

THREE-PHASE, 4 TARIFF ELECTRICITY METER

DTS 353F-3

CONSUMPTION AND SUPPLY



This meter is a three phase, four-tariff electronic meter with RS485 DIN rail.

This meter complies with the standards of EN50470-1/3. It can measure the consumption of active/reactive energy.

This meter has many advantages, such as good reliability, small volume, light weight and easy installation.

Features and Technical Parameters

- Three-phase measurement of active / reactive energy.
- Measurement of consumption and supply, four tariffs (optional).
- The design solution enables easy installation on a DIN-rail.
- The DTS 353F-3 meter measures from an upstream current up to 80 A.
- It can be setted 3 measurement modes according to the synthesis code.
- Maximum consumption calculation.
- Holiday tariff and weekend tariff setting (optional).



Technical data

Basic data

Accuracy class	B complies with EN 50470-1, 50470-3
Constant of electricity meter (test LED output)	1000 (default), 100, 10, 1 (can be configurable by IR or RS485)
Connection	Direct four-wire
Reference voltage U_n	3 x 230/400 V
Operation voltage range	0.85 U_n to 1.15 U_n
Own consumption of each voltage circuit (without inserted module)	Max. 0.8 W/max. 8.58 VA
Own consumption of each current circuit	Max. 0.02 VA
Nominal frequency f_n / Operating frequency	50 Hz/47.5 to 52.5 Hz
Start-up current I_{st}	20 mA
Minimum current I_{min}	200 mA
Reference current I_{ref}	5 A
Maximum current I_{max}	80 A
Maximum range of measurement	250 mA to 100 A

Outputs

S0 output	
• Output connection	Direct, two-wire, open collector output type
• Impulse number	1000 (default), 100, 10, 1 (can be configurable by IR or RS485)
• Impulse width	38 ms
• Supply voltage rated/Maximum voltage	24 V DC/30 V DC
• Current	5 to 15 mA DC
• Maximum wiring length	1000 m

Impact of surroundings

Temperature range	
• Operating/Storage	-25 °C to +55 °C
Humidity	Max. 95 % without condensation
Ingress protection IP	IP51
Mechanical/Electromagnetic environment	M1/E2
Resistance to voltage impulses - Impulse voltage // Impulse shape	6 kV, 1.2 μ s / 50 μ s

Electromagnetic compatibility

Electrostatic discharges	complies with EN 50470-1, 50470-3
• Test voltage	8 kV
• Discharges number	10
High-frequency electromagnetic field	complies with EN 50470-1, 50470-3
• Severity grade 3, Vertical and horizontal polarization	
Fast transient phenomena (impulse groups)	complies with EN 50470-1, 50470-3
• Length of impulse group / Period of impulse group	15 ms/300 ms
• Test length	60 s
• Test voltage	4 kV
Suppression of radio interference	complies with ČSN EN 55022
• Peak phase of interfering voltage within zone	0.15 to 30 MHz
• Peak phase of intensity of electromagnetic field within zone	30 to 2000 MHz
• Resistance to Interference spread in wiring as per EN 61000-4-6	0.15 to 80 MHz

RS485 Communication module

Own consumption (idle / communication)	10 mA / 50 mA
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Weight and dimensions

Weight	ca 0.4 kg
Width x Height x Depth	76 x 100 x 65 mm
Installation / Operation position	DIN-rail / Any

Connection of wires

Terminal diameter	8 mm
Wire maximum cross-section - rope	16 mm ²
Wire maximum cross-section - strand	7*1.8 mm ²
Connecting Sscrews	M5
• Cross slot	Type Z, size 2
• Slot	1.2 mm
• Tightening torque	1.8 Nm

Other technical parameters as per EN 50470-1, 50470-3.

Description



- A: LCD display
- B: Forward page button
- C: Reverse page button
- D: Infrared communication
- E: Reactive pulse LED
- F: Active pulse LED

Outputs and communication

It supports IR (infrared) and RS485 - Modbus RTU communication. The DTS353F-3 with the RS485 can be used for remote data collection and industrial processes (e.g. automation, regulation, control of street lighting etc.).

The distance for communicating via the RS485 can reach up to 1200 m, subject to quality wiring and correct termination. For longer distances, a repeater is required (or when more than) 32 devices are connected. This provides a more stable environment for communication.

The meter is further equipped with a test LED output, the constant for converting the energy taken to the number of transmitted pulses is programmable. A total of four pulse output modes 1000/100/10/1 can be set.

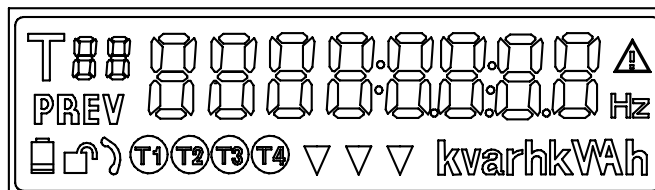
Display of Measured Quantities

Displaying is done by a Liquid Crystal Display (LCD). In addition to data on the measured consumption (and/or supply) of active energy in kWh for tariffs T1 to T4, the display can also show, as per customer requirements, other values, e.g. phase voltage, phase current, power, apparent power, power factor, and so on.

Further to that, the display indicates active tariff (in which the DTS353F-3 logs consumption/supply).

The meter has two buttons, it can be displayed all the contents by pressing the buttons. The presence of items on the display can be set by IR or RS485.

Parameters show on the LCD screen



Some description to the signs:

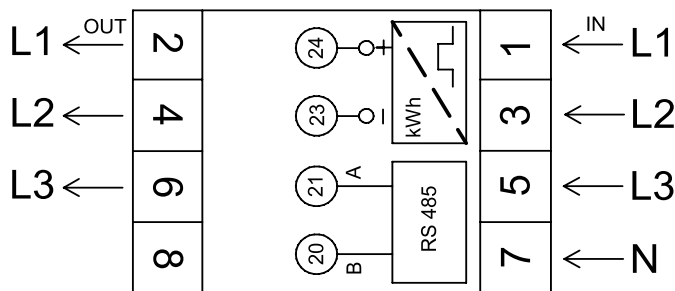
- T1 T2 T3 T4**: present tariff indication
- T88**: content indicate, it can be shown T1/T2/T3/T4, L1/L2/L3
- Hz**: frequency display
- kvarhkVAh**: kWh unit display, it can show kW, kWh, kvarh, V, A and kVA

Installation Instructions

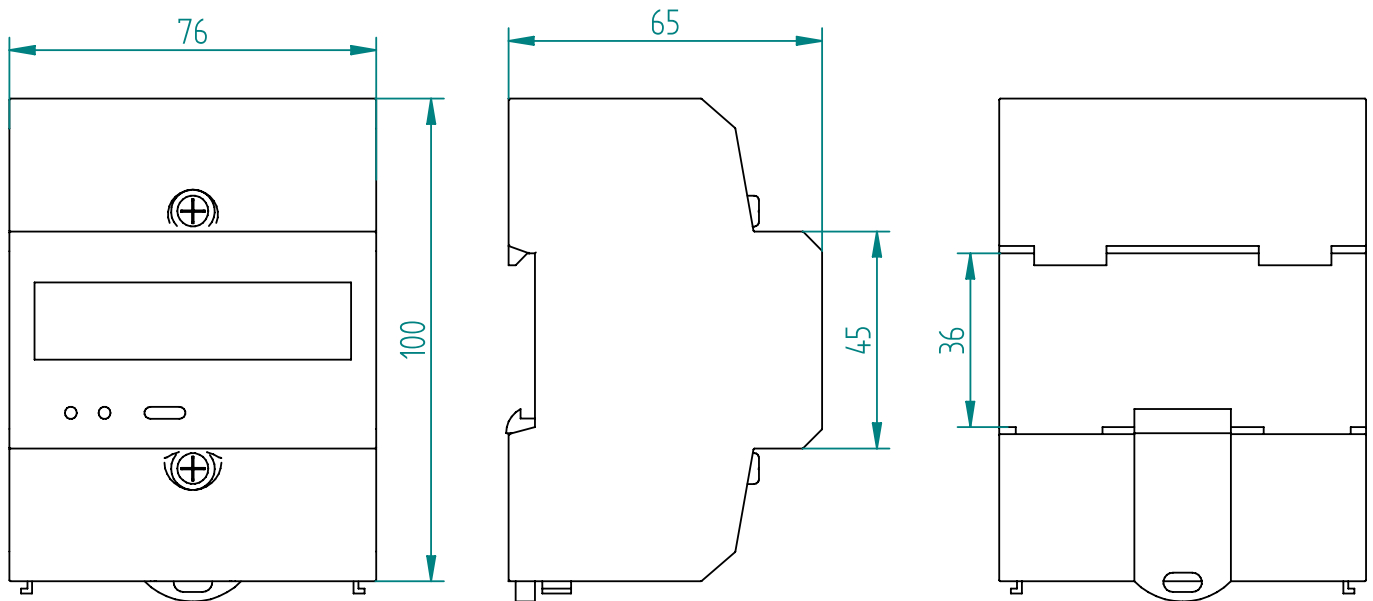
The design allows for a simple DIN-rail installation.

- 1) Choose 35 mm standard DIN-rail (the length is confirmed by yourself), fixed them in the location which are waiting for installation;
- 2) Push down the clip under the bottom of the meter for a gear;
- 3) Put the meter into the DIN-rail, then push up the clip for a gear, install meter to the DIN-rail;
- 4) Making the connection according to the wiring diagram;
- 5) After connection, use lead sealing to seal terminal cover.

Wiring Connection



Dimensional drawing



Maintenance And Storage

Care And Maintenance

The device is a maintenance-free product with determined minimum operation service life of 15 years. For possible cleaning of the outside surface from dust and other impurities, the manufacturer does not recommend using organic solvents, aggressive chemicals and abrasive cleaning agents. Prescribed storage temperatures shall be complied with: failure to do so can result in shortening of electronic components service life. The product shall be protected against wet and humid conditions. It is designed for internal use, i.e. it may be used only in places providing additional protection against the effects of external environment (e.g. in a building or cabinet). Precipitation, humidity and liquids containing minerals can cause corrosion of electric circuits if the device becomes wet. The product shall not be placed on and dried by a source of heat or inserted into a source of heat (e.g. microwave oven, classic oven or radiator / heater) as it can overheat and some of its parts explode. It shall not be exposed to excessive heat as it can lead to deformation of case / cover. The device shall not be stored in cold premises, especially with subsequent warming-up (to nominal operation temperature). Humidity can condensate inside and damage electronic components or isolation properties of the product can deteriorate.

Service

Service shall be ensured by: ZPA Smart Energy a.s., Komenského 821, 541 01 Trutnov, Czech Republic, Trademark Smart Energy, Tel. + 420 499 907 111, E-mail zpa@zpa.cz, www.zpa.cz.

Transport

The device shall be packed for transport either in the original package, in which it was delivered by the manufacturer, or in a package causing/ensuring no damage due to handling or transport.

Safety

Manufacturer Warnings

The product is capable of safe operation. The manufacturer has issued the EU Declaration of Conformity as per Act 90/2016 Coll. Despite this fact, the manufacturer warns of the risk of possible danger resulting from incorrect handling or incorrect use of the product as follows:

- Installation and maintenance must be performed by a personnel with the corresponding electro-technical qualification and adequately trained, that shall inform the operator on conditions of safe operation;
- The product shall not be used for purposes other than those it was manufactured for;
- The product shall not be willfully modified contrary to the type design;
- The product shall not be operated with voltage, current or frequency other than those it was produced or professionally modified for;
- The product shall be located and secured so as to complicate or disable handling by persons with no electro-technical qualification, especially children;
- Before every new putting to operation, e.g. after repair, maintenance etc., Ingress Protection shall be restored in full, all safety measures taken and inspection done by a designated electrical inspector;
- During operation, premises where the device is installed, shall be free of danger of fire or explosion in case of development of gases, vapors of inflammable liquids and occurrence of inflammable dust,
- The product shall be handled by a qualified and adequately trained person only, and handling shall be performed without voltage with the exception of measurement by measuring meter with insulated tips;
- The product shall not be operated under conditions or in an environment not ensuring safe operation (e.g. location on flammable base, cover from inflammable material, insufficient protection from penetration of foreign elements, water or other liquids);
- The product shall be located and operated in an indoor environment, i.e. in places providing additional protection against effects of external environment (e.g. inside a building or cabinet).
- The product shall not be operated in an environment with major vibrations and oscillations or under such conditions.
- Failure of the user to observe any of the aforesaid warnings renders the manufacturer not being liable for a defect occurring as an incidental

consequence of this failure. Non-observance of storage and operation conditions recommended in article Care And Maintenance can have an adverse effect on the device service life.

Responsibility

The owner of the device is responsible for ensuring that all persons engaged in working and handling the product:

- Are knowledgeable and qualified as per national regulations;
- Have read and understood corresponding parts of this document;
- Strictly observe safety regulations and operation data stipulated in its individual articles.

The owner of the device is further responsible for:

- Protection of persons;
- Prevention of damage to material;
- Personnel training.

Safety Instructions

The following safety instructions shall be observed under all circumstances:

- Wires the device is connected to shall be powered neither during installation nor replacement. Powered contacts pose a life threat. For this reason, until the work is finished, the corresponding power supply fuses shall be removed and stored in a place, safeguarding against unnoticed reinstallation by a person holding no responsibility;
- Local safety regulations shall be observed. The device installation shall be executed solely by qualified and trained personnel;
- During installation, the product shall be firmly held or secured against falling and causing injury;
- Dropped device shall not be installed even if showing no visible signs of damage. It shall be returned for inspection either to designated repair office or directly to manufacturer. Internal damage can cause functional failures or a short circuit;
- The product shall by no means be cleaned under running water or by high-pressure equipment. Water penetration can cause a short circuit. It is necessary to respect ingress protection of the device.

Disposal

As per certificate ISO 14001 data, the components used in the device are mostly separable and so can be disposed of or recycled accordingly. At the end of its service life, the device shall be handed over to specialized companies dealing in used material separation and consequent recycling. An unused device shall be disposed of ecologically as per the Waste Act.

The device contains no radioactive, carcinogenic or other materials having an adverse effect either on human health or the environment. All plastic materials can be recycled.

Packing is recyclable and at the end of its service life shall be handed over to specialized companies as a source of secondary raw materials or energy.

Liquidation and Legal Regulations Concerning the Environment Protection

The product disposal shall strictly observe local regulations for environment protection.

Components	Disposal
PCB, LCD, LED	Electronic waste. Dispose of as per local regulations.
Battery	Dangerous waste. Dispose of as per local regulations.
Metal parts	Separate and hand over to the waste collection center for disposal as per local regulations.
Plastic components	Separate and hand over for disposal or re-granulation as per local regulations