



IT7150P HMI

User Guide



Industrial
Automation



Intelligent
Elevator



New Energy
Vehicle



Industrial
Robot



Rail
Transit



Data code PS00017578A00

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Preface

Introduction

Thanks for purchasing IT7150P series human machine interface (hereinafter referred to as HMI) independently developed and manufactured by Inovance. The IT7150P series HMI adopts high-performance processor featuring quick data processing and high response speed. This HMI is developed based on Linux architecture and adopts Android-style interfaces to provide users with friendly interactive experience.

- It supports functions including style customization, VNC remote desktop, vector format icons, and script programming.
- This product can be connected to the personal computer (PC) using USB or Ethernet. That allows users to perform program upload, download, and monitoring for the PLC using the PC and HMI, saving commissioning efforts.
- The Modbus protocol is used to support highly-efficient communication with the PLC.
- The HMI firmware, graphic display program, and recipe data can be updated using a U disc. When using the U disc with Inovance's PLC, the program on the PLC can be updated, which simplifies on-site download and operations for multiple manufacturing devices.
- To facilitate HMI program commissioning and system commissioning, online simulation and offline simulation are available in IT7150E HMIs.

This user guide describes the product information, mechanical design, electrical design, programming, and touch screen calibration of IT7150P.

More information

Data name	Data code	Description
InoTouchPad User Guide	PS00002706	Presents the installation, basic operation, project configuration, and function applications of InoTouchPad.
IT7150P HMI User Guide (This guide)	PS00017578	Presents the product information, mechanical design, electrical design, programming, and product standards of IT7150P.

Revision history

Date	Version	Description
October 2024	A00	Initial release.

Access to the guide

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

- Do keyword searching under Service and Support at <http://www.inovance.com>.

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- Scan the QR code on the equipment to acquire more.
 - Scan the QR code below to install My Inovance app, where you can search for and download user guides.



Warranty disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. Maintenance will be charged after the warranty expires.

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

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or unusual voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance 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.

Fundamental Safety Instructions

Safety precautions

1. Read through the safety instructions before installing, operating, and servicing the equipment, and comply with these instructions.
2. To ensure personal and equipment safety, observe the notes indicated on the product labels and all the safety instructions in the user guide.
3. "CAUTION", "WARNING", and "DANGER" in the user guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
4. Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
5. Inovance shall take no responsibility for any personal injury or property damage caused by improper use.

Safety levels and definitions



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



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



: Indicates that failure to comply with the notice may result in minor or moderate personal injuries or damage to the equipment. Keep this guide properly for future use and deliver this guide to the end user.

Control system design



WARNING

- Interlock circuits and other circuits such as emergency stop, conventional protection, forward and reverse rotation must be set outside the product; devices for preventing equipment damage (up, down and reciprocating movement limit) must be set outside the product.
- A fault protection circuit must be laid outside the to prevent unexpected mechanical movement caused by, for example, errors in the non-detectable I/O control area.
- A user program must be designed to inform users of faults concerning the display, control, communication, power supply and so on, ensuring safety of the user system.
- Make sure that measures have been taken to avoid malfunction caused by the communication faults between the product and the master controller. This is to prevent personal injury and equipment damage.
- Do not bring live parts into contact with the metal enclosure of the product.



CAUTION

- Do not create, on the touch screen of the HMI, switches that may result in personal injury of the operator or equipment damage . Use independent switches for performing critical operations. Failure to comply may result in accidents caused by wrong outputs or faults.
- Do not create switches that are used to control equipment safety operations on the touch screen, such as the emergency stop switch. Use independent hardware switches to perform safety-related operations. Failure to comply may result in series personal injury or equipment damage.
- Do not use this product as an alarm device to report critical alarms that may cause severe personal injury, equipment damage or system stop. Use an independent hardware and/or mechanical interlock to design a mechanism for reporting critical alarms and the related control/triggering devices.

Installation



WARNING

- This equipment must only be used indoor. Ensure that the environment meets the specified requirements;
- Install the product in a place free from strong magnetic field, direct sunlight, high temperature, inflammable gases, vapors, and dust. Failure to comply will result in the risk of explosion.
- Operate the product only in environments without drastic temperature changes or high humidity. Failure to comply may result in water condensation inside the product, leading to equipment damage.
- Ensure all the cable connectors are connected to the product securely. Loose connection may result in wrong I/O signals.



CAUTION

- Install the HMI in environments with temperatures within the recommended storage temperature range. Failure to comply may result in display faults of the LCD.

Wiring
 DANGER • Before wiring, cut off all power supplies. Failure to comply may result in electric shock or damage to the circuit; • Connect the DC power supply to the dedicated terminals specified in this guide. • Prevent metal chippings or cable terminals from falling into the HMI during screw hole machining and wiring. This is to prevent faults, component damage, and fire accidents. • Perform meticulous inspection after wiring to ensure the operating voltage and terminal positions are correct. Failure to comply may result in the risk of fire or accident.
 CAUTION • To avoid electric shock, cut off the power supply before connecting the product to the power supply. • The input power supply of the HMI must be 24 VDC. Power supplies outside $\pm 20\%$ of 24 VDC can cause severe damage to the product. Therefore, check whether the DC power supply provided by the switching-mode power supply is stable at a regular interval.
Operation and maintenance
 CAUTION • Touch the HMI panel with hands only during use. Do not use tools to touch the HMI panel. Innoance assumes no responsibility for panel damage caused by excessive external force. • Retired lithium batteries, LCD screens, capacitors and any other matters that may contain ingredients that are hazardous to health and the environment must be disposed of as industrial wastes.
Safety Recommendations • In the position where the operator directly touches the machinery part, for example, where a machinery tool is loaded/unloaded, or where a machine runs automatically, the on-site manual operating devices and any other alternative means must be carefully arranged and designed so that they are independent of the programmable controller and can start or terminate the automatic running of the system. • If you need to modify the program while the system is running, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

Battery

- The battery model must be correct.
- Do not throw the battery into a fire or heat oven. Do not crush or cut the battery.
- Do not expose the battery to extremely high temperatures.
- Do not swallow the battery to prevent the risk of chemical burns.
- This product contains the button battery. If the button battery is swallowed by accident, severe internal burns may occur within two hours, which may result in death.



- Keep new and used batteries away from children.
- If the battery compartment is not tight, stop using the device and keep it away from children.
- If you swallowed the battery, see a doctor immediately.

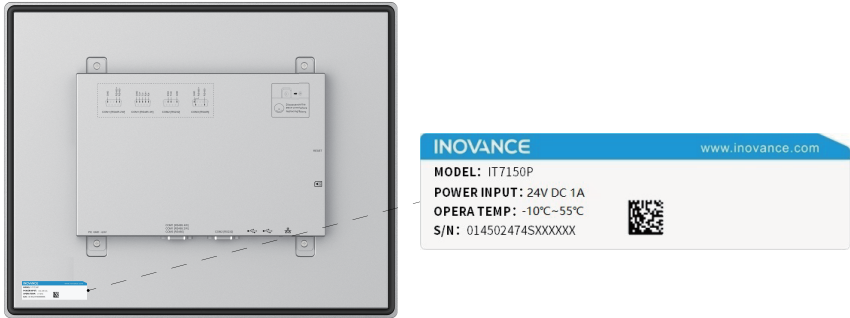
Disposal

- Dispose of retired batteries as industrial waste according to local laws and regulations.

1 Product Information

1.1 Nameplate and Model

Nameplate



Naming rules

IT 7 150 P

① ② ③ ④

① Product type IT: Inovance InoTouch HMI (abbreviation of InoTouch)	③ Screen dimension 150: 15-inch
② Product series 7: 7000 series	④ Performance type Professionals

The ordering data of the product is described in the following table.

Model	Description	Product code
IT7150P	IT7000 series 15-inch touchscreen	01450247

1.2 Technical Data

Item	Model: IT7150P
Display size	15"
Resolution	1024 x 768
Brightness (cd/m ²)	350
Display color	24-bit true color
Backlight source	LED
Backlight lifetime	50000 h

Item	Model: IT7150P
Mounting hole dimensions (mm)	352 x 279
Enclosure color	Silver
Enclosure material	Front housing: aluminum alloy; Rear cover: sheet metal
Operating temperature	-10°C to +55°C
Storage temperature	-20°C to +70°C
Operating humidity	10% RH to 90% RH, without condensation
Cooling method	Natural ventilation
CPU	Quad-core Cortex A7 1.2 GHz
DRAM	512 MB
Flash	512 MB
RTC	Supported
Serial port	COM1 (RS422/RS485) COM2 (RS232) COM3 (RS485)
Ethernet port	One 10 M/100 M adaptive RJ45 Ethernet port with LED indicator Cable length within 100 meters, CAT5 and above
Mini USB type-B port	One USB type-B port
USB type-A port	One USB type-A port (The USB type-A port provides current within 500 mA only.)
SD card interface	One Micro SD interface Supporting Micro SD card, push-push type SD card slot
Input voltage	24 VDC $\pm$ 20%
Rated current	800 mA
IP rating of the panel	Front panel: IP65; Rear cover: IP20

Note

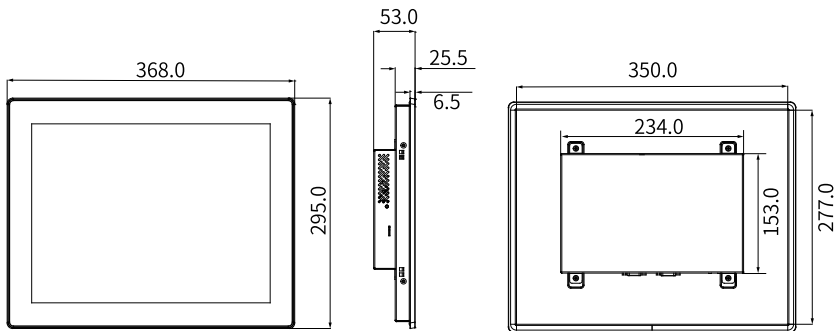
The design service life of the built-in button battery is five years. The actual service life varies with the operating conditions (temperature and humidity).

2 Mechanical Design

2.1 Installation Environment

1. The HMI is designed to operate in a temperature range between -10°C to +55°C (14°F to 131°F), exceeding of which may cause damage to the HMI components, malfunction, or function deterioration. For use in special environments, contact Inovance.
2. Do not install the HMI in environments suffering from strong mechanical vibration.
3. Install the HMI in the panel with a depth of over 105 mm and reserve a surrounding clearance of at least 25 mm.
4. Install the HMI away from cables and devices that generate strong interference, such as AC power supply cables, PLC output modules, AC drives, and relays. Use shielded cables for I/O cables and ground the shielded cable properly.
5. The front panel of the HMI complies with the requirements of IP65. When the equipment is installed in an IP65-rated cabinet, the cabinet must retain its IP rating, which means liquid sprayed on the cabinet cannot get into it.

2.2 Mounting Dimensions



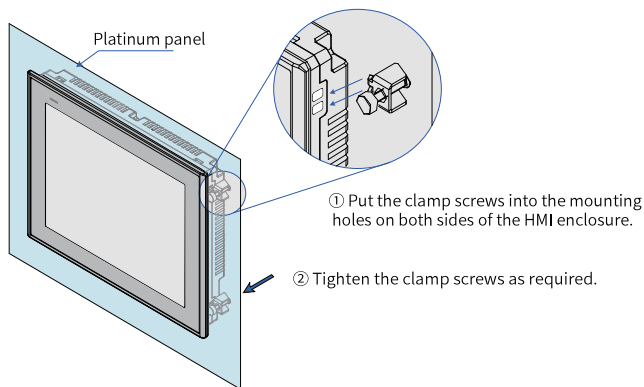
Model	Display size	Outline dimensions W x H x D (mm)	Through-hole mounting dimensions (W x H) (mm)	Recommended cut-out dimensions (mm)	
				W+2	H+2
IT7150P	15"	368.0 x 295.0 x 53.0	350.0 x 277.0	352.0	279.0

2.3 Mounting Method

See the following steps for through-hole mounting:

Procedure

1. Put the HMI into the pre-drilled mounting holes in the panel.
2. Snap the eight metal clips (delivered by default) from the back of the panel into the eight mounting holes on both sides of the HMI enclosure (step ① in the figure).



3. Tighten the mounting screws one by one until the HMI is secured to the panel (step ② in the figure). Recommended tightening torque: 6.0 ± 0.5 kgf/cm (A tight torque within this range achieves the waterproof purpose and avoids deformation.)



Caution

To comply with IP65 sealing specifications, ensure all the mounting screws delivered are used and the curvature of the panel is no greater than 0.010° .

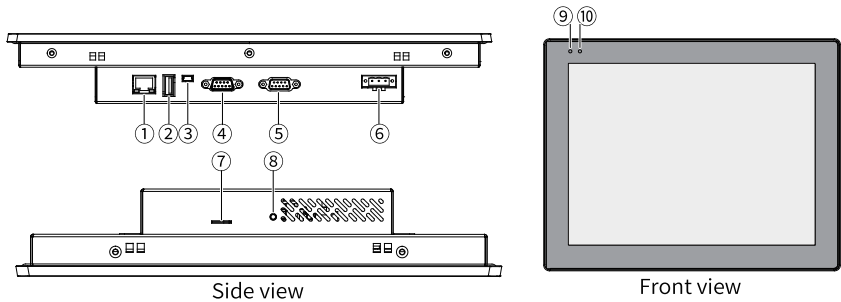


Warning

The mounting screw must be tightened with a proper tightening torque. If you have any question, contact the supplier.

3 Electrical Design

3.1 Terminal Description



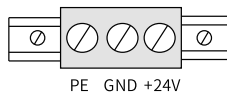
No.	Name	Function description	No.	Name	Function description
①	Ethernet port	Ethernet communication port (RJ45) used to access the PC or PLC with LAN port	⑥	Power port	24 VDC power input, +24V GND (delivered together with a power terminal used to connect to this power port)
②	USB type-A port	Main port of USB communication used to read and write data in the U-disk, connected to devices such as mouse, keypad, and printer	⑦	SD card interface	Connected to Micro SD, used for programming of the firmware core
③	Mini USB port	Slave port of USB communication used for user program downloading and commissioning through PC	⑧	RESET key	Used to restore to default settings

No.	Name	Function description	No.	Name	Function description
④	DB9 male	Communication port between HMI and PLC Equipped with COM2 serial communication port (RS232 interface)	⑨	Power indicator	ON: normal Blinking: unstable OFF: power is off
⑤	DB9 female	Communication port between HMI and PLC Built-in COM1 and COM3 serial communication port COM1: RS485/ RS422 port COM3: RS485	⑩	Network status indicator	Flashing: communication in progress Steady OFF: no communication

3.2 Terminal Wiring

Power supply

The HMI is powered up by a 24 VDC power supply. Connect the positive and negative poles of the external power supply to +24V and GND respectively. The PE terminal is the grounding terminal used to connect to the grounding cable of the HMI, as shown in the following figure:



- Requirements: The product can be powered up by a DC power supply only ($24\text{ V} \pm 20\%$). The capacity of the power supply must be higher than or equal to that required by the specifications.
- Isolate the DC power supply from the main AC power supply properly. Do not use the same power supply for the HMI and inductive load circuit (such as solenoid valve). Failure to comply may result in electromagnetic interference.
- Do not route the 24 V power supply cable or the communication cable in parallel with disturbing cables such as AC power supply cables and motor drive cables. Leave a clearance of at least 30 cm between them.
- It is recommended to use independent 14AWG lead wires (as short as possible) as the conductor of the grounding cable. Connect the grounding conductor to the system grounding point directly without passing through the enclosures of other electrical

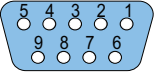
devices or grounding terminals. This is to prevent the grounding conductor from bearing the current of other branch circuits.

Communication port

The HMI provides two DB9 communication ports (DB9 female and DB9 male) and two to three independent serial communication ports used to connect to the PLC, AC drive, printer, or other intelligent devices. The product is built-in with multiple communication protocols and usually acts as the communication master to access the data in external devices.

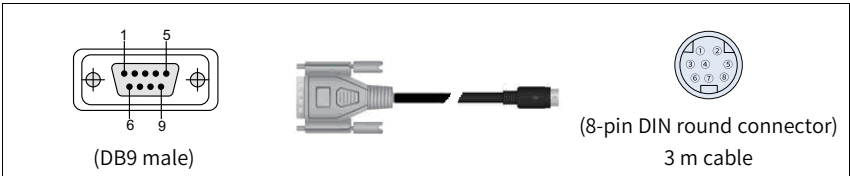
DB9 female connector

The DB9 female is built-in with two serial communication ports, COM1 and COM3. The pin assignment is as follows:

Pin No.	Signal			Pin layout of DB9 female
	COM1 [RS485] 2 Wires	COM1 [RS422]	COM3 [RS485]	
1	RS485-	RX- (Receive-)	-	 COM1 [RS485 2/4W] COM3 [RS485] DB9 female connector (Pin-type signal slot)
2	RS485+	RX+ (Receive+)	-	
3	-	TX- (Transmit-)	-	
4	-	TX+ (Transmit+)	-	
5	GND (Signal ground)			
6	-	-	RS485-	
7/8	-	-	-	
9	-	-	RS485+	

Communication cable for DB9 female connector

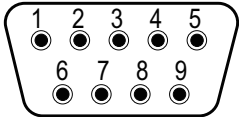
Inovance provides preformed communication cable options (model: IT5-H2U-CAB*, ordering No.: 15041140) for the DB9 female.



Cable connector and pin	DB9 male		8-pin DIN round connector	
Signal interface	RS422		RS422	
-	Pin No.	Signal	Pin No.	Signal
Pin assignment	1	RX-	4	TX-
	2	RX+	7	TX+
	3	TX-	1	RX-
	4	TX+	2	RX+
	5	GND	3	GND
Applicable model and port	IT7150P		Inovance H1U/H2U/H3U RS422 communication port Mitsubishi FX1N/2N/3U/3G RS422 communication port	
HMI user program setting for use of the cable	Set COM1 port to "RS422" in the HMI user program. Select the same communication protocol and data format for the HMI and PLC.			

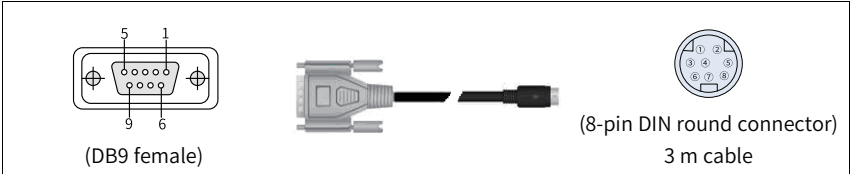
Connection between DB9 male connector and external devices

The DB9 male is built-in with COM2 communication port, RS232 signal interface to connect the the controller with RS232 communication port. The pin assignment is as follows.

Pin No.	Signal	Pin assignment of DB9 male
	COM2[RS-232]	
1	/	 COM2 RS232 DB9 male connector (Ejector-type signal slot)
2	RXD (receiving)	
3	TXD (transmitting)	
4	/	
5	GND (Signal ground)	
6 to 9	/	

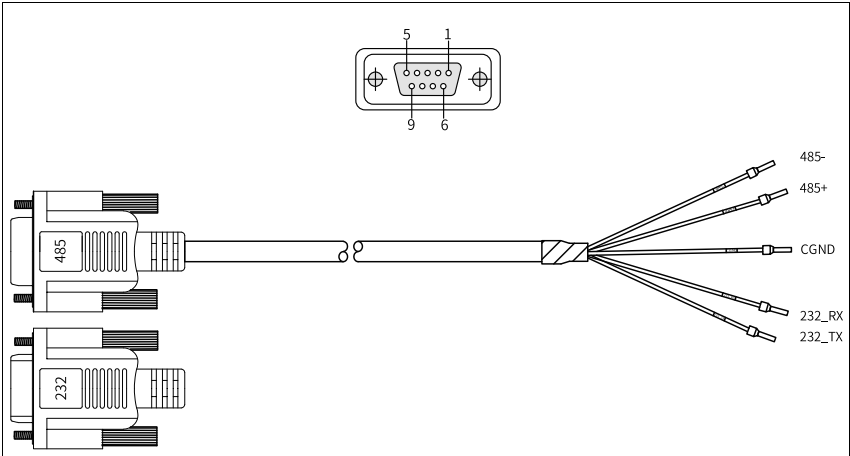
Communication cable for DB9 male connector

We provide prefabricated communication cable options for the DB9 male connector on this equipment (part number: H2U-232-CAB, order number: 15042148):



Cable connector and pin	DB9 female		8-pin DIN round connector	
Signal interface	RS232, built-in RS232-RS422 switching circuit		RS422	
-	Pin No.	Signal	Pin No.	Signal
Pin assignment	1	-	4	TX-
	2	RXD	7	TX+
	3	TXD	1	RX-
	4	-	2	RX+
	5	GND	3	GND
Applicable model and port	IT7150P		Inovance H1U/H2U/H3U RS422 communication port Mitsubishi FX1N/2N/3U/3G RS422 communication port	
HMI user program setting for use of the cable	In the HMI user project, set the COM2 port as "RS232"; Select the same communication protocol and data formate for the HMI and PLC.			

We provide prefabricated communication cable options for the DB9 male connector on this equipment (part number: IT7-Easy-CAB, ordering number: 15310234):



Cable connector and pins	Wiring method	DB9 female	Tubular terminal	
		Pin No.	Conductor color	Tubular terminal (end label)
Internal connection of the cable	Twisted pair	7	Green	485-
		8	Yellow	485+
	Twisted pair	2	Red	232_RX
		3	Orange	232_TX
	Short	5	Black	CGND
		Housing	Grounding cable	-
Compatible HMI and port	-	IT7150P	Inovance Easy300/Easy500 RS232/RS485 communication port	
HMI user program setting for use of the cable		In the HMI user project, set the COM2 port as "RS232"; The HMI and PLC must have the same communication protocol and data format settings.		

Precautions on communication cable connection

- Requirement: Use different communication cables to connect to different external devices. Do not route communication cables in parallel with AC power supply cables or route communication cables near electrical noise source. Do not connect/disconnect communication cables during communication.
- To avoid communication problems, ensure that the communication cable must not exceed 150 m when connecting RS485/422 devices and not exceed 15 m when connecting RS232 devices.
- If a communication error occurs, "Communication timeout" will be displayed until the communication is back to normal.
- Use shielded cables as communication cables in case of long communication cables or where communication cables need to pass through environments suffering from electrical noise.

USB interface

USB mini interface: Used to connect to PC through a general USB communication cable for downloading/uploading user configuration programs and setting HMI system parameters.

USB type-A interface: Used to connect to the U-disk, USB mouse and USB keypad.

Ethernet connection

The 10 M/100 M adaptive Ethernet port on the back of the HMI can be used to:

1. Download/upload HMI configurations, set system parameter, and perform online simulation of configurations.

2. Connected to multiple HMIs through Ethernet to form a networked communication.
3. Communicate with PLC through Ethernet.
4. Connected to HUB or Ethernet switch through a standard Ethernet cable to access the LAN, or connected to the Ethernet port of the PC directly through a dual interconnect network cable. Note: To ensure communication stability, use shielded cables for Ethernet.

4 Programming

Tools needed before programming the HMI: a PC installed with InoTouchPAD, a programming cable, and an IT7000 series HMI

Software source

For the latest version of the programming software InoTouchPAD independently developed by Inovance, contact your HMI supplier or visit <http://en.inovance.cn/> to download the software.

Recommended PC configurations

1. CPU: Intel or AMD, 2.0 GHz or higher
2. Memory: 1 GB or above
3. Hard disk: At least 1 GB free space
4. Display: Color display with resolution of 1024 x 768 or above
5. Ethernet port or USB port: uploading/downloading programs
6. Operating system: Windows 7 or Windows 10

Programming cable (connecting to Inovance PLC)

The mini USB communication cable (optional) is used as the programming cable, which is available from Inovance with an ordering No. of 15041200.

5 Touch Screen Calibration

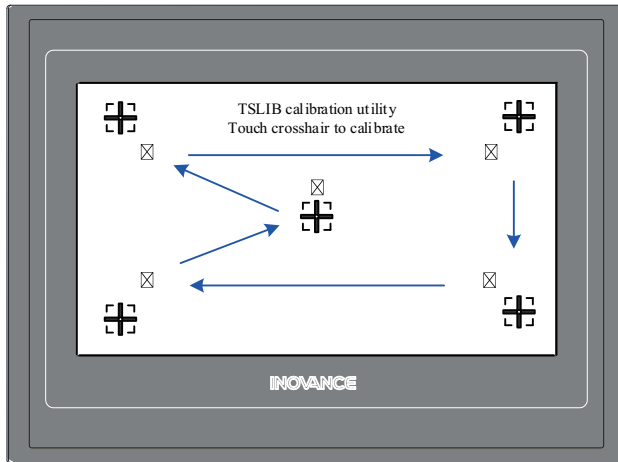
If the touch screen does not respond or respond slowly, use the calibration program to calibrate the touch screen.

Entering the calibration program

Access the program through the system setup menu: After the HMI is powered on and the screen displays "Long press to enter the Setup screen", gently press the screen with your finger until the screen displays "Release to enter the Setup screen". After you enter the system setup password, the system setup menu pops up. Tap the "Calibrate" tab.

Detailed steps

- After entering the calibration mode, "⛶" is shown in the upper left corner of the screen (as shown in the following figure).
- Use the stylus or your finger to tap the center of "⛶". "⛶" will move in the route as shown by the arrows below. Tap each point where "⛶" stops.
- After the 5-point calibration is completed, "⛶" will disappear. Tap the blank space of the screen to exit; if the calibration fails, the crosshair will return to the upper left corner of the screen and you must repeat the calibration.





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