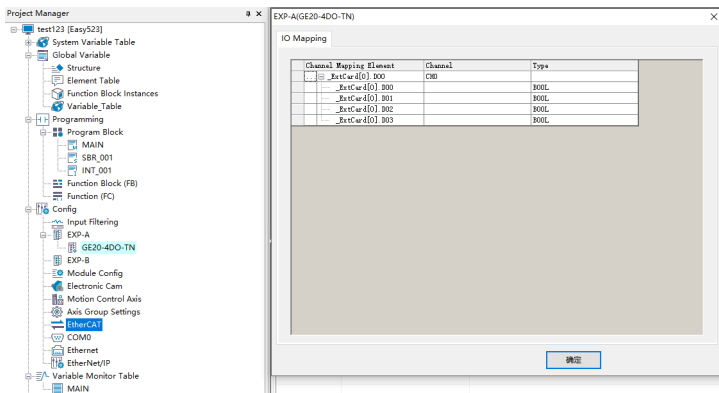
Operating procedure:

1. Create a project.

- In the **Project Manager**, go to **Config**, right-click on EXP-A or EXP-B and select "GE20-4DO-TN", or right-click on **Module Config** and select "Auto Scan" to add the GE20-4DO-TN expansion card, as shown in the figure below.



- Double-click "GE20-4DO-TN" to configure the channel I/O mapping of the GE20-4DO-TN expansion card (by default it is mapped to the system variable "_ExtCard"), or double-click  to map the channel I/O to the X element that is not currently occupied. Click **OK** after the configuration is completed, as shown in the following figure.



4. After successful compiling, download the project and run it.

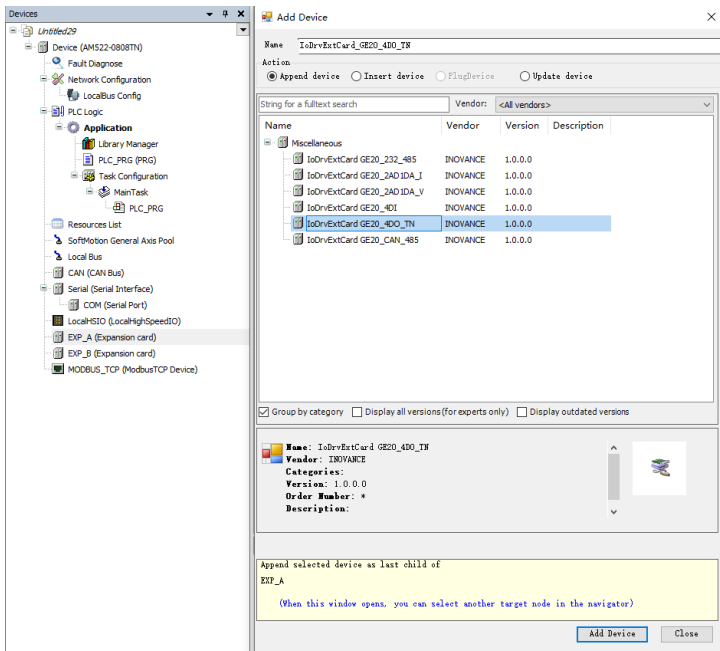
3.5.2 InoProShop Programing (When used with AM522)

Note:

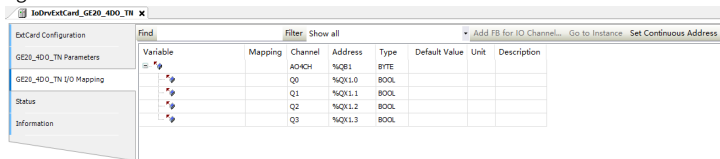
The configured expansion card type must be consistent with the actually installed expansion card type.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-A" or "EXP-B" according to installation position of the expansion card and select **Add Device**.
3. In the **Add Device** pop-up dialog, select "GE20_4DO_TN" and click **Add Device**, as shown in the figure below.



- Double click on "GE20_4DO_TN" to open the configuration page.
- Configure the I/O mapping of the GE20_4DO_TN expansion card, as shown in the figure below.



- After successful compiling, download the project and run it.

4 GE20-4DI Digital Input Expansion Card User Guide

4.1 Preface

■ About this Guide

Thank you for purchasing the GE20-4DI expansion card independently developed and produced by Inovance Technology. The GE20-4DI digital input expansion card can be used with Easy300/Easy500/AM300/AM500 series PLCs and supports 4-channel digital input.

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-4DI Digital Input Expansion Card User Guide	PS00006440	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections
September 2023	A04	Minor corrections
July 2023	A03	Added <i>"4.5.2 InoProShop Programing (When used with AM522)" on page 61.</i>

Date	Version	Revision
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install InoHome app. In this app, you can search and can download the guide.



■ Warranty Agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail. For details, see Product Warranty Card.

4.2 Product Information

4.2.1 Model and Nameplate

■ Model description

$$\begin{array}{c} \text{GE20} - \text{4DI} \\ \text{①} \qquad \text{②} \end{array}$$

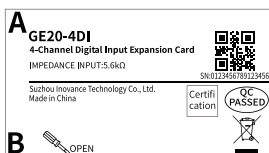
① Product Series

GE20 series general-purpose expansion card

② Product Code

4-channel digital input card

■ Nameplate

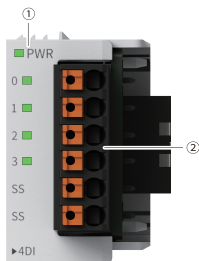


Note

The letters "A" and "B" on the nameplate indicate that the card slots A and B of the PLC are supported.

Model	Description	Code
GE20-4DI	GE20 series 4-channel digital input card	01480032

4.2.2 Components



No.	Component	Mark	Definition	Indicator color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
	Input indicator	0, 1, 2, 3	Input status display	Yellow green	ON when input is active.
②	User terminals	-	-	-	See details in "4.4.2 Terminal Definition" on page 58.

4.2.3 Product Specifications

4.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	69.5 mm × 29.5 mm × 23 mm
Weight	Approx. 17 g

4.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	40 mA (typical@5 V)

Item	Specification
Input short-circuit protection	Supported
Hot swap	Not supported

4.2.3.3 Input Specifications

Item		Specification
Input type		Digital input
Number of input channels		4
Input mode		Sink/Source
Input Voltage		24 VDC $\pm$ 10% (21.6 VDC to 26.4 VDC)
Normal input (0 to 3)	Input current at input ON	Input current >3.5 mA
	Input current at input OFF	Input current <1.5 mA
	Input response time	Approx. 15 ms (hardware RC filter time)
	Input impedance	5.6 k Ω
ON voltage		$\geq$ 15 VDC
OFF voltage		$\leq$ 5 VDC
Software filter time		Not supported
Isolation method		Optocoupler isolation
Common terminal mode		4-point/common terminal (The polarity +/- of input power supply is changeable.)
Input action display		The input indicator lights up (controlled by hardware) when the input is in drive state.

4.3 Mechanical Installation

4.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

4.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



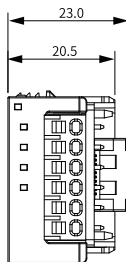
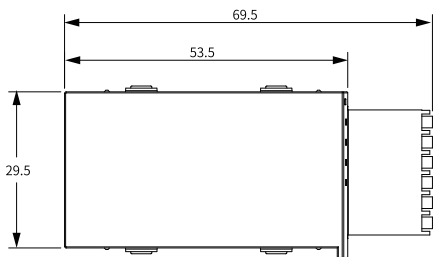
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

4.3.3 Mounting Dimensions

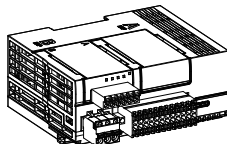
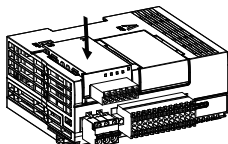
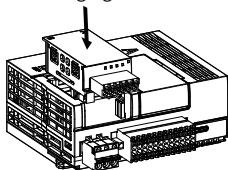
The mounting dimensions (in mm) are shown in the figure below.



4.3.4 Installation Method

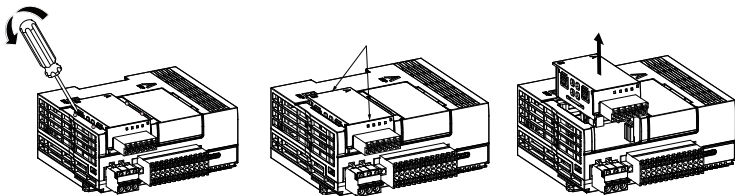
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot A or B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



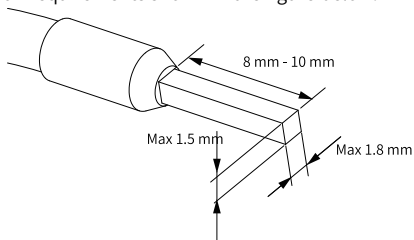
4.4 Electrical Installation

4.4.1 Cable Selection

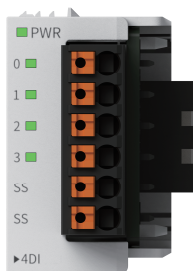
The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping pliers	Model	Crimping pliers
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.



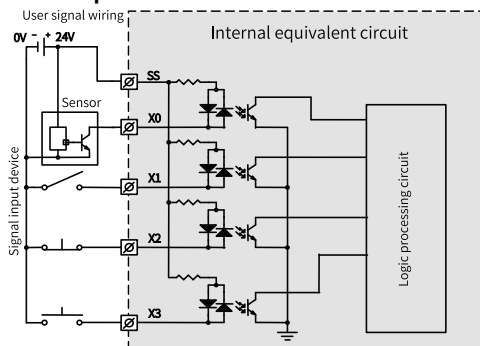
4.4.2 Terminal Definition



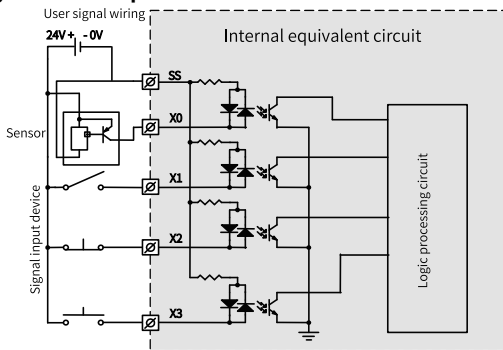
Name	Description
0	X0 input
1	X1 input
2	X2 input
3	X3 input
SS	Common terminal for input
SS	Common terminal for input

4.4.3 Terminal Wiring

■ Wiring of sink input



■ Wiring of source input



4.4.4 Cable Connection

Select tubular cables referring to ["4.4.1 Cable Selection" on page 57](#) and insert the cables into the input ports.

4.5 Programming Examples

4.5.1 Autoshop Programing (When used with Easy523)

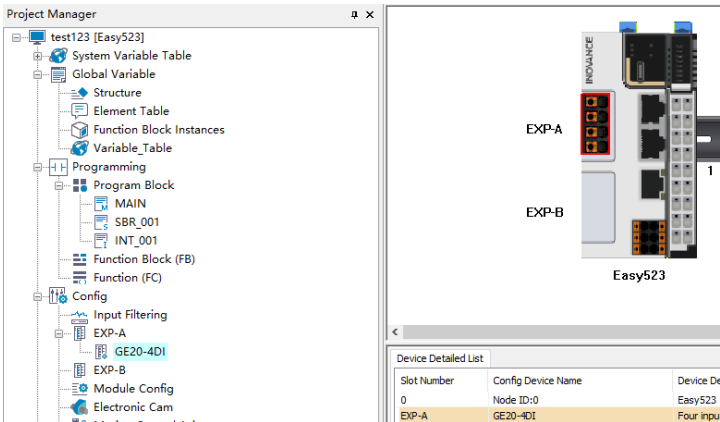
Note:

The type ID of the GE20-4DI expansion card is 13. The configured expansion card type must be consistent with the actually installed expansion card type.

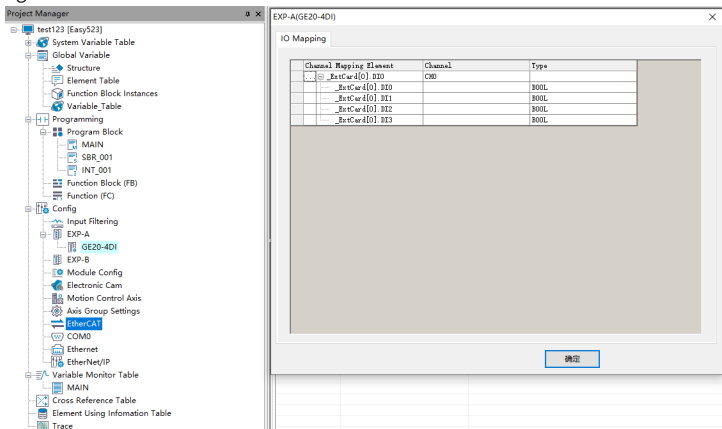
You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

Operating procedure:

1. Create a project.
2. In the **Project Manager**, go to **Config**, right-click on EXP-A or EXP-B and select "GE20-4DI", or right-click on **Module Config** and select "Auto Scan" to add the GE20-4DI expansion card, as shown in the figure below.



3. Double-click “GE20-4DI” to configure the channel I/O mapping of the GE20-4DI expansion card (by default it is mapped to the system variable “_ExtCard”), or double-click to map the channel I/O to the X element that is not currently occupied. Click **OK** after the configuration is completed, as shown in the following figure.



4. After successful compiling, download the project and run it.

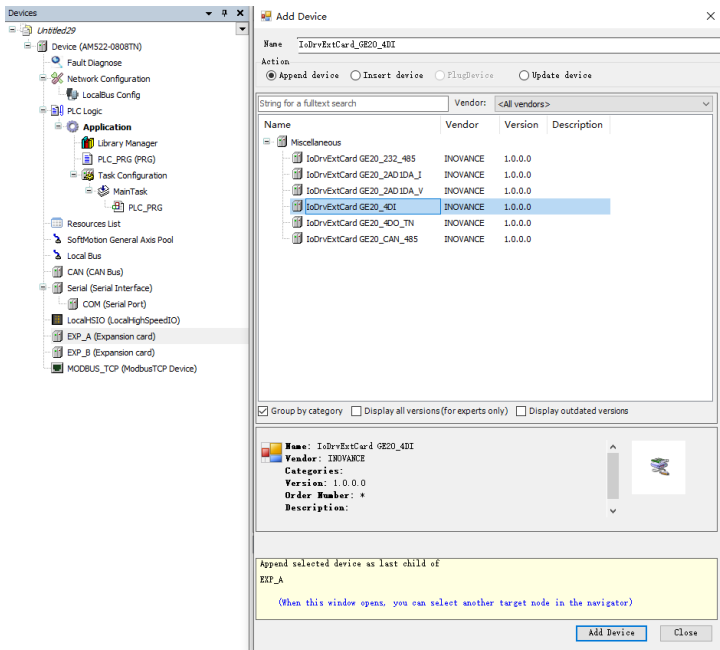
4.5.2 InoProShop Programing (When used with AM522)

Note:

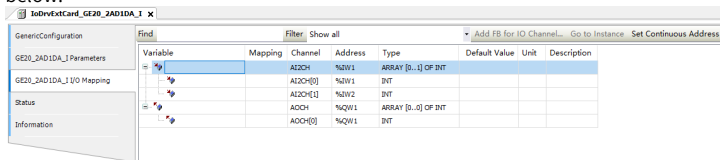
The configured expansion card type must be consistent with the actually installed expansion card type.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-A" or "EXP-B" according to installation position of the expansion card and select **Add Device**.
3. In the **Add Device** pop-up dialog, select "GE20_4DI" and click **Add Device**, as shown in the figure below.



- Double click on "GE20_4DI" to open the configuration page.
- Configure the I/O mapping of the GE20_4DI expansion card, as shown in the figure below.



- After successful compiling, download the project and run it.

5 GE20-2AD1DA-V Analog Input and Output

Voltage-Type Expansion Card User Guide

5.1 Preface

■ About this Guide

Thank you for purchasing the GE20-2AD1DA-V analog input and output expansion card independently developed and produced by Inovance Technology. The GE20-2AD1DA-V can be use with Easy300/Easy500/AM300/AM500 series PLC and supports two analog inputs and one analog output (voltage type).

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-2AD1DA-V Analog Input and Output Voltage-Type Expansion Card User Guide	PS00006441	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Added the following sections: <i>"Appendix: Configuring Communication with Master" on page 82</i> Modified the following sections: <i>"5.2.3.5 Other Specifications" on page 71</i>
October 2023	A05	Minor corrections
September 2023	A04	Modified terminal wiring diagram in <i>"5.4.3 Terminal Wiring" on page 75.</i>
July 2023	A03	Added <i>"5.5.2 InoProShop Programming (When used with AM522)" on page 79.</i>
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install the app, where you can search for and download manuals.



■ Warranty agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

5.2 Product Information

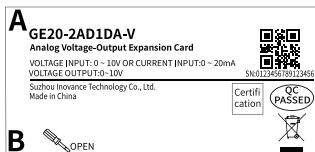
5.2.1 Model and Nameplate

■ Model description

GE20 – 2AD1DA – V
① ② ③

① Product Series GE20 series general-purpose expansion card	③ Product Code Voltage type
② Product Code Expansion card with two analog inputs and one analog output	-

■ Nameplate

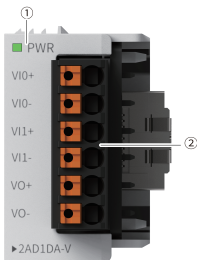


Note

The letters "A" and "B" on the nameplate indicate that the card slots A and B of the PLC are supported.

Model	Description	Code
GE20-2AD1DA-V	GE20 series expansion card with two analog inputs and one analog output (voltage type)	01480028

5.2.2 Components



No.	Component	Mark	Definition	Indicator Color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
②	User terminals	-	-	-	See details in "5.4.2 Terminal Definition" on page 75.

5.2.3 Product Specifications

5.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	69.5 mm × 29.5 mm × 23 mm
Weight	Approx. 18 g

5.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	65 mA (typical@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

5.2.3.3 Input Specifications

Item	Specification
Number of input channels	2
Voltage input range	0 V to 10 V
Voltage input impedance	>200 kΩ
Conversion speed	6 ms/channel
Current input range	0 mA to 20 mA
Current sampling impedance	250 Ω

Item	Specification
Input accuracy (room temperature: 25°C)	Voltage: $\pm 1\%$, current: $\pm 1\%$ (full range)
Input accuracy (full temperature range)	Voltage: $\pm 3\%$, current: $\pm 3\%$ (full range)
Input signal frequency	<10 Hz
Resolution	12bit
Digital output	0 to 20000

5.2.3.4 Output Specifications

Item	Specification
Number of output channels	1
Output voltage range	0 V to 10 V
Output voltage load	>2 k Ω
Conversion speed	1 ms
Output accuracy (room temperature: 25°C)	$\pm 1\%$ (full scale)
Output accuracy (full temperature range)	$\pm 5\%$ (full scale)
Resolution	12bit
Digital output	0 to 20000

5.2.3.5 Other Specifications

Item	Specification
Sampling cycle	1 ms
Communication cycle with PLC	The expansion card with firmware version lower than V2.3 only supports normal mode, while the expansion card with firmware version of V2.3 and above support both high speed mode and normal mode. You can set the communication mode in AutoShop software. For details, see "Appendix: Configuring Communication with Master" on page 82 ● High speed mode: ≤ 6 ms (Modification of channel mapping elements is not supported) ● Normal mode: ≤ 20 ms (Modification of channel mapping elements is supported)
Isolation method	Non-isolation
Output short-circuit detection	Not supported
Output open-circuit detection	Not supported

5.3 Mechanical Installation

5.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)

Item	Specification
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

5.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



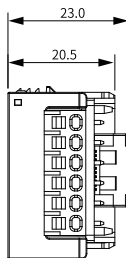
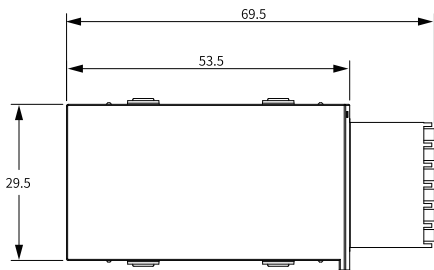
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

5.3.3 Mounting Dimensions

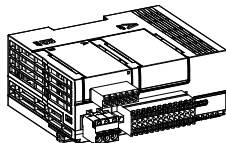
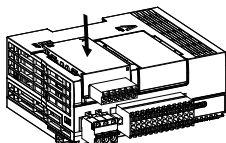
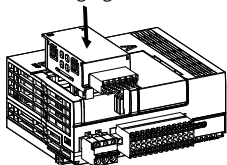
The mounting dimensions (in mm) are shown in the figure below.



5.3.4 Installation Method

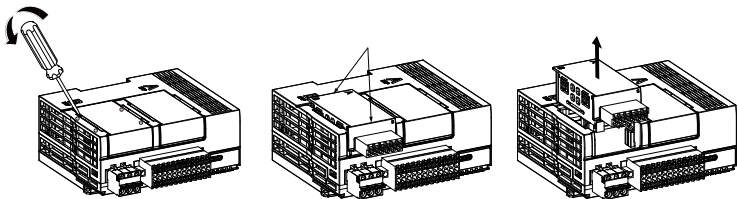
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot A or B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



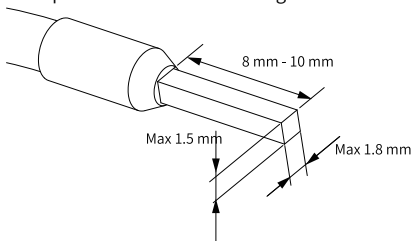
5.4 Electrical Installation

5.4.1 Cable Selection

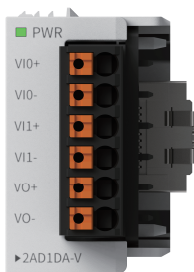
The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping pliers	Model	Crimping pliers
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.



5.4.2 Terminal Definition



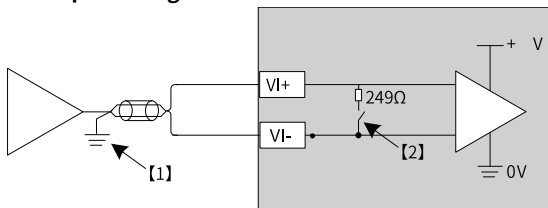
Name	Description
VI0+	Voltage/Current channel 0 input+
VI0-	Voltage/Current channel 0 input-
VI1+	Voltage/Current channel 1 input+
VI1-	Voltage/Current channel 1 input-
VO+	Voltage channel output +
VO-	Voltage channel output-

5.4.3 Terminal Wiring

■ Wiring Precautions

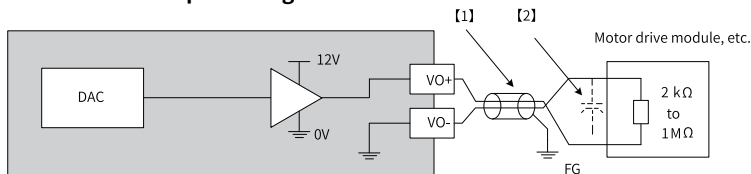
- Do not bundle the extension cable together with power cables (high voltage, large current) which produce strong interference signals; otherwise, it may be influenced by noise, surge and induction. Separate it from other cables and avoid cabling in parallel.
- Select recommended cables for connection. It is recommended that shielded cables be used as extension cables to enhance capacity of resisting interference.
- Apply single-point grounding for the shielding of shielded cable and solder sealed cable.

External input wiring



- [1]: Use 2-core shielded twisted pair cable for analog signal.
- [2]: Current input is provided when the switch is closed, which is controlled by the software.

External output wiring



- [1]: Use 2-core shielded twisted pair cable as power cable.
- [2]: If noises or ripples are generated in external wiring, connect a capacitor of 0.1 to 0.47mF25V between terminals VO+ and VO-.

5.4.4 Cable Connection

Select tubular cables referring to ["5.4.1 Cable Selection" on page 74](#) and insert the cables into the input and output ports.

5.5 Programming Examples

5.5.1 Autosnap Programming (When used with Easy523)

Note:

The type ID of the GE20-2AD1DA-V expansion card is 3. The configured expansion card type must be consistent with the actually installed expansion card type.

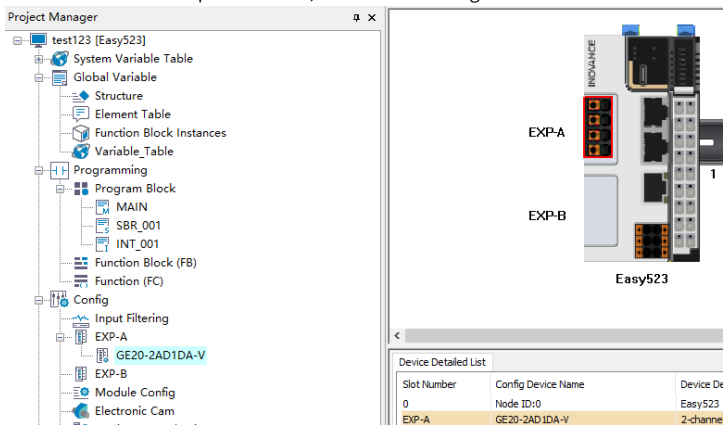
You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

Introduction:

In this section, Easy523 is used as the control module. As an example, we assign the input voltage of channel-0 (AD) of the GE20-2AD1DA-V expansion card to the corresponding variable, and convert the corresponding variable value of channel-2 (DA) to the output voltage.

Operating procedure:

1. Create a project.
2. In the **Project Manager**, go to **Config**, right-click on EXP-A or EXP-B and select "GE20-2AD1DA-V", or right-click on **Module Config** and select "Auto Scan" to add the GE20-2AD1DA-V expansion card, as shown in the figure below.



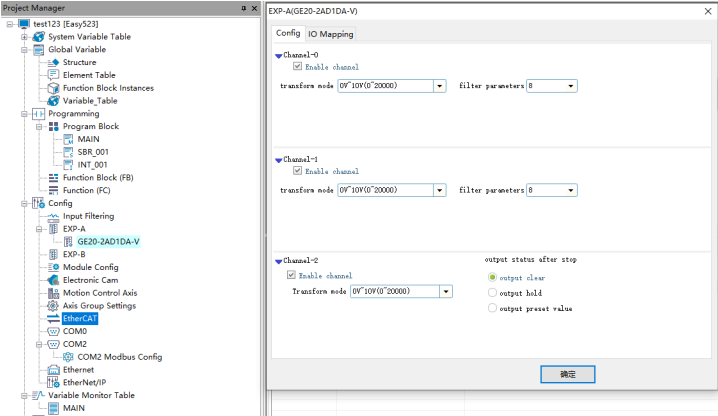
The screenshot displays the 'Project Manager' window on the left, showing a project named 'test123 [Easy523]'. The 'Config' section is expanded, showing 'EXP-A' and 'GE20-2AD1DA-V' selected. The right side of the image shows a hardware rack diagram with 'EXP-A' and 'EXP-B' slots, and a 'Device Detailed List' table at the bottom.

Slot Number	Config Device Name	Device De
0	Node ID:0	Easy523
EXP-A	GE20-2AD1DA-V	2-channel

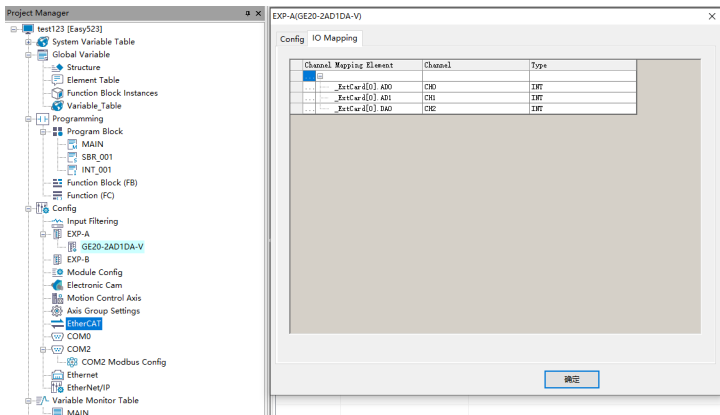
Note

The PLC and the GE20-2AD1DA-V expansion card communicate through the serial port. After the addition of the expansion card, the corresponding serial port configuration will be automatically generated. The serial port configuration of the GE20-2AD1DA-V expansion card is “COM2” when the card is installed in expansion slot A (EXP-A) and “COM3” when the card is installed in expansion slot B (EXP-B).

3. Double-click "GE20-2AD1DA-V". In the **Config** tab, Check **Enable channel** for channels I and II, configure “transfer mode”, “filter parameters” and “output status after stop” as required, as shown in the following figure.



4. (Optional) Click the IO Mapping tab and you can view the channel mapping elements in the IO Mapping interface. The channels are mapped into the system variable "_ExtCard", as shown in the following figure.



Note

AutoShop V4.8.1.0 and above does not support the modification of channel mapping elements. To modify the element, do as follows in AutoShop earlier than V4.8.1.0:

Double-click  to map the channel I/O to an element that is currently unoccupied.

5. After successful compiling, download the project and run it.

5.5.2 InoProShop Programing (When used with AM522)

Note:

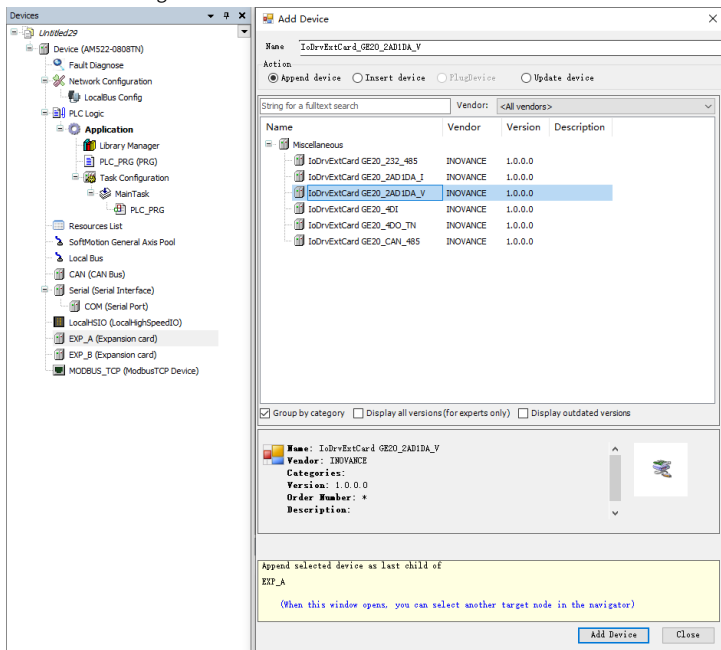
The configured expansion card type must be consistent with the actually installed expansion card type.

Introduction:

In this section, AM522 is used as the control module. As an example, we assign the input voltage of channel-0 (AD) of the GE20_2AD1DA_V expansion card to the corresponding variable, and convert the corresponding variable value of channel-2 (DA) to the output voltage.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-A" or "EXP-B" according to installation position of the expansion card and select **Add Device**.
3. In the **Add Device** pop-up dialog, select "GE20_2AD1DA_V" and click **Add Device**, as shown in the figure below.



4. Double click on "GE20_2AD1DA_V" to open the configuration page.
 - In the **Config** tab, check **Enable channel** for channels, configure "transfer mode", "filter parameters" and "output status after stop" as needed, as shown in the following figure.

IoDrvExtCard_GE20_2AD1DA_V

GenericConfiguration

GE20_2AD1DA_V Parameters

GE20_2AD1DA_V I/O Mapping

Status

Information

Access - AD0

☒ Enable access

AD Conversion Mode: 0V~10V(0~20000) Filter Parameter: 8

Access - AD1

☒ Enable access

AD Conversion Mode: 0V~10V(0~20000) Filter Parameter: 8

Access - DA

☒ Enable access

DA Conversion Mode: 0V~10V(0~20000)

Output After Stop/Offline

☒ Output zero

☐ Output last value

☐ Output preset value

Parameter	Description	Value Option/Range	Default
Enable access	Check this option to enable the channel.	- Check - Uncheck	Check
Transfer mode (AD)	Select the transfer mode as needed	0 V to 10 V 0 V to 5 V 1 V to 5 V 0 mA to 20 mA 4 mA to 20 mA	0 V to 10 V
Filter parameter	Filtering intensity	1 to 255	8
Transfer mode (DA)	Select the transfer mode as needed	0 V to 10 V 0 V to 5 V 1 V to 5 V	0 V to 10 V
Output status after stop	The way of output when the operation stops	- Output clear - Output hold - Output preset value	Output clear

- Configure the I/O mapping of the GE20_2AD1DA_V expansion card, as shown in the figure below.

IoDrvExtCard_GE20_2AD1DA_V

GenericConfiguration

GE20_2AD1DA_V Parameters

GE20_2AD1DA_V I/O Mapping

Status

Information

Find Filter Show all Add FB for IO Channel... Go to Instance Set Continuous Address

Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
		AI2CH	%IW1	ARRAY [0...1] OF INT			
		AI2CH[0]	%IW1	INT			
		AI2CH[1]	%IW2	INT			
		AOCH	%QW1	ARRAY [0...0] OF INT			
		AOCH[0]	%QW1	INT			

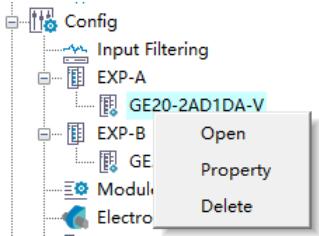
e. In the search results, double-click on "_ExtCard" to add it to monitoring variables.

f. Click  in the toolbar and view the current value of "SWVersion" (namely, firmware version of the expansion card). "_ExtCard[0]" indicates the slot A and "_ExtCard[1]" indicates the slot B of the PLC.

For example, the value "0x203" means that the firmware version of the expansion card in slot A is V2.3. In this case, the communication mode must be set to the high speed mode.

Element Name	Data Type	Display Format	Current Value	Address	Comment
1	ExtCard	EXT_CARD[0]		0x00000000	Extended Card Slot
2	ExtCard[0]	EXT_CARD		0x00000000	
3	ConfigModule	INT	Zero	0x00000000	Configure mod type
4	MountModule	INT	Zero	0x00000010	Card type installed
5	LogicVersion	INT	Zero	0x00000020	Logic Version
6	SWVersion	INT	0x203	0x00000030	Software Version
7	Error	BOOL	Min	0x00000040	Error Status
8	DI0	BOOL	Min	0x00000050	432 Card 310
9	DI1	BOOL	Min	0x00000060	432 Card 311
10	DI2	BOOL	Min	0x00000070	432 Card 312
11	DI3	BOOL	Min	0x00000080	432 Card 320
12	DO0	BOOL	Min	0x00000090	430 Card 300
13	DO1	BOOL	Min	0x00000091	430 Card 301
14	DO2	BOOL	Min	0x00000092	430 Card 302
15	DO3	BOOL	Min	0x00000093	430 Card 303
16	AO0	INT	Zero	0x000000A0	2401DA Card A00
17	AO1	INT	Zero	0x000000B0	2401DA Card A01
18	DA0	INT	Zero	0x000000C0	2401DA Card DA0
19	ConfigData	INT[16]		0x000000D0	Extension Cards Config Data
20	ExtCard[1]	EXT_CARD		0x00000000	
21	ConfigModule	INT	Zero	0x00000000	Configure card type
22	MountModule	INT	Zero	0x00000010	Card type installed
23	LogicVersion	INT	Zero	0x00000020	Logic Version
24	SWVersion	INT	Zero	0x00000030	Software Version
25	Error	BOOL	Min	0x00000040	Error Status
26	DI0	BOOL	Min	0x00000050	432 Card 310
27	DI1	BOOL	Min	0x00000060	432 Card 311
28	DI2	BOOL	Min	0x00000070	432 Card 312
29	DI3	BOOL	Min	0x00000080	432 Card 320
30	DO0	BOOL	Min	0x00000090	430 Card 300
31	DO1	BOOL	Min	0x00000091	430 Card 301
32	DO2	BOOL	Min	0x00000092	430 Card 302
33	DO3	BOOL	Min	0x00000093	430 Card 303
34	AO0	INT	Zero	0x000000A0	2401DA Card A00
35	AO1	INT	Zero	0x000000B0	2401DA Card A01
36	DA0	INT	Zero	0x000000C0	2401DA Card DA0
37	ConfigData	INT[16]		0x000000D0	Extension Cards Config Data

2. Right-click on the added expansion card and select "Property".



3. In the pop-up dialog, select "High speed mode (V2.3 and above support)" or "Normal mode" and then click **OK**.

Mode: ☒ High speed mode(V2.3 and above support)

☐ Normal mode

Ok

Cancel

Note

Modification of channel mapping elements is supported in normal mode, not in high-speed mode.

6 GE20-2AD1DA-I Analog Input and Output

Current-Type Expansion Card User Guide

6.1 Preface

■ About this Guide

Thank you for purchasing the GE20-2AD1DA-I current-type expansion card with analog input and output independently developed and produced by Inovance Technology. The GE20-2AD1DA-I can be use with Easy300/Easy500/AM300/AM500 series PLC and supports two analog inputs and one analog output (current type).

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-2AD1DA-I Analog Input and Output Current-Type Expansion Card User Guide	PS00006442	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Added the following sections: <i>"Appendix: Configuring Communication with Master" on page 82</i> Modified the following sections: <i>"6.2.3.5 Other Specifications" on page 93</i>
October 2023	A05	Minor corrections
September 2023	A04	Modified the external input/output wiring diagram in <i>"6.4.3 Terminal Wiring" on page 97.</i>
July 2023	A03	Minor corrections
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install the app, where you can search for and download manuals.



■ Warranty agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

6.2 Product Information

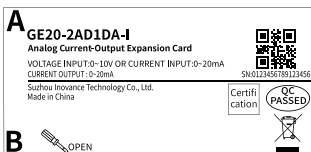
6.2.1 Model and Nameplate

■ Model description

GE20 - 2AD1DA - I
① ② ③

① Product Series GE20 series general-purpose expansion card	③ Product Code Current-type
② Product Code Expansion card with two analog inputs and one analog output	-

■ Nameplate

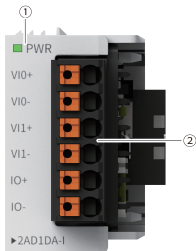


Note

The letters "A" and "B" on the nameplate indicate that the card slots A and B of the PLC are supported.

Model	Description	Code
GE20-2AD1DA-I	GE20 series expansion card with two analog inputs and one analog output (current type)	01480027

6.2.2 Components



No.	Component	Mark	Definition	Indicator color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
②	User terminals	-	-	-	See details in "6.4.2 Terminal Definition" on page 97.

6.2.3 Product Specifications

6.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	69.5 mm × 29.5 mm × 23 mm
Weight	Approx. 18 g

6.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	65 mA (max@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

6.2.3.3 Input Specifications

Item	Specification
Number of input channels	2
Voltage input range	0 V to 10 V
Voltage input impedance	>200 kΩ
Conversion speed	6 ms/channel
Current input range	0 mA to 20 mA
Current sampling impedance	250 Ω

Item	Specification
Input accuracy (room temperature: 25°C)	Voltage: $\pm 1\%$, current: $\pm 1\%$ (full range)
Input accuracy (full temperature range)	Voltage: $\pm 3\%$, current: $\pm 3\%$ (full range)
Input signal frequency	<10 Hz
Resolution	12bit
Digital output	0 to 20000

6.2.3.4 Output Specifications

Item	Specification
Number of output channels	1
Output current range	0 mA to 20 mA
Current output impedance	0 Ω to 500 Ω
Conversion speed	1 ms
Output accuracy (room temperature: 25°C)	$\pm 1\%$ (full scale)
Output accuracy (full temperature range)	$\pm 5\%$ (full scale)
Resolution	12bit
Digital output	0 to 20000

6.2.3.5 Other Specifications

Item	Specification
Sampling cycle	1 ms
Communication cycle with PLC	The expansion card with firmware version lower than V2.3 only supports normal mode, while the expansion card with firmware version of V2.3 and above support both high speed mode and normal mode. You can set the communication mode in AutoShop software. For details, see "Appendix: Configuring Communication with Master" on page 82 • High speed mode: ≤ 6 ms (Modification of channel mapping elements is not supported) • Normal mode: ≤ 20 ms (Modification of channel mapping elements is supported)
Isolation method	Non-isolation
Output short-circuit detection	Not supported
Output open-circuit detection	Not supported

6.3 Mechanical Installation

6.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)

Item	Specification
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

6.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



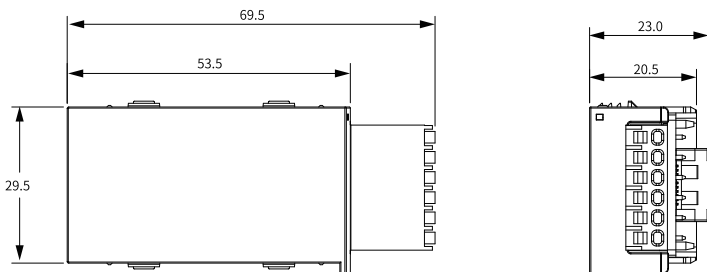
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

6.3.3 Mounting Dimensions

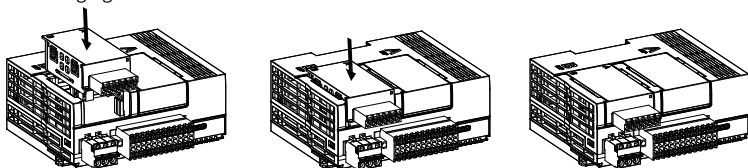
The mounting dimensions (in mm) are shown in the figure below.



6.3.4 Installation Method

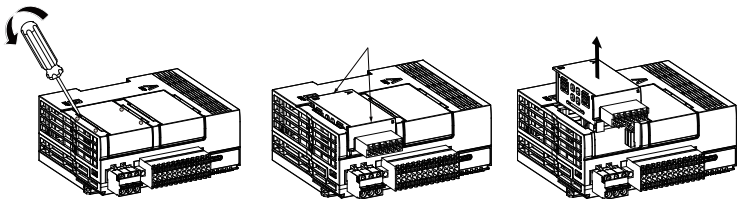
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot A or B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



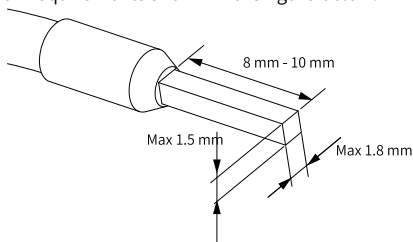
6.4 Electrical Installation

6.4.1 Cable Selection

The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping pliers	Model	Crimping pliers
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.



6.4.2 Terminal Definition



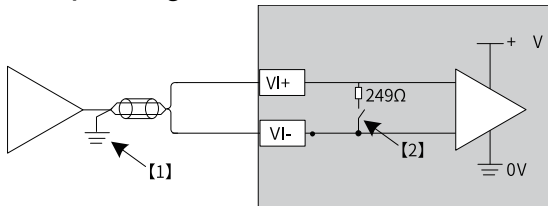
Name	Description
VI0+	Voltage/Current channel 0 input+
VI0-	Voltage/Current channel 0 input-
VI1+	Voltage/Current channel 1 input+
VI1-	Voltage/Current channel 1 input-
IO+	Current channel output+
IO-	Current channel output-

6.4.3 Terminal Wiring

■ Wiring Precautions

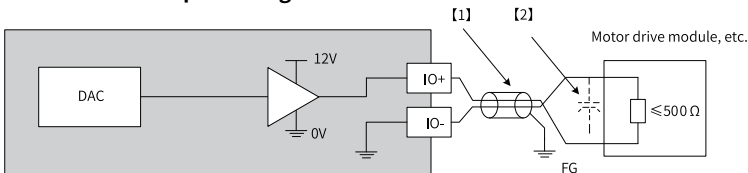
- Do not bundle the extension cable together with power cables (high voltage, large current) which produce strong interference signals; otherwise, it may be influenced by noise, surge and induction. Separate it from other cables and avoid cabling in parallel.
- Select recommended cables for connection. It is recommended that shielded cables be used as extension cables to enhance capacity of resisting interference.
- Apply single-point grounding for the shielding of shielded cable and solder sealed cable.

External input wiring



- [1]: Use 2-core shielded twisted pair cable for analog signal.
- [2]: Current input is provided when the switch is closed, which is controlled by the software.

External output wiring



- [1]: Use 2-core shielded twisted pair cable as power cable.
- [2]: If noises or ripples are generated in external wiring, connect a capacitor of 0.1 to 0.47mF25V between terminals V+/I+ and IO-.

6.4.4 Cable Connection

Select tubular cables referring to ["6.4.1 Cable Selection" on page 96](#) and insert the cables into the input and output ports.

6.5 Programming Examples

6.5.1 Autosnap Programming (When used with Easy523)

Note:

The type ID of the GE20-2AD1DA-I expansion card is 11. The configured expansion card type must be consistent with the actually installed expansion card type.

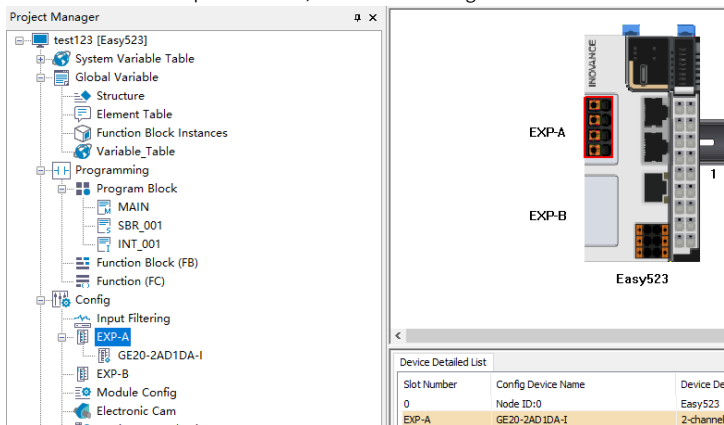
You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

Introduction:

In this section, Easy523 is used as the control module. As an example, we assign the input current of channel-0 (AD) of the GE20-2AD1DA-I expansion card to the corresponding variable, and convert the corresponding variable value of channel-2 (DA) to the output current.

Operating procedure:

1. Create a project.
2. In the **Project Manager**, go to **Config**, right-click on EXP-A or EXP-B and select "GE20-2AD1DA-I", or right-click on **Module Config** and select "Auto Scan" to add the GE20-2AD1DA-I expansion card, as shown in the figure below.

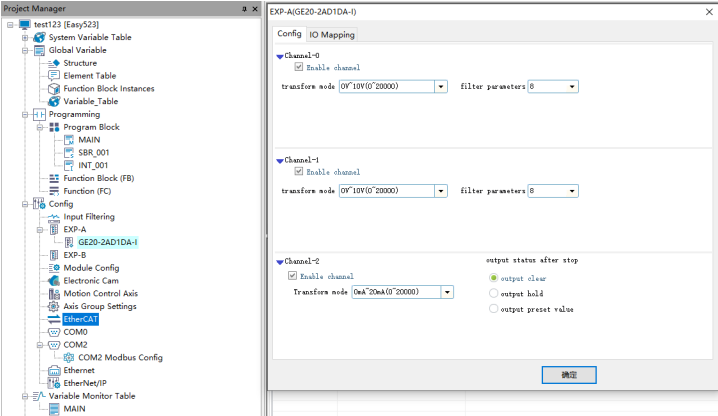


Device Detailed List		
Slot Number	Config Device Name	Device De
0	Node ID:0	Easy523
EXP-A	GE20-2AD1DA-I	2-channel

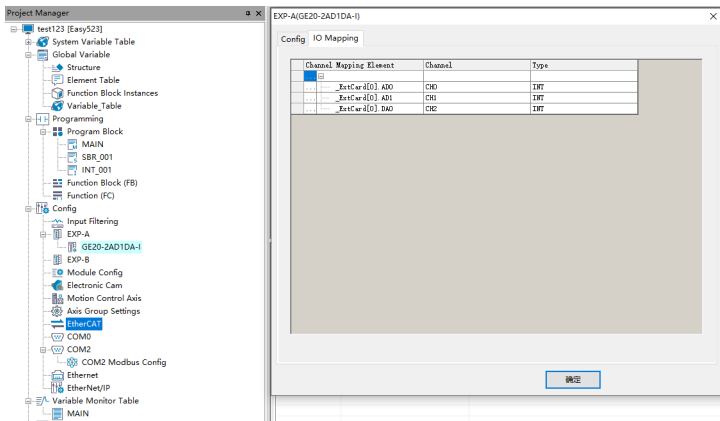
Note

The PLC and the GE20-2AD1DA-I expansion card communicate through the serial port. After the addition of the expansion card, the corresponding serial port configuration will be automatically generated. The serial port configuration of the GE20-2AD1DA-I expansion card is “COM2” when the card is installed in expansion slot A (EXP-A) and “COM3” when the card is installed in expansion slot B (EXP-B).

3. Double-click "GE20-2AD1DA-I". In the Config tab, Check Enable channel for channels I and III, configure "transfer mode", “filter parameters” and "output status after stop" as required, as shown in the following figure.



4. (Optional) Click the IO Mapping tab and you can view the channel mapping elements in the IO Mapping interface. The channels are mapped into the system variable "_ExtCard", as shown in the following figure.



Note

AutoShop V4.8.1.0 and above does not support the modification of channel mapping elements. To modify the element, do as follows in AutoShop earlier than V4.8.1.0:

Double-click  to map the channel I/O to an element that is currently unoccupied.

5. After successful compiling, download the project and run it.

6.5.2 InoProShop Programing (When used with AM522)

Note:

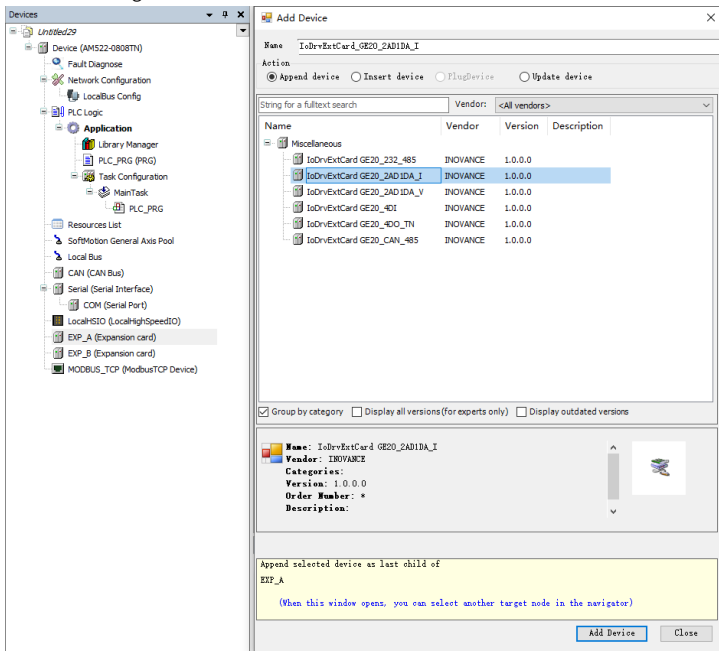
The configured expansion card type must be consistent with the actually installed expansion card type.

Introduction:

In this section, AM522 is used as the control module. As an example, we assign the input voltage of channel-0 (AD) of the GE20_2AD1DA_I expansion card to the corresponding variable, and convert the corresponding variable value of channel-2 (DA) to the output voltage.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-A" or "EXP-B" according to installation position of the expansion card and select **Add Device**.
3. In the **Add Device** pop-up dialog, select "GE20_2AD1DA_I" and click **Add Device**, as shown in the figure below.



4. Double click on "GE20_2AD1DA_I" to open the configuration page.
 - In the **Config** tab, check **Enable channel** for channels, configure "transfer mode", "filter parameters" and "output status after stop" as needed, as shown in the following figure.

IoDrvExtCard_GE20_2AD1DA_I

GenericConfiguration

GE20_2AD1DA_I Parameters

GE20_2AD1DA_I I/O Mapping

Status

Information

Access - AD0

☒ Enable access

AD Conversion Mode: 0V~10V(0~20000) Filter Parameter: 8

Access - AD1

☒ Enable access

AD Conversion Mode: 0V~10V(0~20000) Filter Parameter: 8

Access - DA

☒ Enable access

DA Conversion Mode: 0mA~20mA(0~20000)

Output After Stop/Offline

☒ Output zero

☐ Output last value

☐ Output preset value

Parameter	Description	Value Option/Range	Default
Enable access	Check this option to enable the channel.	- Check - Uncheck	Check
Transfer mode (AD)	Select the transfer mode as needed	0 V to 10 V 0 V to 5 V 1 V to 5 V 0 mA to 20 mA 4 mA to 20 mA	0 V to 10 V
Filter parameter	Filtering intensity	1 to 255	8
Transfer mode (DA)	Select the transfer mode as needed	0 mA to 20 mA 4 mA to 20 mA	0 mA to 20 mA
Output status after stop	The way of output when the operation stops	- Output clear - Output hold - Output preset value	Output clear

- Configure the I/O mapping of the GE20_2AD1DA_I expansion card, as shown in the figure below.

IoDrvExtCard_GE20_2AD1DA_I

GenericConfiguration

GE20_2AD1DA_I Parameters

GE20_2AD1DA_I I/O Mapping

Status

Information

Find Filter Show all Add FB for IO Channel... Go to Instance Set Continuous Address

Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
		AI2CH	%IW1	ARRAY [0...1] OF INT			
		AI2CH[0]	%IW1	INT			
		AI2CH[1]	%IW2	INT			
		AOCH	%QW1	ARRAY [0...0] OF INT			
		AOCH[0]	%QW1	INT			

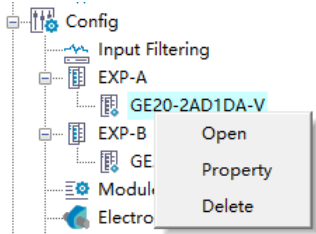
e. In the search results, double-click on "_ExtCard" to add it to monitoring variables.

f. Click  in the toolbar and view the current value of "SWVersion" (namely, firmware version of the expansion card). "_ExtCard[0]" indicates the slot A and "_ExtCard[1]" indicates the slot B of the PLC.

For example, the value "0x203" means that the firmware version of the expansion card in slot A is V2.3. In this case, the communication mode must be set to the high speed mode.

Element Name	Data Type	Display Format	Current Value	Address	Comment
1	ExtCard	EXT_CARD[0]		0x00000000	Extended Card Slot
2	ExtCard[0]	EXT_CARD		0x00000000	
3	ConfigModule	INT	Zero	0x00000000	Configure mod type
4	MountModule	INT	Zero	0x00000010	Card type installed
5	LogicVersion	INT	Zero	0x00000020	Logic Version
6	SWVersion	INT	Hex 0x203	0x00000030	Software Version
7	Error	BOOL	Min	0x00000040	Error Status
8	IO1	BOOL	Min	0x00000050	432 Card 310
9	IO2	BOOL	Min	0x00000060	432 Card 311
10	IO3	BOOL	Min	0x00000070	432 Card 312
11	IO4	BOOL	Min	0x00000080	432 Card 313
12	DO0	BOOL	Min	0x00000090	430 Card 300
13	DO1	BOOL	Min	0x00000091	430 Card 301
14	DO2	BOOL	Min	0x00000092	430 Card 302
15	DO3	BOOL	Min	0x00000093	430 Card 303
16	AO0	INT	Zero	0x000000A0	2401DA Card A00
17	AO1	INT	Zero	0x000000B0	2401DA Card A01
18	DA0	INT	Zero	0x000000C0	2401DA Card DA0
19	ConfigData	INT[16]		0x000000D0	Retention Cards Config Data
20	ExtCard[1]	EXT_CARD		0x00000000	
21	ConfigModule	INT	Zero	0x00000000	Configure card type
22	MountModule	INT	Zero	0x00000010	Card type installed
23	LogicVersion	INT	Zero	0x00000020	Logic Version
24	SWVersion	INT	Zero	0x00000030	Software Version
25	Error	BOOL	Min	0x00000040	Error Status
26	IO1	BOOL	Min	0x00000050	432 Card 310
27	IO2	BOOL	Min	0x00000060	432 Card 311
28	IO3	BOOL	Min	0x00000070	432 Card 312
29	IO4	BOOL	Min	0x00000080	432 Card 313
30	DO0	BOOL	Min	0x00000090	430 Card 300
31	DO1	BOOL	Min	0x00000091	430 Card 301
32	DO2	BOOL	Min	0x00000092	430 Card 302
33	DO3	BOOL	Min	0x00000093	430 Card 303
34	AO0	INT	Zero	0x000000A0	2401DA Card A00
35	AO1	INT	Zero	0x000000B0	2401DA Card A01
36	DA0	INT	Zero	0x000000C0	2401DA Card DA0
37	ConfigData	INT[16]		0x000000D0	Retention Cards Config Data

2. Right-click on the added expansion card and select "Property".



3. In the pop-up dialog, select "High speed mode (V2.3 and above support)" or "Normal mode" and then click **OK**.

Mode: ☒ High speed mode(V2.3 and above support)

☐ Normal mode

Ok

Cancel

Note

Modification of channel mapping elements is supported in normal mode, not in high-speed mode.

7 GE20-232/485 Communication Expansion

Card User Guide

7.1 Preface

■ About this Guide

Thank you for purchasing the GE20-232/485 communication expansion card independently developed and produced by Inovance Technology. The GE20-232/485 can be used with Easy300/Easy500/AM300/AM500 series PLCs and supports one channel of RS485 or RS232 communication.

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-232/485 Communication Expansion Card User Guide	PS00006437	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections
September 2023	A04	Minor corrections

Date	Version	Revision
July 2023	A03	Added <i>"7.5.2 InoProShop Programing (When used with AM522)" on page 121.</i>
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install InoHome app. In this app, you can search and can download the guide.



■ Warranty Agreement

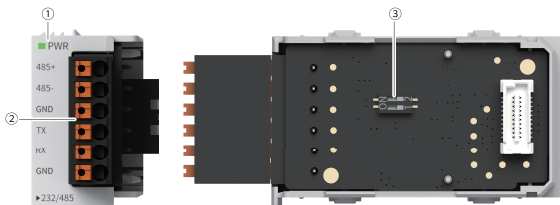
Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.

Model	Description	Code
GE20-232/485	GE20 series RS232 or RS485 communication card	01480029

7.2.2 Components



No.	Component	Mark	Definition	Indicator color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
②	User terminals	-	-	-	See details in "7.4.2 Terminal Definition" on page 117.
③	RS485 DIP switch	1, 2	Used to control the termination resistor.	-	The RS485 DIP switch is set to OFF by default, i.e. at positions 1 and 2. To turn on the switch, toggle it to position ON using tools such as forceps.

7.2.3 Product Specifications

7.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	69.5 mm × 29.5 mm × 23 mm
Weight	Approx. 17 g

7.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	60 mA (typical@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

7.2.3.3 Communication Specifications

Item		Specification
RS485	Number of channels	1
	Isolation method	Non-isolation
	Termination resistor	With termination resistor, which can be controlled by DIP switch. The switch is set to OFF by default, in which case the termination resistor is not connected.
	Number of slaves	Up to 31 slaves (The length of each slave branch must be shorter than 3 m.)
	Baud rate	9.6 kbit/s, 19.2 kbit/s, 38.4 kbit/s, 57.6 kbit/s, 115.2 kbit/s
	Communication distance	• Transmission distance <100 m at a rate of 115.2 kbit/s • Transmission distance <1000 m at a rate of 19.2 kbit/s
RS232	Number of channels	1
	Isolation method	Non-isolation
	Baud rate	9.6 kbit/s, 19.2 kbit/s, 38.4 kbit/s, 57.6 kbit/s, 115.2 kbit/s

7.3 Mechanical Installation

7.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

7.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



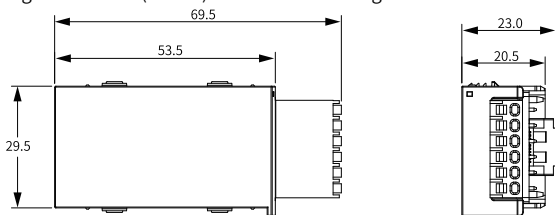
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

7.3.3 Mounting Dimensions

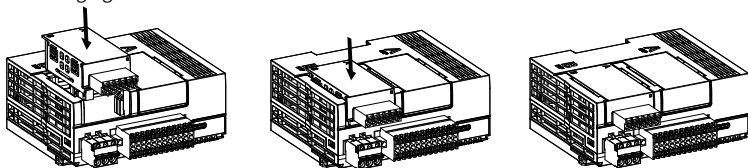
The mounting dimensions (in mm) are shown in the figure below.



7.3.4 Installation Method

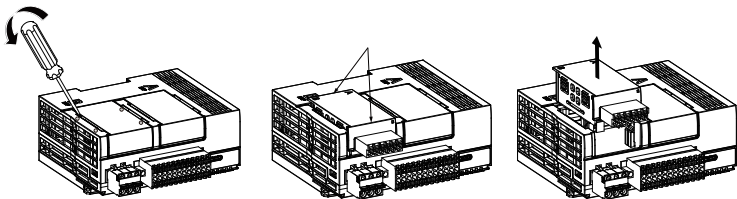
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot A or B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



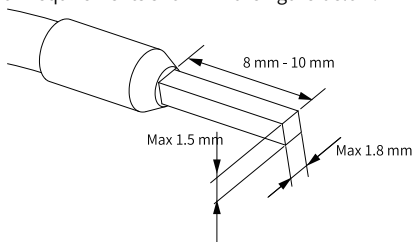
7.4 Electrical Installation

7.4.1 Cable Selection

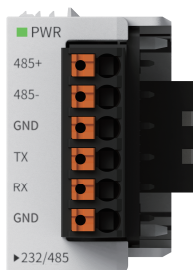
The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping pliers	Model	Crimping pliers
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.



7.4.2 Terminal Definition



Name	Description
RS485+	RS485 communication signal+
RS485-	RS485 communication signal-
GND	RS485 communication GND
TX	RS232 signal transmission
RX	RS232 signal reception
GND	RS485 communication GND

7.4.3 RS485 Communication

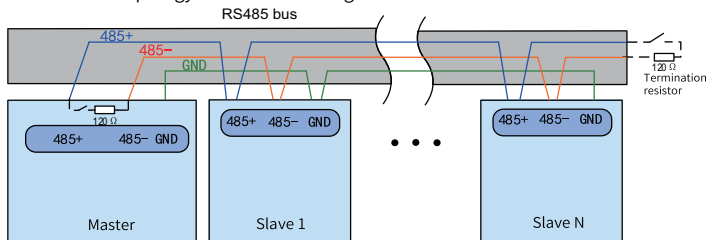


Caution

- Do not bundle the extension cable together with power cables (high voltage, large current) which produce strong interference signals. Separate it from other cables and avoid cabling in parallel.
- Select recommended cables and pinboards for connection. It is recommended that shielded cables be used as extension cables to enhance capacity of resisting interference.

It is recommended to use a shielded twisted pair cable for the RS485 bus. Connect a 120 Ω termination resistor to both ends of the bus respectively to prevent signal reflection. Connect the signal reference grounds of all nodes together. Up to 31 nodes can be connected and the distance between nodes must be less than 3 m.

The RS485 bus topology is shown in the figure below.

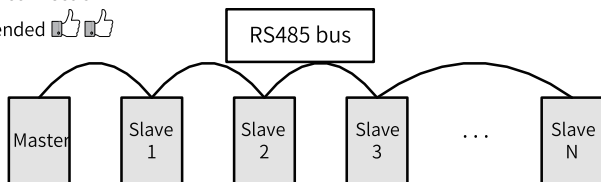


Multi-node connection

In case of a large number of nodes, connect the RS485 bus using the daisy chain mode. If the branch line connection is used, the branch line length is as short as possible. The recommended length is shorter than 3 m. Star connections are prohibited. Common bus structures are shown in the following figures.

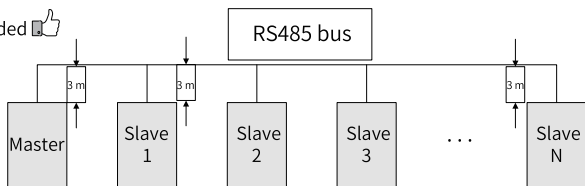
● Daisy chain connection

Recommended  



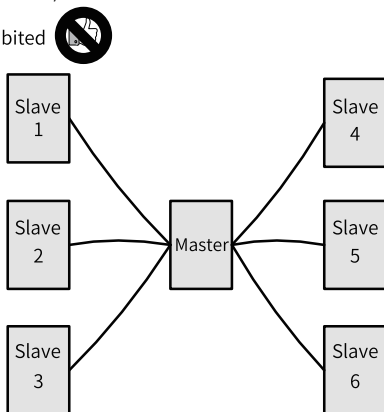
● Branch line connection

Recommended 



- Star connection (prohibited)

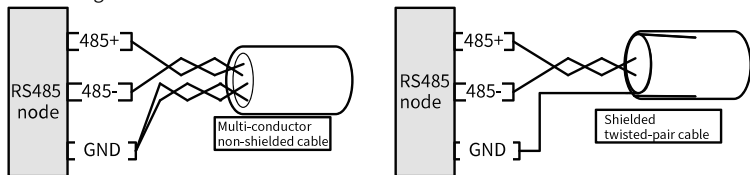
Prohibited 



■ Terminal wiring

Check whether there are three conductors in the RS485 bus and whether terminals are connected correctly. If a shielded cable is used, the shield must be connected to GND. Never connect the shield to any terminal except GND, including the drive housing and grounding terminal.

Given the effect of attenuation, it is recommended to use AWG26 or higher cables for connection longer than 3 m. Twisted pair cables are always recommended for connecting 485+ and 485-.



1. Recommended cable 1: Use multi-conductor twisted pair cables, with one twisted pair connected to 485+ and 485-, and others twisted together to connect GND.
2. Recommended cable 2: Use shielded twisted pair cables, with the twisted pair connected 485+ and 485-, and the shield connected to GND. In applications where shielded cables are used, the shield can be connected to GND only. Never connect the shield to the ground.

7.4.4 Cable Connection

Select tubular cables referring to ["7.4.1 Cable Selection" on page 116](#) and insert the cables into the communication ports.

7.5 Programming Examples

7.5.1 Autoshop Programing (When used with Easy523)

Note:

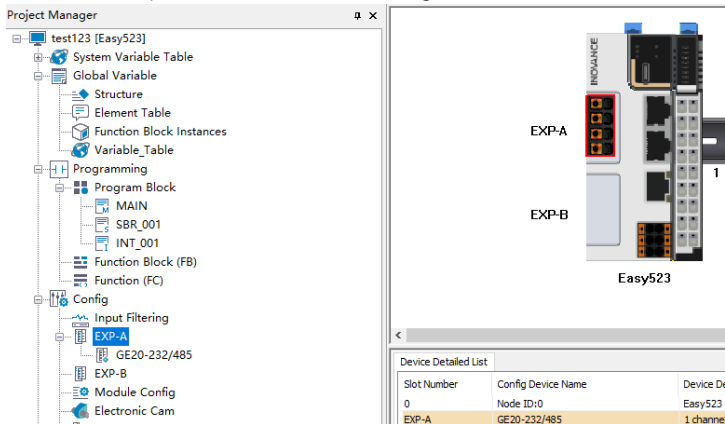
The type ID of the GE20-232/485 expansion card is 7. The configured expansion card type must be consistent with the actually installed expansion card type.

You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the

actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

Operating procedure:

1. Create a project.
2. In the **Project Manager**, go to **Config**, right-click on EXP-A or EXP-B and select "GE20-232/485", or right-click on **Module Config** and select "Auto Scan" to add the GE20-232/485 expansion card, as shown in the figure below.



3. For configuration of the serial communication, see the "Serial Communication > Slave Configuration" section in the "H5U&Easy Series Programmable Logic Controller Programming and Application Guide".
4. After successful compiling, download the project and run it.

7.5.2 InoProShop Programing (When used with AM522)

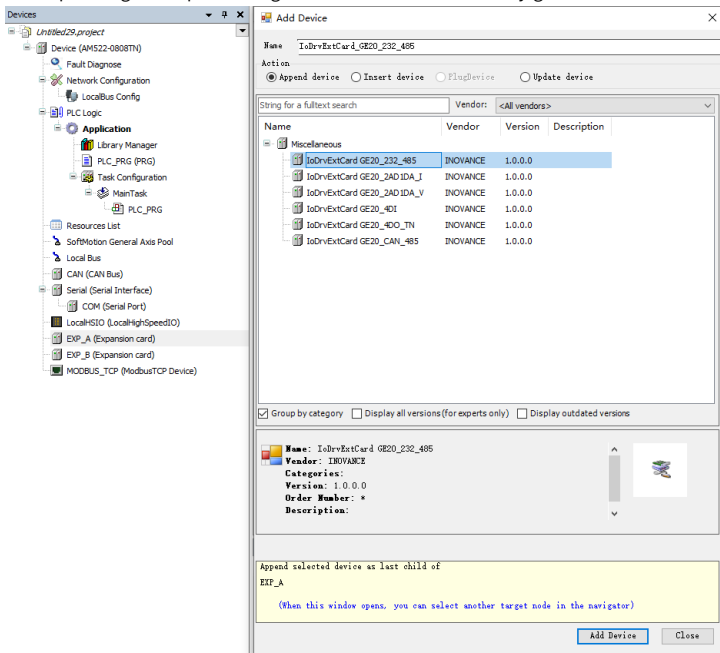
Note:

The configured expansion card type must be consistent with the actually installed expansion card type.

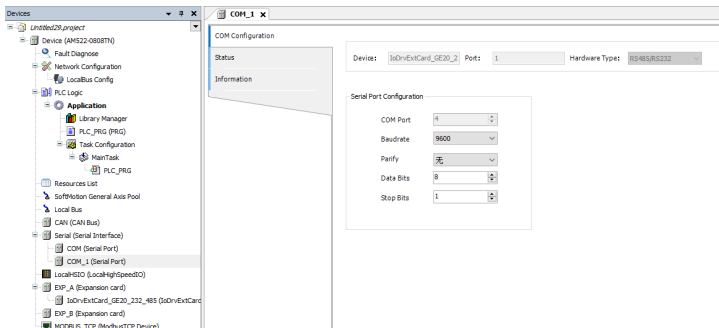
Operating procedure:

1. Create a project.

- In the **Devices** pane, right-click on "EXP-A" or "EXP-B" according to installation position of the expansion card and select **Add Device**.
- In the **Add Device** pop-up dialog, select "GE20_232_485" and click **Add Device**, as shown in the figure below. The PLC and the GE20_232_485 expansion card communicate through the serial port. After the addition of the expansion card, the corresponding serial port configuration will be automatically generated.



- Modify the serial port configuration as needed.



5. After successful compiling, download the project and run it.

8 GE20-232/485-RTC Communication

Expansion Card User Guide

8.1 Preface

■ About this Guide

Thank you for purchasing the GE20-232/485-RTC communication expansion card independently developed and produced by Inovance Technology. The GE20-232/485-RTC can be used with Easy300/Easy500/AM300/AM500 series PLCs, supporting one channel of RS485 communication with RTC or one channel of RS232 communication with RTC.

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-232/485-RTC Communication Expansion Card User Guide	PS00006438	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections
September 2023	A04	Minor corrections

Date	Version	Revision
July 2023	A03	Added <i>"8.5.2 InoProShop Programing (When used with AM522)" on page 139.</i>
March 2023	A02	Updated the description of nameplate description and added some product specification data.
October 2022	A01	Minor corrections
August 2022	A00	First release.

■ Guide Acquisition

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- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install InoHome app. In this app, you can search and can download the guide.



■ Warranty Agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.
- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.

- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

8.2 Product Information

8.2.1 Model and Nameplate

■ Model description

$$\frac{\text{GE20}}{\text{①}} - \frac{\text{232}}{\text{②}} / \frac{\text{485}}{\text{③}} - \frac{\text{RTC}}{\text{④}}$$

① Product Series GE20 series general-purpose expansion card	③ Product Code RS485 communication card
② Product Code RS232 communication card	④ Product Code RTC clock card

■ Nameplate

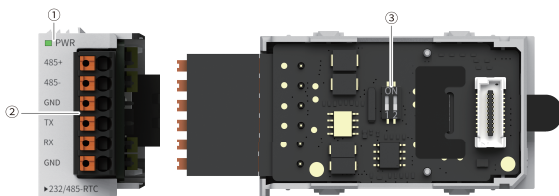


Note

The letter “B” on the nameplate indicates that only the card slot B of the PLC is supported.

Model	Description	Code
GE20-232/485-RTC	GE20-232/485-RTC series supports one channel of RS485 communication with RTC or one channel of RS232 communication with RTC.	01480035

8.2.2 Components



No.	Component	Mark	Definition	Indicator color	Description
①	Power supply indicator	PWR	Power supply is normal.	Yellow green	ON when the expansion card is powered on.
②	User terminals	-	-	-	See details in "8.4.2 Terminal Definition" on page 134.
③	RS485 DIP switch	1, 2	Used to control the termination resistor.	-	The RS485 DIP switch is set to OFF by default, i.e. at positions 1 and 2. To turn on the switch, toggle it to position ON using tools such as forceps.

8.2.3 Product Specifications

8.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	69.5 mm × 29.5 mm × 23 mm
Weight	Approx. 21 g

8.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	60 mA (typical@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

8.2.3.3 Communication Specifications

Item		Specification
RS485	Number of channels	1
	Isolation method	Non-isolation
	Termination resistor	With termination resistor, which can be controlled by DIP switch. The switch is set to OFF by default, in which case the termination resistor is not connected.
	Number of slaves	Up to 31 slaves (The length of each slave branch must be shorter than 3 m.)
	Communication baud rate	9.6 kbit/s, 19.2 kbit/s, 38.4 kbit/s, 57.6 kbit/s, 115.2 kbit/s
	Communication distance	• Transmission distance <100 m at a rate of 115.2 kbit/s • Transmission distance <1000 m at a rate of 19.2 kbit/s
RS232	Number of channels	1
	Isolation method	Non-isolation
	Communication baud rate	9.6 kbit/s, 19.2 kbit/s, 38.4 kbit/s, 57.6 kbit/s, 115.2 kbit/s
RTC	Communication port	I ² C
	Clock accuracy	120 seconds/month
	Time format	YYYY-MM-DD hh-mm-s
	Built-in battery	CR2032 coin cell battery, 5 year life, replaceable

8.3 Mechanical Installation

8.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

8.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



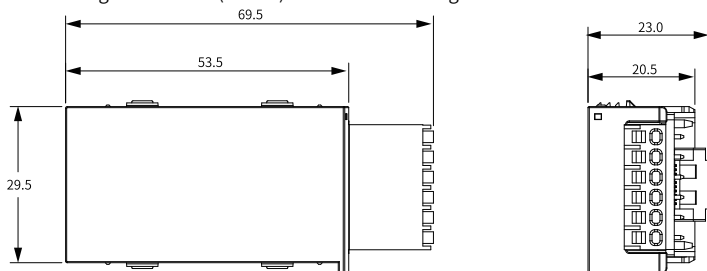
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

8.3.3 Mounting Dimensions

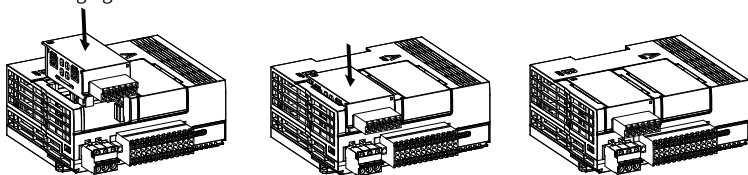
The mounting dimensions (in mm) are shown in the figure below.



8.3.4 Installation Method

■ Installing the Expansion Card

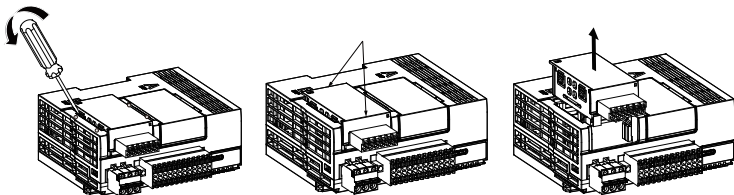
The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at

the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



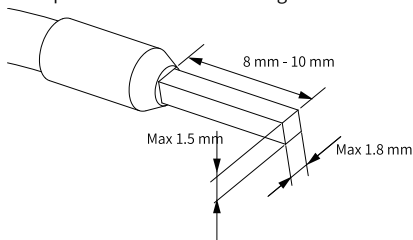
8.4 Electrical Installation

8.4.1 Cable Selection

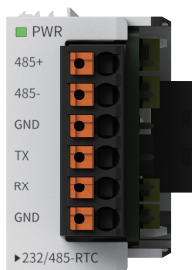
The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping pliers	Model	Crimping pliers
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.



8.4.2 Terminal Definition



Name	Description
RS485+	RS485 communication signal+
RS485-	RS485 communication signal-
GND	RS485 communication ground
TX	RS232 signal transmission
RX	RS232 signal reception
GND	RS232 communication ground

8.4.3 RS485 Communication



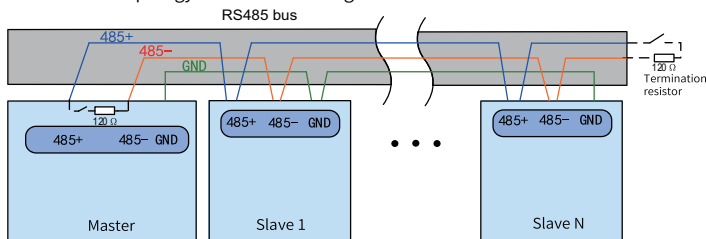
Caution

- Do not bundle the extension cable together with power cables (high voltage, large current) which produce strong interference signals. Separate it from other cables and avoid cabling in parallel.
- Select recommended cables and pinboards for connection. It is recommended that shielded cables be used as extension cables to enhance capacity of resisting interference.

It is recommended to use a shielded twisted pair cable for the RS485 bus. Connect a 120 Ω termination resistor to both ends of the bus respectively to prevent signal

reflection. Connect the signal reference grounds of all nodes together. Up to 31 nodes can be connected and the distance between nodes must be less than 3 m.

The RS485 bus topology is shown in the figure below.

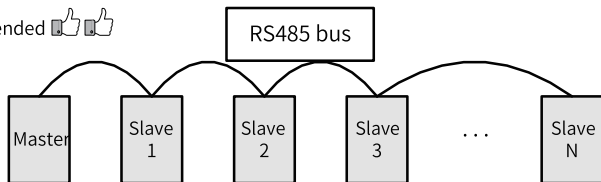


Multi-node connection

In case of a large number of nodes, connect the RS485 bus using the daisy chain mode. If the branch line connection is used, the branch line length is as short as possible. The recommended length is shorter than 3 m. Star connections are prohibited. Common bus structures are shown in the following figures.

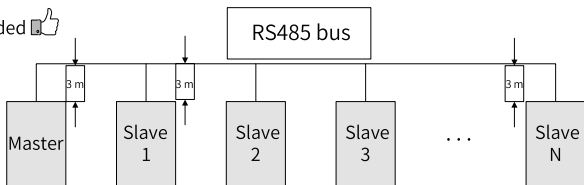
● Daisy chain connection

Recommended  



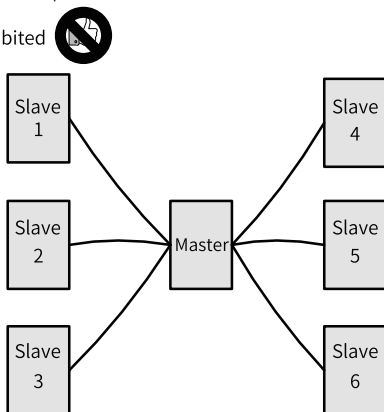
● Branch line connection

Recommended 



- Star connection (prohibited)

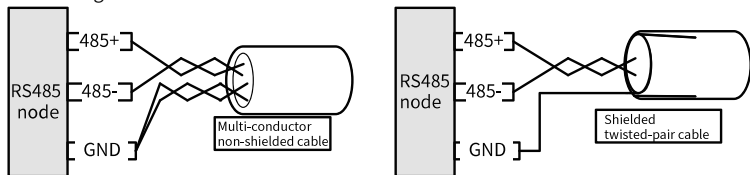
Prohibited 



■ Terminal wiring

Check whether there are three conductors in the RS485 bus and whether terminals are connected correctly. If a shielded cable is used, the shield must be connected to GND. Never connect the shield to any terminal except GND, including the drive housing and grounding terminal.

Given the effect of attenuation, it is recommended to use AWG26 or higher cables for connection longer than 3 m. Twisted pair cables are always recommended for connecting 485+ and 485-.



1. Recommended cable 1: Use multi-conductor twisted pair cables, with one twisted pair connected to 485+ and 485-, and others twisted together to connect GND.
2. Recommended cable 2: Use shielded twisted pair cables, with the twisted pair connected 485+ and 485-, and the shield connected to GND. In applications where shielded cables are used, the shield can be connected to GND only. Never connect the shield to the ground.

8.4.4 Cable Connection

Select tubular cables referring to ["8.4.1 Cable Selection" on page 133](#) and insert the cables into the communication ports.

8.5 Programming Examples

8.5.1 Autoshop Programing (When used with Easy523)

Note:

- The type ID of the GE20-232/485-RTC expansion card is 14. The configured expansion card type must be consistent with the actually installed expansion card type.

You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

- The GE20-232/485-RTC expansion card only supports EXP-B.

Operating procedure:

1. Create a project.
2. In the Project Manager, go to **Config**, right-click on **EXP-B** and select "GE20-232/485-RTC", or right-click on **Module Config** and select **Auto Scan** to add the GE20-232/485-RTC expansion card, as shown in the figure below.

The screenshot displays the 'Project Manager' on the left and the 'Easy523' hardware configuration interface on the right. In the Project Manager, the 'Config' folder is expanded, and 'EXP-B' is selected. The main window shows a rack of modules with 'EXP-A' and 'EXP-B' highlighted. Below the rack is a 'Device Detailed List' table.

Slot Number	Config Device Name	Device Description
0	Node ID:0	Easy523
EXP-B	GE20-232/485-RTC	1 channel RS232 or RS485 communication interface;

3. For configuration of the serial communication, see the "Serial Communication" section in the "H5U&Easy Series Programmable Logic Controller Programming and Application Guide".

4. After successful compiling, download the project and run it.

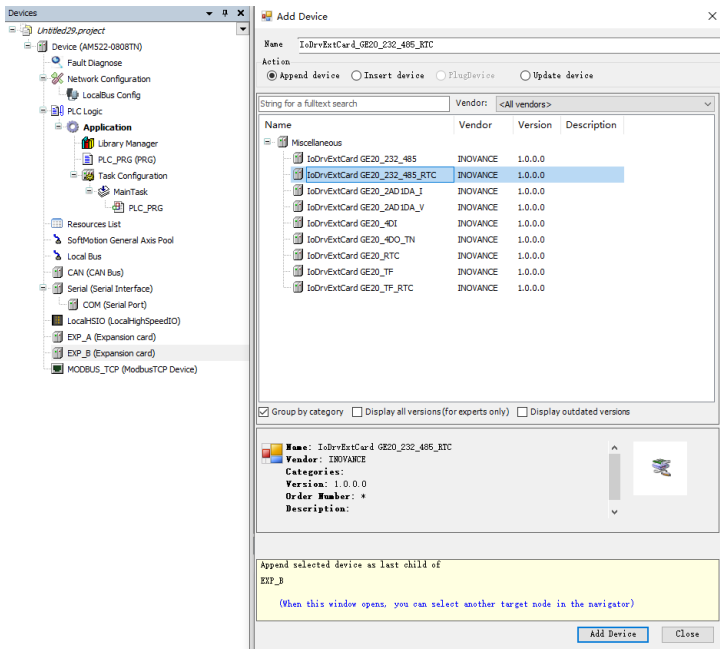
8.5.2 InoProShop Programing (When used with AM522)

Note:

- The configured expansion card type must be consistent with the actually installed expansion card type.
- The GE20-232/485-RTC expansion card only supports EXP-B.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-B" and select **Add Device**.
3. In the **Add Device** pop-up dialog, select "GE20_232_485_RTC" and click Add Device, as shown in the figure below. The PLC and the GE20_232_485_RTC expansion card communicate through the serial port. After the addition of the expansion card, the corresponding serial port configuration will be automatically generated.



4. Modify the serial port configuration as needed. For configuration of the serial communication, see "Network Configuration > Serial Port Free Protocol > Serial Communication" section in the "Medium-sized PLC Programming Software User Guide".

5. After successful compiling, download the project and run it.

8.6 Appendix: Maintenance of Backup Battery

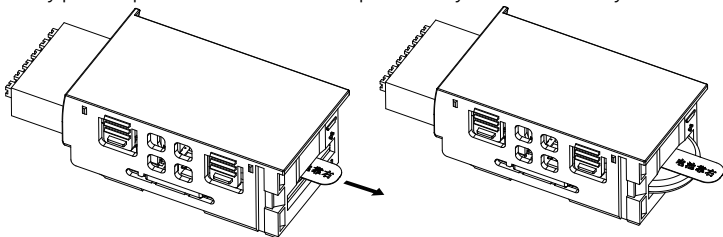
The backup battery supplies power to the product when PLC is out of power, with a maximum battery life of 5 years, depending on the use environment. When the backup battery runs out of power, replace it promptly.



Caution

The replacement of the backup battery must be completed within 15 seconds (excluding the time taken to remove the expansion card), otherwise the RTC clock will be lost.

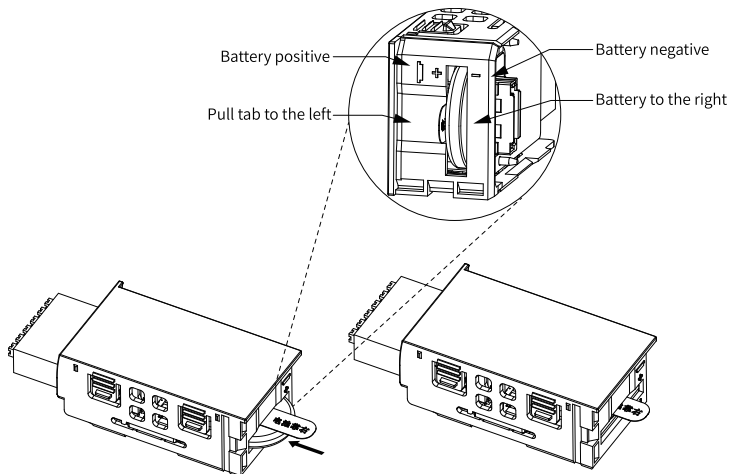
1. Remove the expansion card as described in "Removing the Expansion Card" in ["8.3.4 Installation Method" on page 132](#).
2. Gently pull the pull tab and take out the spare battery when it is halfway out.



Caution

Do not pull the pull tab forcibly to prevent it from breakage.

3. Push the replacement battery into the battery holder.



9 GE20-CAN-485 Communication Expansion

Card User Guide

9.1 Preface

■ About this Guide

Thank you for purchasing the GE20-CAN-485 communication expansion card independently developed and produced by Inovance Technology. The GE20-CAN-485 can be used with Easy300/Easy500/AM300/AM500 series PLCs and supports one channel of CAN communication and one channel of RS485 communication.

This guide describes the product information, mechanical installation, electrical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-CAN-485 Communication Expansion Card User Guide	PS00006436	Describes the product information, mechanical installation, electrical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A06	Minor corrections
October 2023	A05	Minor corrections

Date	Version	Revision
September 2023	A04	Updated the programming examples, and added <i>"9.5.2 InoProShop Programing (When used with AM522)" on page 160.</i>
August 2023	A03	Minor corrections
May 2023	A02	Minor corrections
March 2023	A01	Updated the description of nameplate description and added some product specification data.
October 2022	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install the app, where you can search for and download manuals.



■ Warranty agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.

- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

9.2 Product Information

9.2.1 Model and Nameplate

■ Model description

GE20 - CAN - 485
 ① ② ③

① Product Series GE20 series general-purpose expansion card	③ Product Code RS485 communication card
② Product Code CAN communication card	-

■ Nameplate

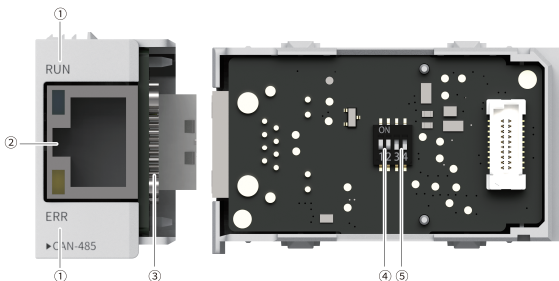


Note

The letter "A" on the nameplate indicates that only the card slot A of the PLC is supported.

Model	Description	Code
GE20-CAN-485	GE20 Series CAN and RS485 Communication Card	01480034

9.2.2 Components



No.	Component	Mark	Definition	Indicator color	Description
①	Operation status indicator	RUN	Running	Green	CANlink ON: CANlink bus connected (remote frames received on the node) Blinking (≤ 3 Hz) During CANlink communication, one blink per frame of bus data sent or received OFF: CANlink bus not connected or disconnected Blinking (5 Hz): Flag monitor CANopen Flashing slowly (0.8s cycle): CANopen node is in pre-operational state ON: CANopen node is running Single flash (1.2s cycle): CANopen node is stopped
		ERR	Error	Red	CANlink ON: Monitor timeout (node), no node (monitor) Blinking (0.5 Hz): CANlink configuration error (for the configurator) Blinking (1 Hz): Node lost or crash (for the monitor) Blinking (5 Hz): CANlink address conflict OFF: No fault CANopen ON: CANopen bus closed Single flash (1.2s cycle): At least one error counter hitting or exceeding the threshold (too many error frames) Double flash (1.6s cycle): Error control event (node protection or heartbeat timeout)

No.	Component	Mark	Definition	Indicator color	Description
②	RJ45 interface	-	-	-	-
③	User terminals	-	-	-	See details in "9.4.1 Terminal Definition" on page 154.
④	CAN DIP switch	1, 2	Used to control the termination resistor.	-	The CAN DIP switch is set to ON by default. To turn off the switch, toggle it to positions 1, 2 using tools such as forceps.
⑤	RS485 DIP switch	3, 4	Used to control the termination resistor.	-	The RS485 DIP switch is set to OFF by default, i.e. at positions 3 and 4. To turn on the switch, toggle it using tools such as forceps.

9.2.3 Product Specifications

9.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	53.5 mm × 29.5 mm × 23 mm
Weight	Approx. 16 g

9.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	60 mA (typical@5 V)
Input short-circuit protection	Supported
Hot swap	Not supported

9.2.3.3 Communication Specifications

Item		Specification
RS485	Number of channels	1
	Isolation method	Non-isolation
	Termination resistor	With termination resistor, which can be controlled by DIP switch. The switch is set to OFF by default, in which case the termination resistor is not connected.
	Number of slaves	Up to 31 slaves (The length of each slave branch must be shorter than 3 m.)
	Communication baud rate	9.6 kbit/s, 19.2 kbit/s, 38.4 kbit/s, 57.6 kbit/s, 115.2 kbit/s
	Communication distance	• Transmission distance <100 m at a rate of 115.2 kbit/s • Transmission distance <1000 m at a rate of 19.2 kbit/s
CAN	Number of channels	1
	Isolation method	Non-isolation
	Termination resistor	With termination resistor, which can be controlled by DIP switch. The switch is set to OFF by default, in which case the termination resistor is not connected.
	Number of slaves	• CANlink: Supports up to 63 slaves. • CANopen: Supports up to 30 slaves.
	Communication distance	• <20 m at a rate of 1000 kbit/s • <80 m at a rate of 500 kbit/s • <150 m at a rate of 250 kbit/s • <300 m at a rate of 125 kbit/s • <500 m at a rate of 100 kbit/s • <1000 m at a rate of 50 kbit/s

9.3 Mechanical Installation

9.3.1 Installation Environment

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Max. 2000 m (80 kPa)
Pollution degree	2
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	- Storage temperature: -20°C to +60°C - Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	- Transportation temperature: -40°C to +70°C - Relative humidity: <90% RH, non-condensing
Operating temperature/humidity	- Operating temperature: -20°C to +55°C - Relative humidity: <90% RH, non-condensing

9.3.2 Installation Precaution

- Make sure the PLC is powered off before installing or removing the expansion card.



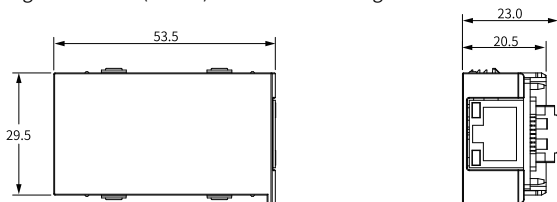
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

9.3.3 Mounting Dimensions

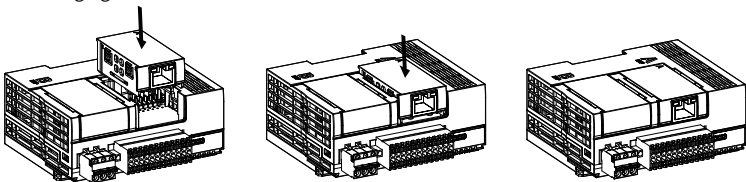
The mounting dimensions (in mm) are shown in the figure below.



9.3.4 Installation Method

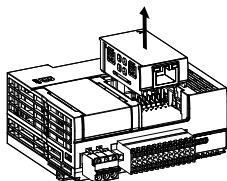
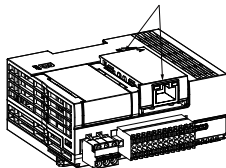
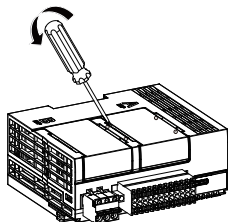
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot A vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



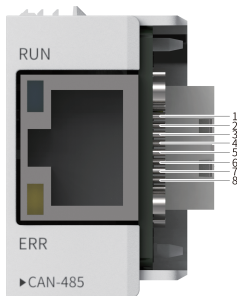
■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



9.4 Electrical Installation

9.4.1 Terminal Definition



RJ45 Pin	Description
1	CAN signal+
2	CAN signal-
3	Communication ground
4	RS485 communication signal+
5	RS485 communication signal-
6	-
7	-
8	Communication ground

9.4.2 RS485 Communication

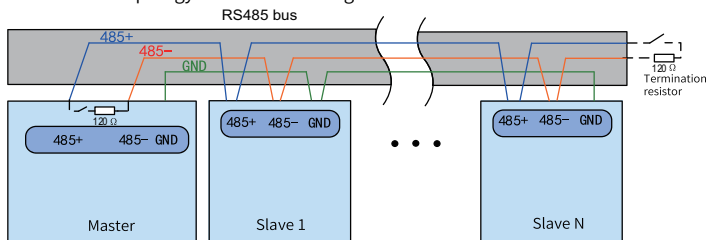


Caution

- Do not bundle the extension cable together with power cables (high voltage, large current) which produce strong interference signals. Separate it from other cables and avoid cabling in parallel.
- Select recommended cables and pinboards for connection. It is recommended that shielded cables be used as extension cables to enhance capacity of resisting interference.

It is recommended to use a shielded twisted pair cable for the RS485 bus. Connect a $120\ \Omega$ termination resistor to both ends of the bus respectively to prevent signal reflection. Connect the signal reference grounds of all nodes together. Up to 31 nodes can be connected and the distance between nodes must be less than 3 m.

The RS485 bus topology is shown in the figure below.

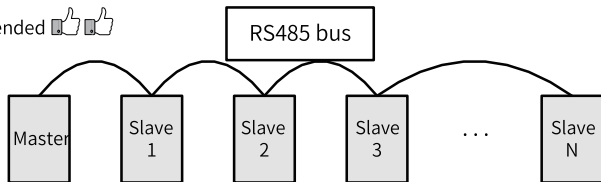


■ Multi-node connection

In case of a large number of nodes, connect the RS485 bus using the daisy chain mode. If the branch line connection is used, the branch line length is as short as possible. The recommended length is shorter than 3 m. Star connections are prohibited. Common bus structures are shown in the following figures.

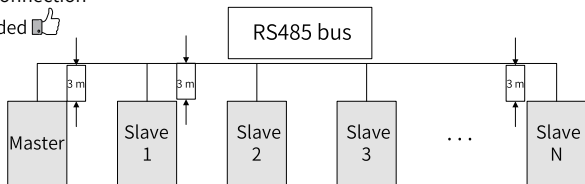
- Daisy chain connection

Recommended  



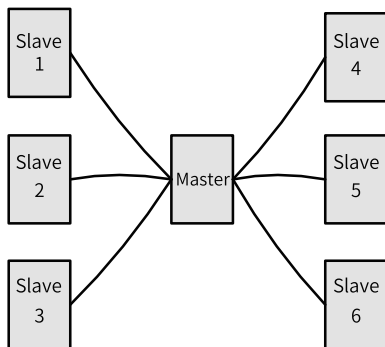
- Branch line connection

Recommended 



- Star connection (prohibited)

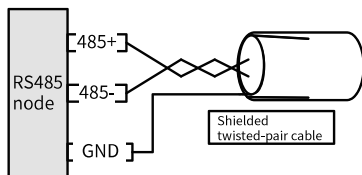
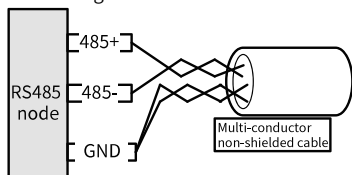
Prohibited



■ Terminal wiring

Check whether there are three conductors in the RS485 bus and whether terminals are connected correctly. If a shielded cable is used, the shield must be connected to GND. Never connect the shield to any terminal except GND, including the drive housing and grounding terminal.

Given the effect of attenuation, it is recommended to use AWG26 or higher cables for connection longer than 3 m. Twisted pair cables are always recommended for connecting 485+ and 485-.

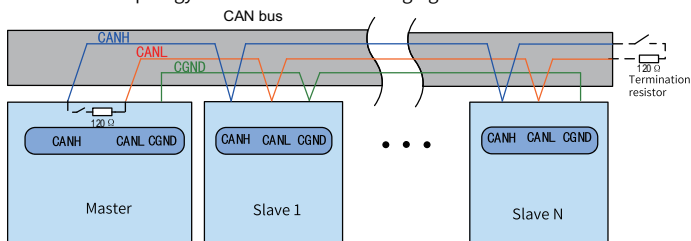


1. Recommended cable 1: Use multi-conductor twisted pair cables, with one twisted pair connected to 485+ and 485-, and others twisted together to connect GND.
2. Recommended cable 2: Use shielded twisted pair cables, with the twisted pair connected 485+ and 485-, and the shield connected to GND. In applications where

shielded cables are used, the shield can be connected to GND only. Never connect the shield to the ground.

9.4.3 CAN Communication

In a CAN network, The three cables of each device must be interconnected. By default, 120Ω matching resistor has been added to the first end of the CAN bus, and 120Ω matching resistor needs to be added to the second end of the CAN bus. The CAN bus connection topology is shown in the following figure.



9.4.4 Cable Connection

Connecting: Insert the crystal head into the RJ45 port until you hear a click.

Disconnecting: To remove the RJ45 network cable, press and hold the tail of the registered jack, and then pull it out along the direction parallel with the module.



It is recommended to use network cables for RS485 communication and CAN communication. It is not recommended to strip the wires for separate connection. If you do need to strip the wires for separate connection, see ["9.4.1 Terminal Definition" on page 154](#) for the definition of RJ45 pins, and also see ["9.4.2 RS485 Communication" on page 155](#) and ["9.4.3 CAN Communication" on page 158](#).

9.5 Programming Examples

9.5.1 Autoshop Programing (When used with Easy523)

Note:

- The type ID of the GE20-CAN-485 expansion card is 15. The configured expansion card type must be consistent with the actually installed expansion card type. You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".
- The GE20-CAN-485 expansion card only supports EXP-A.

1. Create a project.

2. In the Project Manager, go to **Config**, right-click on **EXP-B** and select "GE20-CAN-485", or right-click on **Module Config** and select **Auto Scan** to add the GE20-CAN-485 expansion card, as shown in the figure below.

Project Manager

test123 [Easy523]

- System Variable Table
- Global Variable
- Structure
 - Element Table
 - Function Block Instances
 - Variable_Table
- Programming
 - Program Block
 - MAIN
 - SBR_001
 - INT_001
 - Function Block (FB)
 - Function (FC)
- Config
 - Input Filtering
 - EXP-A
 - GE20-CAN-485
 - EXP-B
 - Module Config
 - Electronic Cam

EXP-A

EXP-B

Easy523

Device Detailed List

Slot Number	Config Device Name	Device D
0	Node ID:0	Easy523
EXP-A	GE20-CAN-485	1 channel

3. For configuration of the serial communication and CAN communication, see the "Serial Communication" and "CAN Communication" sections in the "H5U&Easy Series Programmable Logic Controller Programming and Application Guide".
4. After successful compiling, download the project and run it.

9.5.2 InoProShop Programing (When used with AM522)

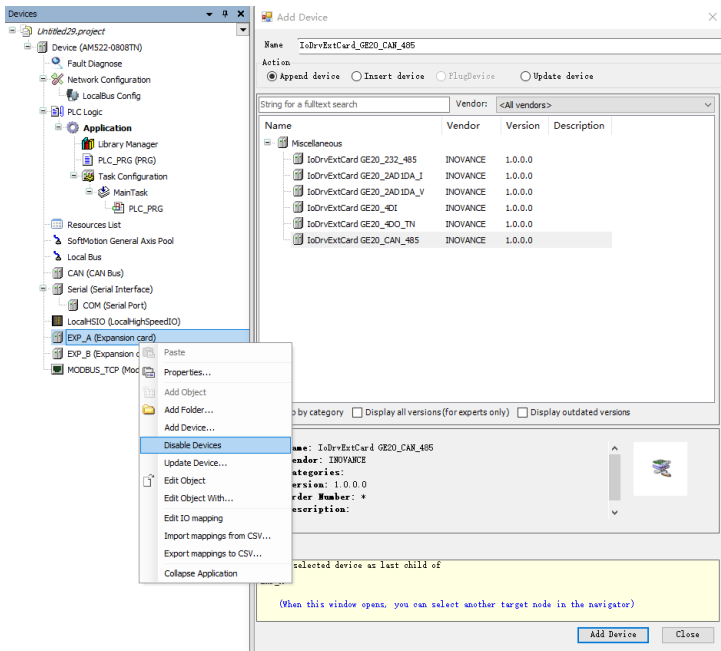
Notes

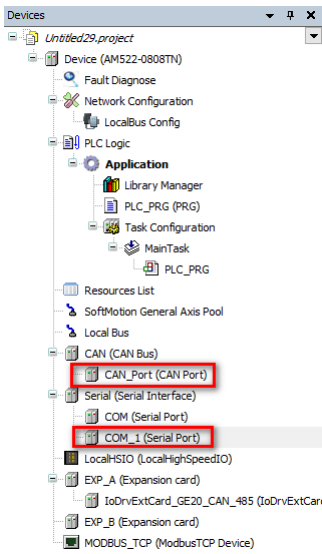
- The configured expansion card type must be consistent with the actually installed expansion card type.
- The GE20-CAN-485 expansion card only supports EXP-A.

Procedure

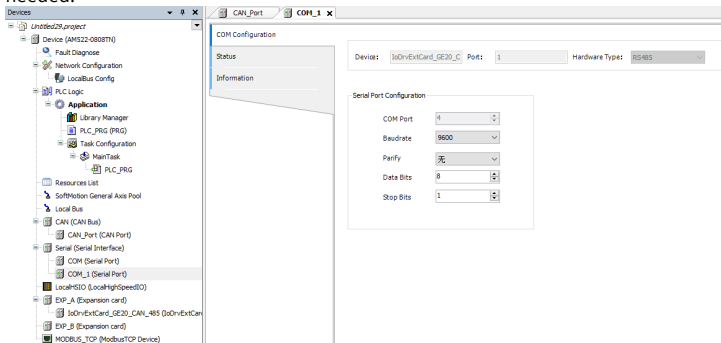
1. Create a project.
2. In the **Devices** pane, right-click on "EXP-A" and select **Add Device**.
3. In the **Add Device** pop-up dialog, select "GE20_ CAN _485" and click **Add Device**, as shown in the figure below.

After the expansion card is added, the COM and CAN communications are generated automatically, as shown below.

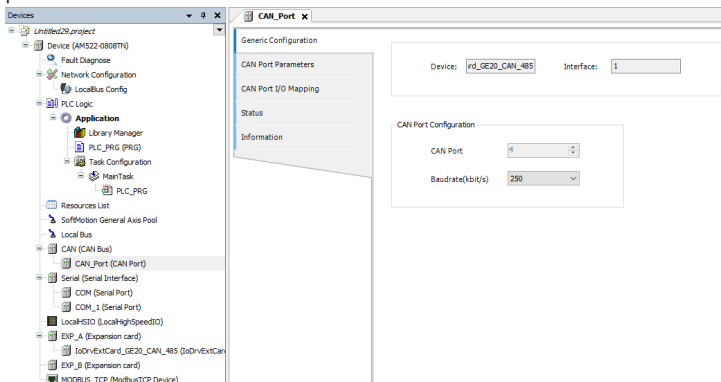




4. In the **Devices** pane, double-click on **COM_1(Serial Port)**. In the COM configuration page, click the **COM Configuration** tab and modify the COM parameters as needed.



5. In the **Devices** pane, double-click on **CAN_Port(CAN Port)**. In the CAN configuration page, click the **General Configuration** tab and modify the CAN parameters as needed.



6. After successful compiling, download the project and run it.

10 GE20-TF-RTC Memory Expansion Card

(with Integrated RTC) User Guide

10.1 Preface

■ About this Guide

Thank you for purchasing the GE20-TF-RTC memory expansion card (with integrated RTC) independently developed and produced by Inovance Technology. This card can be used with Easy300/Easy500/AM300/AM500 series PLCs and supports upgrading user programs and firmware. During the upgrade, the RTC clock remains running normally.

This guide describes the product information, mechanical installation, and programming examples of the product. Before using this product, read this guide carefully to ensure safe use.

■ Standard Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive Name		Standard
CE Certification	EMC directive	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-
UKCA Certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

More Data

Document Name	Data Code	Description
Easy Series Programmable Logic Controller User Guide	PS00006444	Introduces the product information, installation and wiring, operation and maintenance of the Easy series products.
AM300 Series Programmable Logic Controller User Guide	PS00008836	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
AM300 Series Programmable Logic Controller User Guide	PS00008837	This guide describes installation and wiring of the AM300 series PLC, including product information, mechanical installation, and electrical installation.
H5U & Easy Series Programmable Logic Controller Programming and Application Guide	19011157	Describes the basic knowledge of PLC programming, quick start guidance, communication, motion control, and the use of high-speed counters.
H5U & Easy Series Programmable Logic Controller Instruction Guide	19011156	Describes the basic and complex instructions, as well as examples of instructions used in product programming and application.
GE20-TF-RTC Memory Expansion Card (with Integrated RTC) User Guide	PS00013155	Describes the product information, mechanical installation, and programming examples of the product.

■ Revision History

Date	Version	Revision
January 2024	A03	- Modified precautions in <i>"10.4.1 Autoshop Programing (When used with Easy523)" on page 173.</i> - Other minor corrections
October 2023	A02	Added <i>"10.4.2 InoProShop Programing (When used with AM522)" on page 175.</i>
September 2023	A01	Minor corrections
August 2023	A00	First release.

■ Guide Acquisition

This guide is not delivered with the product. You can obtain the PDF version in the following ways:

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install InoHome app. In this app, you can search and can download the guide.



■ Warranty Agreement

Under the condition of normal use, if the product is faulty or damaged, Inovance provides the warranty service within the warranty period (specified in the order). After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for the following damage:

- The user does not perform operations in compliance with the user manual of the product.

- The product is damaged due to fire, flood, and abnormal voltage.
- The user uses the product for abnormal functions.
- The user uses the product outside the specified specification range.
- Force majeure such as natural disasters, earthquake, lightning strike

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

10.2 Product Information

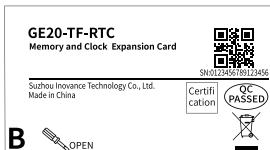
10.2.1 Model and Nameplate

■ Model description

GE20 -TF- RTC
 ① ② ③

① Product Information GE20 series general-purpose expansion card	③ Product Code RTC clock card
② Product Code TF card	-

■ Nameplate

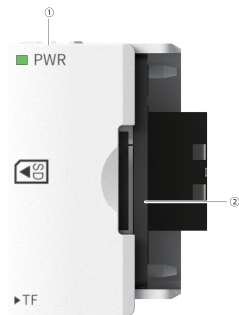


Note

The letter “B” on the nameplate indicates that only the card slot B of the PLC is supported.

AC Drive Model	Description	Code
GE20-TF-RTC	GE20-TF-RTC expansion card for the upgrade of user programs and firmware.	01480050

10.2.2 Components



No.	Terminal Type	Identification	Description	Indicator Color	Description
①	Power supply indicator	PWR	Power supply normal	Yellow green	ON when the expansion card is powered on.
②	TF card slot	TF	-	-	-

10.2.3 Product Specifications

10.2.3.1 General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	53.5 mm × 29.5 mm × 23 mm
Weight	Approx. 12 g

10.2.3.2 Power Supply Specifications

Item	Specification
Rated input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated input current	100mA (typical@5 V)
Input short-circuit protection	Yes
Hot swap	Not supported

10.2.3.3 TF Card Specifications

Item	Specification
Communication port	SDIO
Capacity	Max. 32 GB
File format	TransFlash (Micro SD)
Installation mode	Self-eject

10.2.3.4 Clock Specifications

Item	Specification
Communication port	I ² C
Clock accuracy	120 seconds/month
Time format	YYYY-MM-DD hh-mm-s
Battery specifications	Coin cell battery, 3 year life, replaceable
Battery replacement time	≤15s

10.3 Mechanical Installation

10.3.1 Installation Environment Requirements

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Working environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	Up to 2,000 m (80 kPa)
Pollution degree	2 or less
Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6, 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27, 150 m/s ² , 11 ms, 3 times each in $\pm X$, $\pm Y$ and $\pm Z$ directions, 18 times in total
Storage temperature/humidity	• Temperature: -20 °C to 60 °C • Relative humidity: <90% RH, non-condensing
Transportation temperature/humidity	• Temperature: -40 °C to 70 °C • Relative humidity: <95% RH, non-condensing
Operating temperature/humidity	• Temperature: -20 °C to 55 °C • Relative humidity: <95% RH, non-condensing

10.3.2 Installation Precautions

- Make sure the PLC is powered off before installing or removing the expansion card.



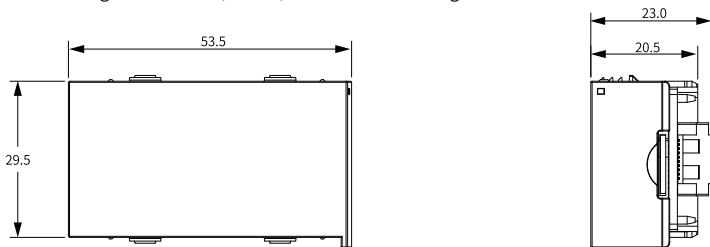
Caution

Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.

- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

10.3.3 Mounting Dimensions

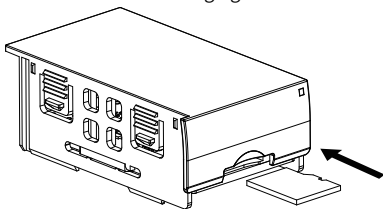
The mounting dimensions (in mm) are shown in the figure below.



10.3.4 Installation Method

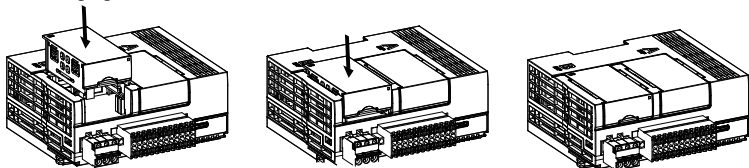
■ Installing the TF card

Align the TF card with the TF card slot of the expansion card and insert the TF card in the direction indicated by the arrow. The TF card is fixed in place when it does not rebound obviously, as shown in the following figure.



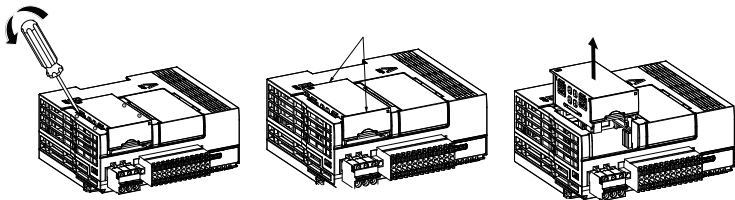
■ Installing the expansion card

The expansion card is snap-fitted with the PLC. Place the PLC horizontally, place the expansion card into the card slot B vertically along the guide ribs, and press the expansion card. When you hear a click and the surface of the expansion card is flush with the surface of the PLC, the expansion card is installed in place, as shown in the following figure.



■ Removing the expansion card

Place the PLC horizontally, insert the slotted screwdriver into the snap-fit joints in the order shown in the figure on the left, and pry the expansion card in the direction indicated by the arrow. When you hear a click, the expansion card is initially disengaged from the PLC. Then you can hold the expansion card with two fingers at the positions indicated by the arrow as shown in the middle figure and take out the expansion vertically.



10.4 Programming Examples

10.4.1 Autoshop Programing (When used with Easy523)

Note:

- This expansion card is only supported in AutoShop V4.10.0.0 and later and the firmware of Easy master must be V6.2.0.0 and later.

- The GE20-TF-RTC expansion card only supports EXP-B.
- The type ID of the GE20-TF-RTC expansion card is 6. The configured expansion card type must be consistent with the actually installed expansion card type. You can view the configured expansion card type ID through the value of the variable name "ExtCard [x]. ConfigModule" in the system variable table "SEYS-INFO", and the actual installed expansion card type ID through the value of the variable name "ExtCard [x]. MountedModule" in the system variable table "SEYS-INFO".

Operating procedure:

1. Create a project.
2. In the Project Manager, go to **Config**, right-click on **EXP-B** and select "GE20-TF-RTC", or right-click on **Module Config** and select **Auto Scan** to add the GE20-TF-RTC expansion card, as shown in the figure below.

The screenshot displays the Project Manager interface for an Easy523 device. The left pane shows the project tree with the following structure:

- Temp Project [Easy523]
 - System Variable Table
 - Global Variable
 - Structure
 - Element Table
 - Function Block Instances
 - Variable_Table
 - Programming
 - Program Block
 - MAIN
 - SBR_001
 - INT_001
 - Function Block (FB)
 - Function (FC)
 - Config
 - Input Filtering
 - EXP-A
 - EXP-B
 - GE20-TF
 - Module Config
 - Electronic Cam
 - Motion Control Axis
 - Axis Group Settings
 - EtherCAT
 - COM0

The right pane shows a physical view of the Easy523 device. The EXP-A and EXP-B slots are highlighted. The EXP-B slot is labeled with a red box and the text 'EXP-B'. The device is labeled 'Easy523'.

Below the device view is a 'Device Detailed List' table:

Slot Number	Config Device Name	Device Description
0	Node ID:0	Easy523
EXP-B	GE20-TF	TF card expansion card

3. After successful compiling, download the project and run it.

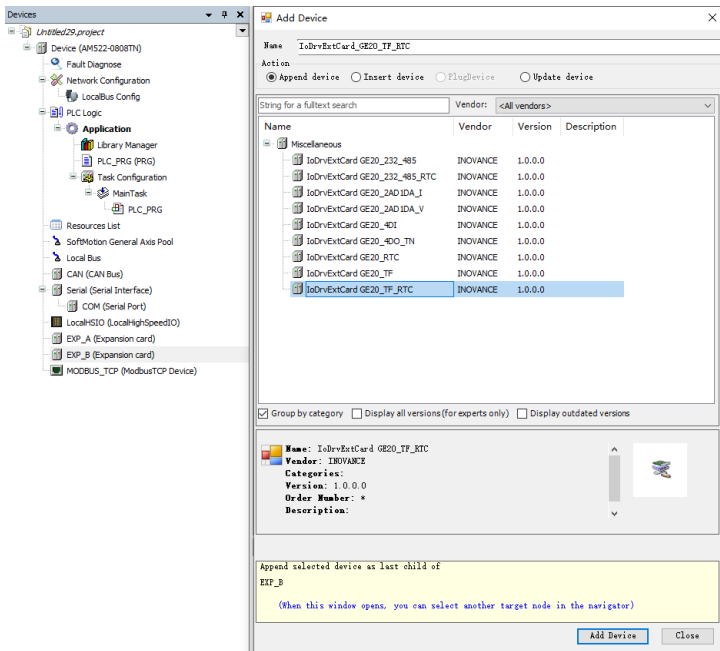
10.4.2 InoProShop Programing (When used with AM522)

Notes

- This expansion card is only supported in InoProShop V1.8.0.0 and later and the firmware of AM300&AM500 master must be V1.3.0.0 and later.
- The GE20-TF-RTC expansion card only supports EXP-B.
- The configured expansion card type must be consistent with the actually installed expansion card type.

Operating procedure:

1. Create a project.
2. In the **Devices** pane, right-click on "EXP-B" and select **Add Device**.
3. In the pop-up **Add Device** dialog, select "GE20-TF-RTC" and click **Add Device**, as shown in the figure below.



4. After successful compiling, download the project and run it.

10.5 Appendix: Maintenance of Backup Battery

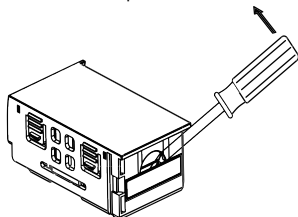
The backup battery supplies power to the product when PLC is out of power, with a maximum battery life of 3 years, depending on the use environment. When the backup battery runs out of power, replace it promptly.



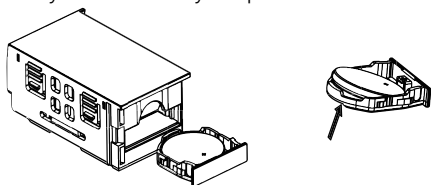
Caution

The replacement of the backup battery must be completed within 15 seconds (excluding the time taken to remove the expansion card), otherwise the RTC clock will be lost.

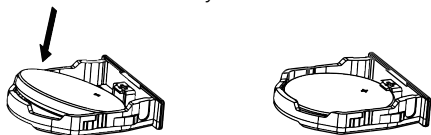
1. Remove the expansion card as described in "Removing the Expansion Card" in ["10.3.4 Installation Method" on page 172](#).
2. Insert a pointed tool, such as a screwdriver, into the notch in the housing and lever the battery compartment out of the expansion card with force obliquely upward.



3. Remove the old battery from the battery compartment.



4. Place a new battery in the battery compartment according to the polarity markings on the battery and make sure the battery is secured.



5. Push the battery compartment into the expansion card until you hear a click (Note that the positive polarity of the battery faces the notch in the housing).

