

User 's Manual



Voltage Transducer iMT406

Current Transducer iMT408

Voltage Transducer iMT406

Current Transducer iMT408

User and Installation manual



Security Advices and Warnings

Please read this chapter carefully and examine the equipment carefully for potential damages which might arise during transport and to become familiar with it before continue to install, energize and work with a measuring transducers.

This chapter deals with important information and warnings that should be considered for safe installation and handling with a device in order to assure its correct use and continuous operation.

Everyone using the product should become familiar with the contents of chapter »Security Advices and Warnings«.

If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

PLEASE NOTE

This booklet contains instructions for installation and use of measuring transducer. Installation and use of a device also includes handling with dangerous currents and voltages therefore should be installed, operated, serviced and maintained by qualified personnel only. ISKRA d.o.o. assumes no responsibility in connection with installation and use of the product. If there is any doubt regarding installation and use of the system in which the device is used for measuring or supervision, please contact a person who is responsible for installation of such system.





Before switching the device ON

Check the following before switching on the device:

- Nominal voltage.
- Proper connection of auxiliary supply.
- Nominal frequency.
- Voltage ratio and phase sequence.
- Current transformer ratio and terminals integrity.
- Protection fuse - recommended maximal external fuse size is 6 A.
- Integrity and proper connection of analogue output.

Important: A current transformer secondary should be short circuited before connecting the meter.

Used symbols on devices' housing and labels

SYMBOL	EXPLANATION
	<p>WARNING</p> <p>Indicates situations where careful reading of this manual is required and following requested steps to avoid potential injury is advised.</p>
	<p>Double insulation in compliance with the SIST EN 61010-1 standard.</p>
	<p>Compliance of the product with directive 2002/96/EC, as first priority, the prevention of waste electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste. It also seeks to improve the environmental performance of all operators involved in the life cycle of electrical and electronic equipment.</p>
	<p>Compliance of the product with European CE directives.</p>

Important: A current transformer secondary should be short circuited before connecting the transducer.

Disposal

It is strongly recommended that electrical and electronic equipment (WEEE) is not deposit as municipal waste. The manufacturer or provider shall take waste electrical and electronic equipment free of charge. The complete procedure after lifetime should comply with the Directive 2002/96/EC about restriction on the use of certain hazardous substances in electrical and electronic equipment.

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1 BASIC DESCRIPTION AND OPERATION

The following chapter presents basic information about multifunction transducers required to understand its purpose, applicability and basic features connected to its operation.
In this chapter you will find:

1.1	INTRODUCTION	2
1.2	DESCRIPTION OF THE DEVICE	2
1.3	PURPOSE AND USE OF DIFFERENT TYPES OF MEASURING TRANSDUCERS	3

1.1 Introduction

The iMT406 and iMT408 are voltage / current transducers with minimal differences in functionality. Where there are some characteristic features that denote iMT406 or iMT408 symbol next to data.

1.1.1 Description of symbols

1.1.1.1 Subchapter

Symbols next to the subchapters indicate accessibility of functions described. Accessibility of functions is indicated with the following symbols:



PLEASE NOTE

For unknown technical terms please refer to Glossary at the end of the document.

1.2 Description of the device

Measuring transducer is intended for measuring single-phase voltage or current. It measures the average absolute value of the voltage or current and is calibrated for the RMS value for a sine wave input. The transducer is powered from measuring circuit due to it does not need auxiliary supply.

1.2.1 Appearance

Measuring transducer can differ from yours depending on the type and functionality.



- 1 – Analogue output
- 2 – Voltage/Current input

1.2.1.1 Analogue output

Analogue output is connected through screw-in connectors.

1.2.1.2 Voltage input (iMT406)

Voltage input is connected to measuring circuit through measuring voltage transformer. Maximum value of input voltage is 500 V_{L-N}.

1.2.1.3 Current input (iMT408)

Current input is connected to measuring circuit through current transformer. Maximum allowed thermal value of input current is 6 A (cont.).

1.3 Purpose and use of different types of measuring transducers

1.3.1 Voltage transducer iMT406

The iMT406 voltage transducer is used for a permanent monitoring of a single-phase voltage value. PLCs, PCs, microprocessor control, indicators, alarms units etc. can be operated by the output signal. Voltage input can be connected either directly to low-voltage network or shall be connected to network via a corresponding voltage transformer (with standard 100 V output).

1.3.2 Current transducer iMT408

The iMT408 current transducer is used for a permanent monitoring of a single-phase current value. PLCs, PCs, microprocessor control, indicators, alarms units etc. can be operated by the output signal. Current input can be connected either directly to low-voltage network or shall be connected to network via a corresponding current transformer (with standard 1 A or 5 A output).

2 CONNECTION

This chapter deals with the instructions for measuring transducer connection. Both the use and connection of the device includes handling with dangerous currents and voltages. Only a qualified person shall therefore perform connection. Iskra d.o.o. does not take any responsibility regarding the use and connection. If any doubt occurs regarding connection and use in the system, which device is intended for, please contact a person who is responsible for such installations.

In this chapter you will find:

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2.2	MOUNTING	5
2.3	ELECTRICAL CONNECTION	5
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2.1 Introduction

iMT406: A circuit breaker with current rating of 6A shall be included in close proximity with measuring voltage circuit as a means of disconnection.

iMT408: In case the current transformer (CT) is used, a care must be taken to never open circuit a CT secondary while the primary is energised. To avoid personal injury or equipment damage, the secondary must always be short-circuited or connected to a burden.



WARNING!

Wrong or incomplete connection of voltage, protective ground or other terminals can cause malfunction or damage the device.

For safety purposes it is important that both wires are firmly connected. They should be connected only to the designated terminals as shown on the label above as well as on the front foil.



PLEASE NOTE

After connection, settings have to be performed via communication or remote display (connection mode, current and voltage transformers ratio, etc.).

2.2 Mounting

iMT406/408 measuring transducer is designed for panel mounting. It should be mounted on a 35 mm DIN rail by means of one plastic fastener. Before installation fastener should be in open position (pulled). After device is on place, fastener is locked (pushed) to close position.

2.3 Electrical connection

Voltage inputs of measuring transducer can be connected directly to low-voltage network or via appropriate voltage measuring transformer to medium or high voltage network.

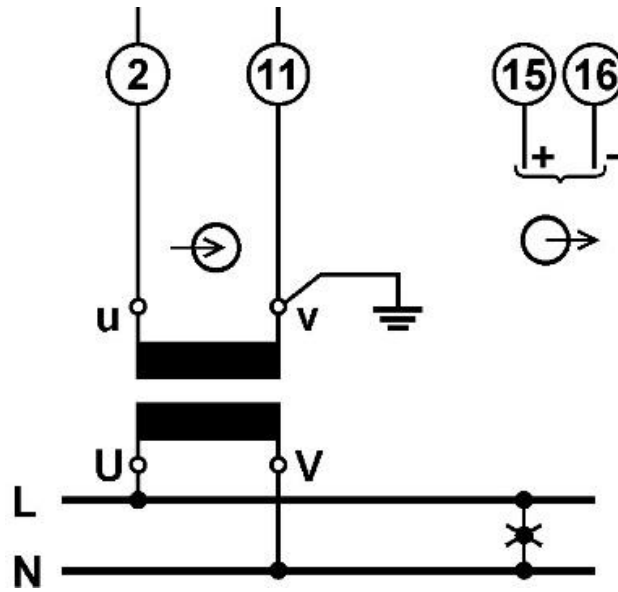
Current inputs of measuring transducer can be connected directly to low-voltage network or via a corresponding current transformer.

Choose corresponding connection from the figures below and connect corresponding voltages and currents. Information on electrical characteristics is given in chapter *Measuring Inputs*.

System/connection
Terminal assignment

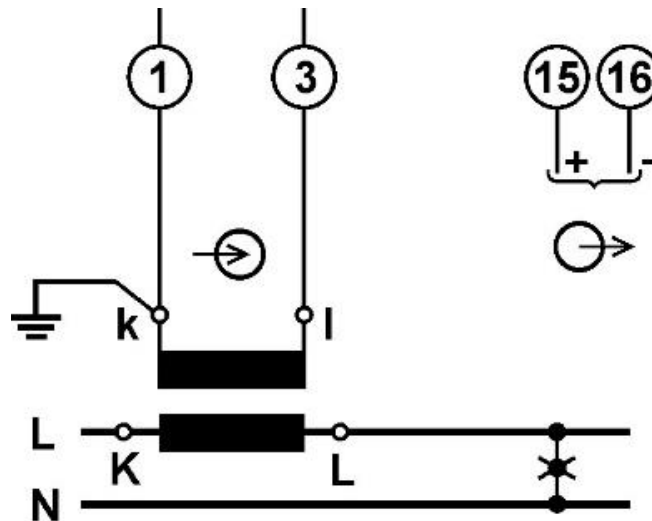
iMT406

Voltage measurement



iMT408

Current measurement



2.4 Connection

Function			Connection
Measuring input:	AC current	I ⊖	1/3
	AC voltage	U ⊖	2/11
Analogue output:		+ ⊕	15
		- ⊕	16

4 TECHNICAL DATA

In following chapter all technical data regarding operation of multifunction transducers is presented.

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4.1 Applied standards

EN 61010-1: 2010, Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements.

EN 60688:2013 Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals.

EN 61326-1:2013, EMC requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements.

4.2 Accuracy

Total accuracy (measurements and analogue output) according to EN 60688 is presented as percentage of range of the measurand's nominal value, except when it is stated as an absolute value.

Measured values iMT408	
Reference value:	Output end value
Basic accuracy:	Class 0.5
Reference conditions:	
Current	0% ... 100% x I _N
Ambient temperature range	15 ... 30°C
Frequency	f _N ± 2Hz
Output burden	R _{B max} / 2
Additional error:	
Temp influence:	max. ± 0.2% / 10 K
Frequency influence:	0,5% / (Δ10Hz)
Burden influence:	0,1% / (Δ R _{Bmax} / 2)

Measured values iMT406	
Reference value:	Output end value
Basic accuracy:	Class 0.5
Reference conditions:	
Voltage	20% ... 100% x U _N
Ambient temperature range	15 ... 30°C
Frequency	f _N ± 2Hz
Output burden	R _{B max} / 2
Additional error:	
Temp influence:	max. ± 0.3% / 10 K
Frequency influence:	0,25% / (Δ5Hz)
Burden influence:	0,1% / (Δ R _{Bmax} / 2)

4.3 Mechanical characteristics of input

4.3.1 Permitted conductor cross-sections


Terminals	Max. conductor cross-sections DIN / ANSI housing
Voltage / Current inputs	0,325 ... 2,5 mm ² (22 – 14 AWG) one conductor
Analogue output	0,325 ... 2,5 mm ² (22 – 14 AWG) one conductor

4.4 Electrical characteristics of input

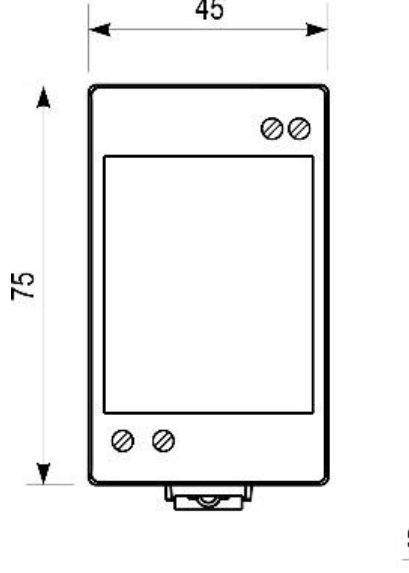
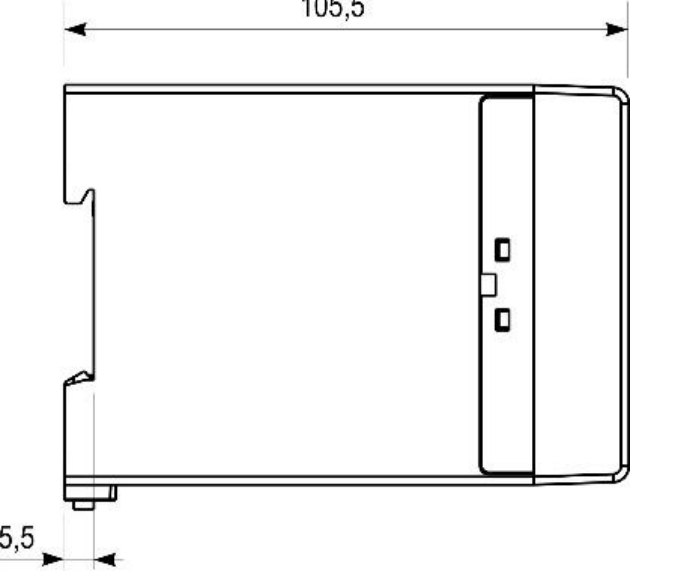
Voltage input iMT406	Standard nominal input voltage (U_N)	57,7, 63.5, 69.3, 100, 110, 115, 120, 127, 220, 230, 240, 250, 380, 400, 415, 440, 500 V
	Measuring range limit values	0...50 V to 0...500 V
	Overload capacity:	acc. to IEC/EN 60 688
	Max. measured value (cont.)	$1,2 \times U_N$
	Max. allowed value	$2 \times U_N$; 1 s, 10 times, 10 s interval
	Nominal frequency (f_N)	50, 60 Hz
	Measuring frequency range	$f_N \pm 10\%$
	Consumption	< 2 VA
	Current input iMT408	Standard nominal input current (I_N)
Measuring range limit values		0...0.5 A to 0...6 A
Overload capacity:		acc. to IEC/EN 60 688
Max. measured value (cont.)		$1,2 \times I_N$
Max. allowed value		$20 \times I_N$; 1 s, 10 times, 300 s interval
Nominal frequency (f_N)		50, 60 Hz
Measuring frequency range		$f_N \pm 10\%$
Consumption		< 2 VA
4.4 Measuring output	Standard ranges I_{AN} :	0...1 mA, 0...5 mA, 0...10 mA, 0...20 mA
	Burden voltage:	10V
	External resistance:	$R_{B \max} = 10 \text{ V} / I_{AN}$
	Maximal output voltage (open circuit current output)	< 25 V
	Maximal output current: iMT408	$3 \times I_{AN}$
	iMT406	$2 \times I_{AN}$
	Residual ripple	< 1% p.p.
	Response time	< 300 ms

The output may be either short or open-circuited. It is electrically insulated from all other circuits.

4.5 Safety features

Protection	Protection class I
	Protection class II Double insulation on all connectors (analogue output, voltage / current input and RS232/485 Com port)
Pollution degree	2
Installation category	CAT III 600V iMT406 > 300Vac CAT III 300V iMT406 ≤ 300Vac CAT III 300V iMT408
Test voltages	50 Hz, 1 min. acc to EN61010-1 5200 V, measuring input versus measuring output and other surface
EMC	Directive on electromagnetic compatibility 2004/108/EC Acc. to EN 61326-1
Ambient conditions Ambient temperature Operating temperature Storage temperature Average annual humidity Altitude	usage group II 0... <u>15</u> ... <u>30</u> ...45 °C Acc. to IEC/EN 60688 -30 to +70 °C -40 to +70 °C ≤93% r.h. ≤2000 m
Enclosure DIN ANSI RD500 Enclosure protection Flammability Mounting Dimensions (WxHxD) Weight	ABS self-extinguish ability, in compliance with UL 94 V0 IP 20 Acc. to UL 94 V-0 Rail mounting 35 × 15 mm acc. to DIN EN 50022 45 × 75 ×105 mm 280 g

4.6 Dimensions

Construction	Appearance	
<i>Measuring transducers</i>		
<i>iMT406/408</i>		

5 ABBREVIATION/GLOSSARY

Abbreviations are explained within the text where they appear the first time. Most common abbreviations and expressions are explained in the following table:

Term	Explanation
<i>RMS</i>	<i>Root Mean Square value</i>
<i>TRMS</i>	<i>True Root Mean Square value</i>
<i>MODBUS</i>	<i>Industrial protocol for data transmission</i>
<i>MiQen</i>	<i>Software for Iskra MIS instruments</i>
<i>AC</i>	<i>Alternating voltage, current</i>
<i>DC</i>	<i>Direct voltage, current</i>
<i>THD</i>	<i>Total harmonic distortion</i>
<i>MD</i>	<i>Measurement of average values in time interval (Maximum Demand)</i>
<i>M_v – Sample factor</i>	<i>Defines a number of periods for measuring calculation on the basis of measured frequency</i>
<i>M_p – Average interval</i>	<i>Defines frequency of refreshing displayed measurements on the basis of a Sample factor</i>
<i>Hysteresis expressed as percentage [%]</i>	<i>Percentage specifies increase or decrease of a measurement from a certain limit after exceeding it.</i>

List of common abbreviations and expressions



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