IVDM-13 Three-Phase AC Line Voltage Detection Module User Manual

Preface

Thank you for choosing INVT IVDM-13 three-phase AC line voltage detection module.

The IVDM-13 three-phase AC line voltage detection module is used to detect the AC line voltage in offshore applications of daily inverters, and needs to be used with GD880 series VFD control box. The module transmits the detection signal to the control box through optical fibers, achieving control and protection of the rectification system.

This manual provides the product overview, installation, wiring, and commissioning instructions. To ensure safe and proper use of the product and to maximize its performance, please carefully read the manual before installation.
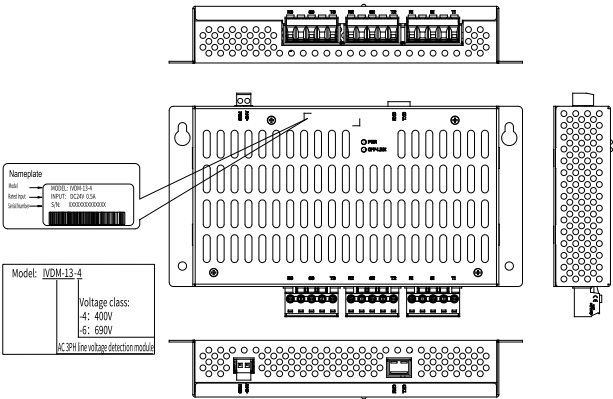
Product features:
- Supports three-channel 380/690 VAC voltage input detection with high accuracy.
- Adopts fiber optic communication, enabling fast and stable communication rate.
- Supports wall-mounted installation, making installation and removal convenient.

1 Product overview

1.1 Model description

Figure 1-1 Product nameplate and model

1.2 Specifications

Table 1-1 Specifications

Item	Specifications
Working temperature	-10~+ 50℃
Storage temperature	-10~+ 60℃
Relative humidity	5%~95% (No condensation)
Operating environment	No corrosive gas
Installation method	Wall-mounted
Ingress protection (IP) rating	IP20
Cooling method	Natural air cooling

1.3 Technical parameters

Table 1-2 Technical parameters

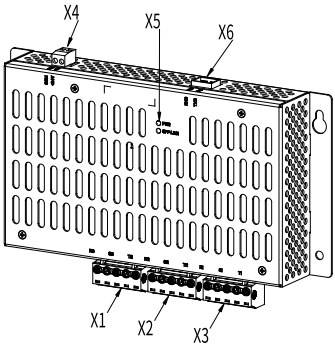| Item	Specifications
Supply voltage/current	24V±5%/0.5A
Communication connection method	Fiber optic communication
Channel 1 input voltage detection range	0~380V/690VAC
Channel 2 input voltage detection range	0~380V/690VAC
Channel 3 input voltage detection range	0~380V/690VAC

1.4 Structure

Figure 1-2 Component diagram

Table 1-3 Component description

Symbol	Name	Description
X1	Three-channel AC line voltage detection terminal (380/690VAC)	Input voltage range: 0~380V/690VAC Cable cross-sectional area: 0.5~6mm^2
X2	Three-channel AC line voltage detection terminal (380/690VAC)	Input voltage range: 0~380V/690VAC Cable cross-sectional area: 0.5~6mm^2
X3	Three-channel AC line voltage detection terminal (380/690VAC)	Input voltage range: 0~380V/690VAC Cable cross-sectional area: 0.5~6mm^2
X4	24VDC power input terminal	External power supply: 24VDC±5% 0.5A The two-core twisted-pair cable is recommended. Cable cross-sectional area: 0.5~2.5mm^2
X5	PWR Power indicator (Green)	Steady on: The power supply is normal. Off: The module is not powered on or the power supply is abnormal
	OFF-LINE Operation status indicator (Red)	Blink: Abnormal running Off: Normal running
X6	Fiber optic connection terminal	Communicates with the control box via the fiber optic expansion module Plastic optical fiber

2 Installation and wiring

2.1 Installation precautions

⚠	● Make sure the device is powered off before installation.
Note	● Prevent the module from falling or shock to avoid damage. ● Do not disassemble the module to avoid damage. ● Tighten the screws according to the required torque to avoid damage or looseness.

Tools required for installation: Phillips screwdriver PH1; slotted screwdriver SL3.

Table 2-1 Screw torque requirements

Screw size	Fastening torque
M4	1.2N・m
M5	2N・m

2.2 Dimensions

The dimensions of the AC line voltage detection module is 254×41×130mm (W×D×H), as shown in Figure 2-1.

Figure 2-1 Product outline and installation dimensions (unit: mm)
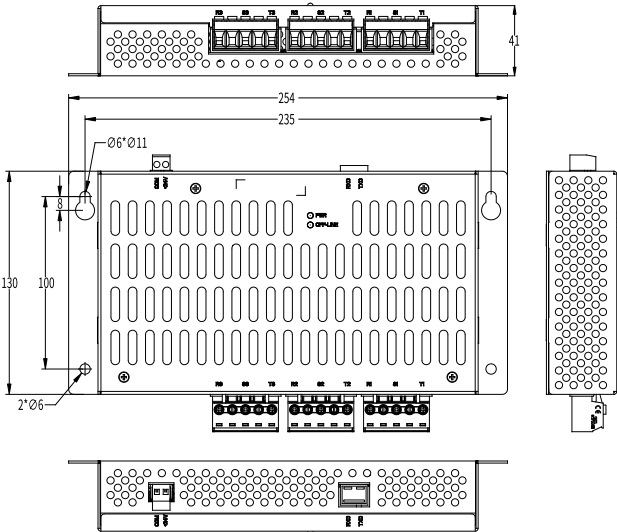
2.3 Installation and removal

The IVDM-13 three-phase AC line voltage detection module adopts wall-mounted installation.

2.3.1 Wall-mounted installation and removal

Installation procedure:

Step 1 Mark the installation hole positions and pre-tighten the two screws at the top.

Step 2 Attach the end of the module with the keyhole slots to the two pre-tightened screws.

Step 3 Pre-tighten the two screws at the bottom.

Step 4 Tighten the four pre-tightened screws.
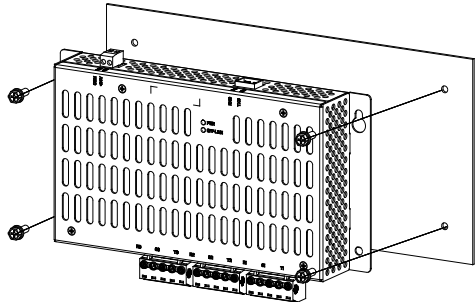
✎Note:
- Ensure that all terminals and fiber optic connectors are installed in place for effective electrical connection.
- The module is grounded through contact between its exposed metal shell and the assembly board inside the cabinet, so the assembly board must be an exposed metal plate. To ensure the reliable operation of the module and meet the EMC requirements, tighten the screws to ensure reliable grounding.

Removal procedure:

Step 1 Disconnect the power supply and remove all cables connected to the expansion module.

Step 2 Use a Phillips screwdriver to remove the grounding screw of the module.

Step 3 Pull out the module and position it properly.

2.4 User wiring terminals

Figure 2-2 IVDM-13 external structure
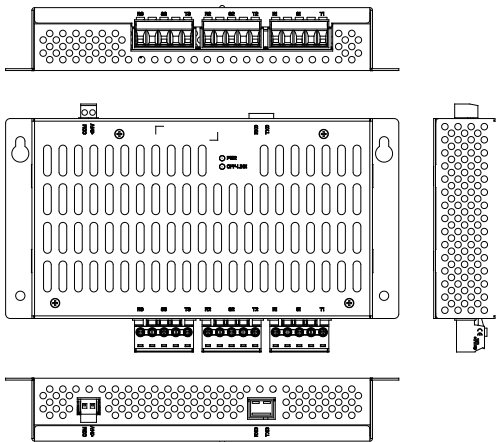
Table 2-2 X1~X3 terminal function definition

Terminal definition	Terminal name	Specifications
X1	R1 R1 phase voltage input	
	S1 S1 phase voltage input	Input voltage range: 0~380V/690VAC
	T1 T1 phase voltage input	
X2	R2 R2 phase voltage input	
	S2 S2 phase voltage input	Input voltage range: 0~380V/690VAC
	T2 T2 phase voltage input	
X3	R3 R3 phase voltage input	
	S3 S3 phase voltage input	Input voltage range: 0~380V/690VAC
	T3 T3 phase voltage input	

✎Note: The X1 terminal should be connected to the capacitor side of the LC filter (point A). The X2 terminal should be connected to the output of the isolation transformer / before the grid-connection switch (point B). The X3 terminal should be connected to the grid-connection point / after the grid-connection switch (point C).

Table 2-3 X4 terminal function definition

X4 terminal definition	Terminal name	Specifications
24V	24VDC power supply	External power supply: 24VDC±5%/0.5A
COM	Power ground	

Table 2-4 X5 terminal function definition

X5 terminal definition	Terminal name	Specifications
PWR	Power indicator (Green)	Steady on: The power supply is normal. Off: The module is not powered on or the power supply is abnormal.
OFF-LINE	Running status indicator (Red)	Blink: Abnormal running Off: Normal running.

Table 2-5 X6 terminal function definition

X6 terminal definition	Terminal name	Specifications
RXD	Receive optical fiber	Plastic optical fiber
TXD	Transmit optical fiber	

The IVDM-13 three-phase AC line voltage detection module is connected to the fiber optic expansion modules EC-TX821 and EC-TX823 via optical fiber. It is recommended to use the main control box SLOT3 to transmit the detection signals to the control box. Figure 2-3 shows the external wiring of the IVDM-13 module, taking the fiber optic expansion module EC-TX823 and PCS unit as an example.

Figure 2-3 External wiring when using IVDM-13 (without isolation transformer)

Figure 2-4 External wiring when using IVDM-13 (with isolation transformer)

✎ **Note**: The phase sequence of the three-phase AC voltage of the IVDM-13 must be consistent with the phase sequence of the PCS unit; otherwise, an overcurrent fault may occur in the unit.

2.5 Wiring precautions

● It is recommended to place the fiber optic expansion module EC-TX821 or EC-TX823 at expansion slot 3 of the control box.

● Handle the fiber optic cables with care to prevent damage to the cables and connectors, and keep the connectors clean.

● Ensure that the direction of the connector is correct when installing. Align and insert the connector into the interface until the "click" sound is heard, indicating it has been installed.

● During removal, firmly hold the connector and unplug it. Do not pull the fiber optic cable directly.

3 Commissioning

Figure 3-1 IVDM-13 configuration flowchart

3.1 Relevant function code parameter settings

Function code	Name	Description	Default
P54.02	Module online status	Setting range: 0x0000–0xFFFF	0x0000
P54.21	Sampling card slot 1 type	Setting range: 0–6 0: No card 1: Single-channel line voltage sampling card 1 (690) 2: Single-channel line voltage sampling card 2 (110) 3: DC voltage sampling card 4: Three-channel current sampling card 5: Three-channel line voltage sampling card 6: Three-channel phase voltage sampling card	0
P54.22	Sampling card slot 1 software version	Setting range: 0.00–655.35	0.00
P54.23	Sampling card slot 2 type	Setting range: 0–6 0: No card 1: Single-channel line voltage sampling card 1 (690) 2: Single-channel line voltage sampling card 2 (110) 3: DC voltage sampling card 4: Three-channel current sampling card 5: Three-channel line voltage sampling card 6: Three-channel phase voltage sampling card	0
P54.24	Sampling card slot 2 software version	Setting range: 0.00–655.35	0.00
P54.25	Sampling card slot 3 type	Setting range: 0–6 0: No card 1: Single-channel line voltage sampling card 1 (690) 2: Single-channel line voltage sampling card 2 (110) 3: DC voltage sampling card 4: Three-channel current sampling card 5: Three-channel line voltage sampling card 6: Three-channel phase voltage sampling card	0
P54.26	Sampling card slot 3 software version	Setting range: 0.00–655.35	0.00
P54.27	Sampling card slot 4 type	Setting range: 0–6 0: No card 1: Single-channel line voltage sampling card 1 (690) 2: Single-channel line voltage sampling card 2 (110) 3: DC voltage sampling card 4: Three-channel current sampling card 5: Three-channel line voltage sampling card 6: Three-channel phase voltage sampling card	0
P54.28	Sampling card slot 4 software version	Setting range: 0.00–655.35	0.00
P54.29	Sampling card slot 5 type	Setting range: 0–6 0: No card 1: Single-channel line voltage sampling card 1 (690) 2: Single-channel line voltage sampling card 2 (110) 3: DC voltage sampling card 4: Three-channel current sampling card 5: Three-channel line voltage sampling card 6: Three-channel phase voltage sampling card	0
P54.30	Sampling card slot 5 software version	Setting range: 0.00–655.35	0.00
P54.31	Sampling card slot 6 type	Setting range: 0–6 0: No card 1: Single-channel line voltage sampling card 1 (690) 2: Single-channel line voltage sampling card 2 (110) 3: DC voltage sampling card 4: Three-channel current sampling card 5: Three-channel line voltage sampling card 6: Three-channel phase voltage sampling card	0
P54.32	Sampling card slot 6 software version	Setting range: 0.00–655.35	0.00
P54.33	AC voltage sampling card source	Setting range: 1–6 1: Sampling card slot 1 2: Sampling card slot 2 3: Sampling card slot 3 4: Sampling card slot 4 5: Sampling card slot 5 6: Sampling card slot 6	5
P54.34	Three-phase AC sampling card source	Setting range: 1–6 1: Sampling card slot 1 2: Sampling card slot 2 3: Sampling card slot 3 4: Sampling card slot 4 5: Sampling card slot 5 6: Sampling card slot 6	4

✎ **Note:** For other parameter settings of the IVDM-13 three-phase AC line voltage detection module, see software manuals of the PCS unit.

66001- 01583

Copyright© INVT.
Manual information may be subject to change without prior notice.   202508 (V1.0)