

AMIS

Automated Metering and Information System

TD-351x/EMVK30/EMAS30

Multifunction Meter

Electronic 4-Quadrant Multifunction Meter



- Meter types:
 - 3 Phases: 5/60 A and 10/100 A
 - 1 Phase: 5/60 A
- Integrated DLC communication
- Accuracy:
 - class 2 for active energy
 - class 3 for reactive energy
 - class A for active energy (MID)
- Number of tariff registers:
 - 2 x 6 for active energy
 - 2 x 1 for reactive energy
- Generation of 4 load profiles corresponding to P+, P-, Q+, Q- with a memory depth of 60 days
- Summation registers for active energy (supplied / imported)
- Integrated circuit breaker for customer installation
- Time- and/or load-controlled switchover between tariff registers
- Internal clock and calendar
- Expansion slot for additional services; for coupling of branch meters and pulse output modules for load profile management
- Voltage monitoring with over- and under-voltage registers
- IR interface for local readout and parameter setting
- Manipulation contacts
- External field sensor

Application and Function

The TD-351x/EMVK30/EMAS30 AMIS multifunction meters are microprocessor-controlled devices and are used for acquisition of electrical energy in 1- or 3-phase low-voltage networks for household customers.

EMVK = Electronic Metering Verified Kernel (calibration requiring firmware)

EMAS = Elektronic Metering Additional Services (non calibration requiring firmware)

The devices have a well readable and clear display and can be operated by the use of a single push-button. They can be expanded in a modular way, have an integrated disconnection device and a IR interface for local readout using a PDA.

The TD-351x/EMVK30/EMAS30 meters are integrated parts of the complete solution AMIS for the acquisition of consumption data and management of distribution networks. AMIS stands for Automated Metering and Information System.

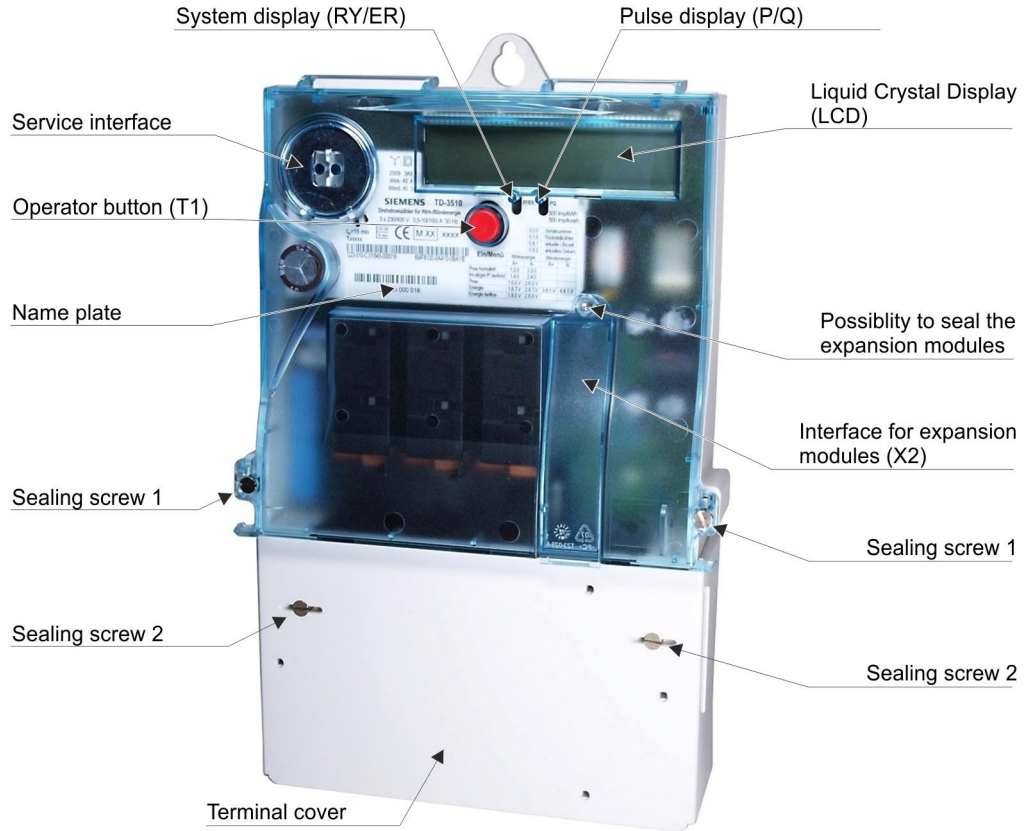
The meters communicate with higher-level devices (data concentrator CP-341x) via the low-voltage power distribution network ("power line communication") and can be parameterized and read-out remotely.

The AMIS multifunction meters are electronic 4-quadrant meters for the acquisition of active and reactive energy with following main features:

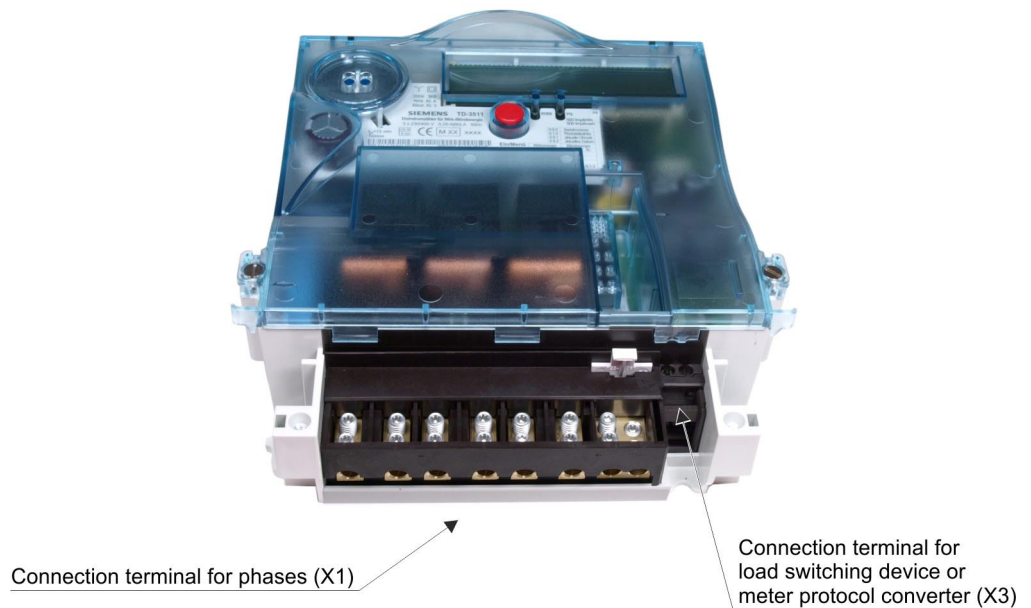
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Mechanical Design

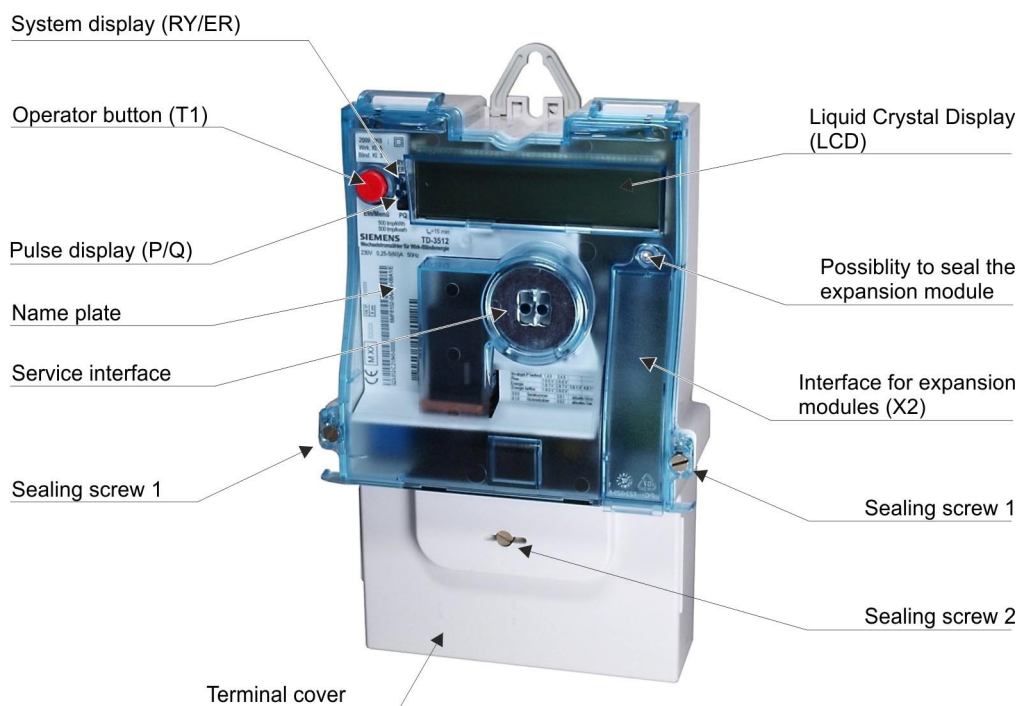
Meter TD-3510 and TD-3511



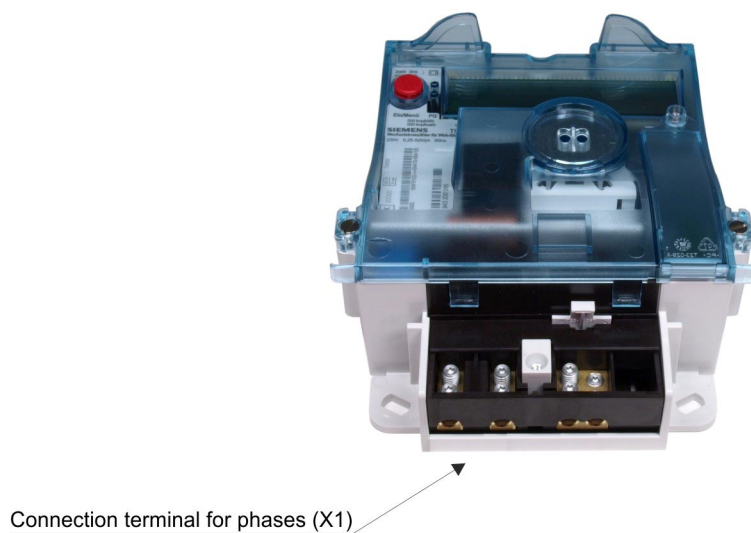
Meter without terminal cover:



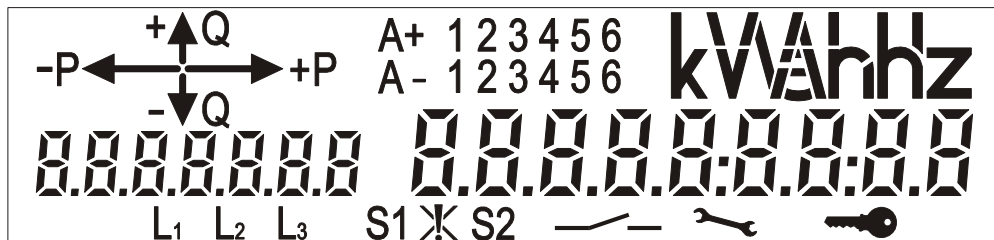
Meter TD-3512



Meter without terminal cover:

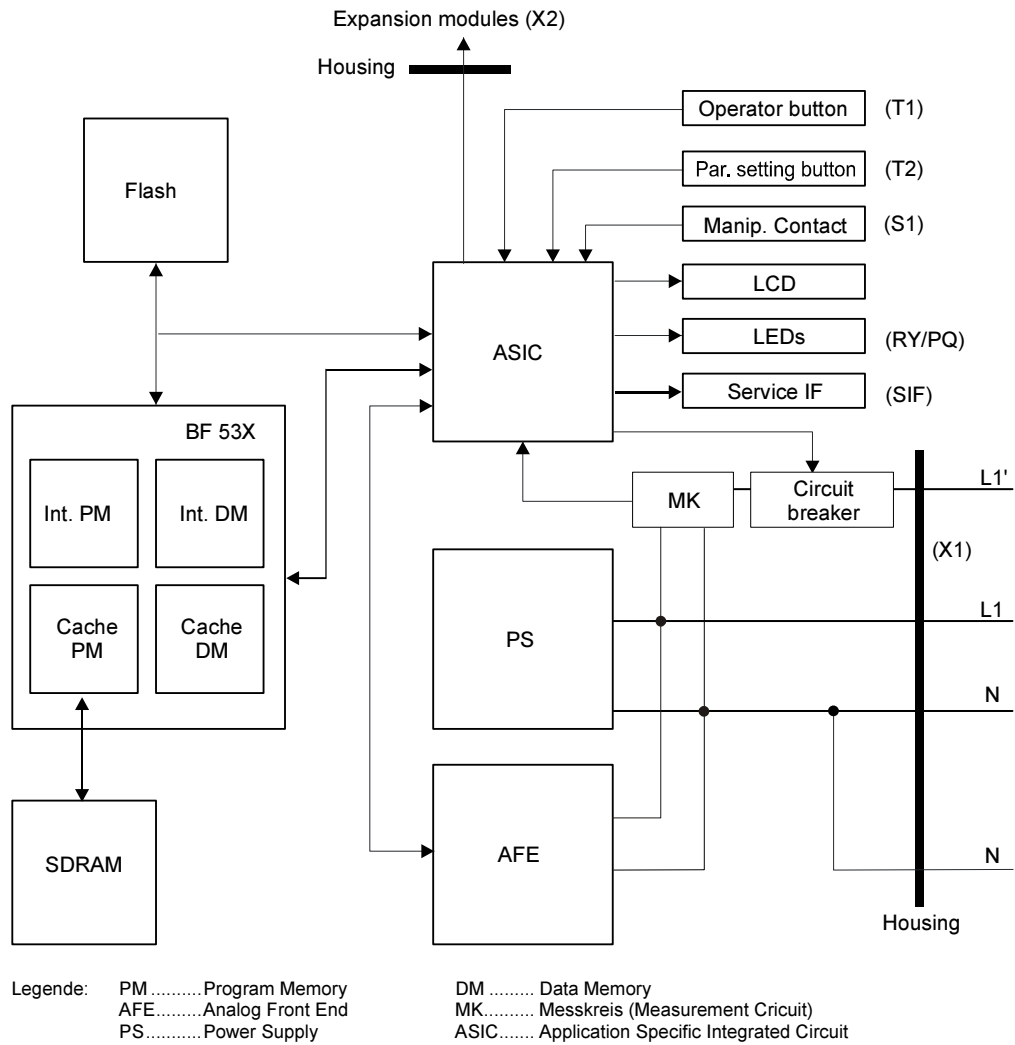


LCD Display



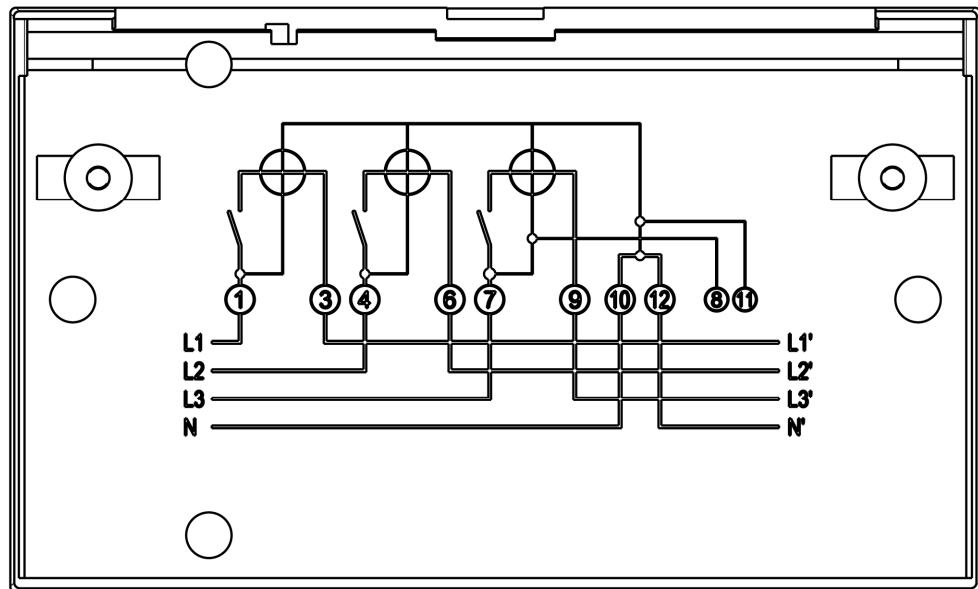
Symbol on LCD	Meaning
	Value field, 9 digits
	OBIS identifier field, 7 digits (OBIS = Object Identification System nach EN 62056-61)
L1 L2 L3	Display of phases and rotating field
	Display of phases and rotating field P = active energy Q = reactive energy + = supplied - = imported
A+ 123456 A- 123456	Tariff display
S1	Manipulation contact
	Cumulation blocked
	Parameter setting mode or manufacturer mode
	Circuit breaker
	Flash programming in process
S2	PQ-LED indicates the measuring period

Block Diagram



External Circuitry

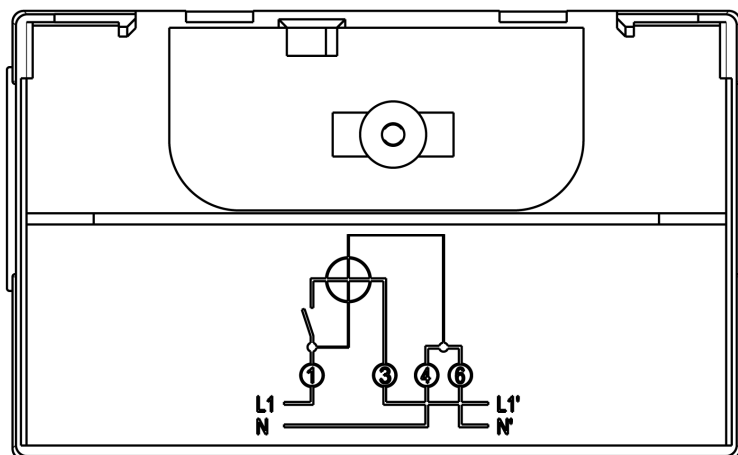
Meter TD-3510 / TD-3511



Phase	Connection terminal (X1)		Connection terminal for load-switching device or meter protocol converter (X3)
	Current input	Voltage output	Voltage output
L1	1	3	
L2	4	6	
L3	7	9	8 *)
N	10	12	11 *)

*) Load switching device and meter protocol converter must be protected by an external fuse. There is no internal fuse!


Meter TD-3512



Phase	Connection terminal (X1)	
	Current input	Voltage output
L1	1	3
N	4	6

Name plate

Meter TD-3510 (Example)



 2009 3K6
 Wirk. Kl. A
 Blind. Kl. 3

SIEMENS TD-3510
 Drehstromzähler für Wirk-/Blindenergie
 3 x 230/400 V 0,5-10(100) A 50 Hz
 A 0445/3530/2008

t_m = 15 min OE 08 CE M 09 0445
 E 100

G23-510-C.01/741-000027 6MF8100-0AA00-0BA0/E


741 000 027

RY/ER PQ
 500 Imp/kWh
 500 Imp/kvarh

0.0.0	Serialnummer
0.1.0	Rückstellzähler
0.9.1	aktuelle Uhrzeit
0.9.2	aktuelles Datum

Ein/Menü	Wirkenergie		Blindenergie	
	A+	A-	R+	R-
P _{max} kumuliert	1.2.0	2.2.0		
t _m -abgel./P laufend	1.4.0	2.4.0		
P _{max}	1.6.0.V	2.6.0.V		
Energie	1.8.T.V	2.8.T.V	3.8.1.V	4.8.1.V
Energie tariftos	1.8.0.V	2.8.0.V		

Meter TD-3511 (Example)



 2008 3K6
 Wirk. Kl. A
 Blind. Kl. 3

SIEMENS TD-3511
 Drehstromzähler für Wirk-/Blindenergie
 3 x 230/400 V 0,25-5(60) A 50Hz

t_m = 15 min OE 08 CE M 09 0445
 E 030

G23-511-C.01/741-000027 6MF8101-0AA00-0BA0/E

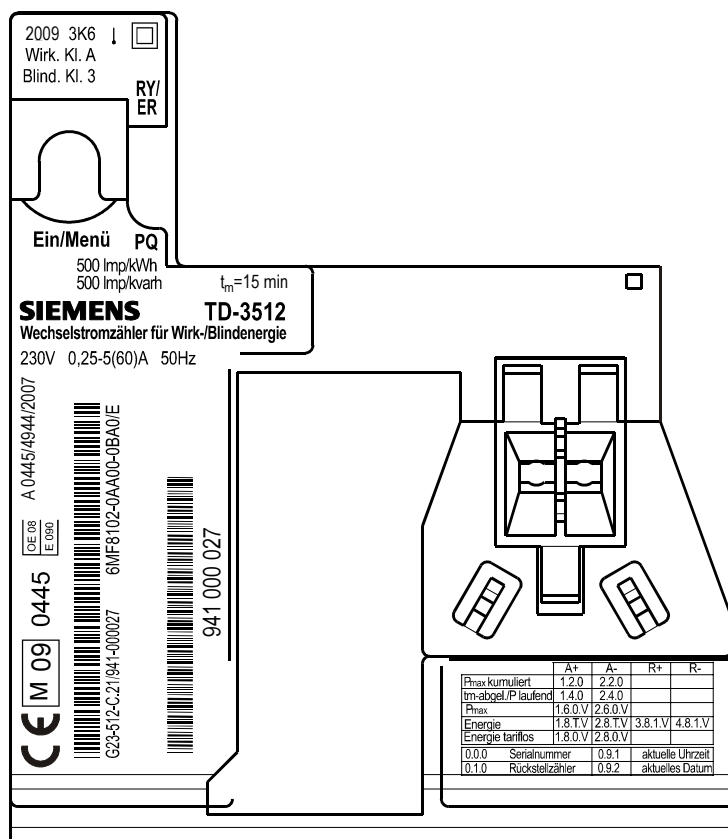
741 000 027

RY/ER PQ
 500 Imp/kWh
 500 Imp/kvarh

0.0.0	Serialnummer
0.1.0	Rückstellzähler
0.9.1	aktuelle Uhrzeit
0.9.2	aktuelles Datum

Ein/Menü	Wirkenergie		Blindenergie	
	A+	A-	R+	R-
P _{max} kumuliert	1.2.0	2.2.0		
t _m -abgel./P laufend	1.4.0	2.4.0		
P _{max}	1.6.0.V	2.6.0.V		
Energie	1.8.T.V	2.8.T.V	3.8.1.V	4.8.1.V
Energie tariftos	1.8.0.V	2.8.0.V		

Meter TD-3512 (Example)



Characteristics

	TD-3510	TD-3511	TD-3512
Nominal voltage Un	3 x 230 / 400 V		230 V
Voltage range	230 VAC -20% / +15%		
Rated frequency	50 Hz		
Basic current Ib (IEC 62052-11)	10 A	5 A	5 A
Maximum current Imax (IEC 62052-11)	100 A	60 A	60 A
Mechanical design	DIN 43857-2	DIN 43857-1	DIN 43857-1
Connection terminals, hole diameter	9,5 mm	6,5 mm	6,5 mm
Accuracy class for active energy	Class 2 according to IEC 62053-21 Class A according to MID		
Accuracy class for reactive energy	Class 3 according to IEC 62053-23		
Display element (LCD)	Value field: 9 digits (height: 8 mm) OBIS identifier field: 7 digits (height: 6 mm) Display of energy direction (quadrants) Tariff display Symbol display of manipulation contact, cumulation blocking, disconnection device, phases and rotating field		
Number of tariff registers	6 for active energy imported +1 sum register 6 for active energy supplied +1 sum register 1 for reactive energy imported 1 for reactive energy supplied		
Tariff switching	Switching program per tariff register with max. 64 entries by <ul style="list-style-type: none"> time/calendar/holidays/day of week consumption values of basic load/overload 		
Cumulation	Controlled by time/calendar or on request (local/control center) Automatically: daily, weekly or monthly Cumulation counter, Cumulation time with date/time		
Cumulated values	15 per tariff register		
Measured values	Current P+ and P-, Current Q+ and Q-, frequency, voltage, current, phase angle		
Special registers	Active energy imported and delivered (without tariff) Up-to-date and maximum active power (imported and delivered)		
Load profile data	Separately available for P+, P-, Q+, Q- with 5760 entries each (= 60 days with a measuring period of 15 minutes)		
Logbook and sizes	separated in: General with max.: 100	Calibration-relevant 50	Voltage Quality 25 entries
Voltage quality	Counter for over-/undervoltage and voltage failure Acquisition of over-/undervoltage intervals Long-term and short-term voltage outage times (logbook) Counter for voltage dip		

	TD-3510	TD-3511	TD-3512
Realtime clock	Synchronized internal, via control center or mains frequency With season switching, setable		
Running reserve of clock (RTC)	min. 24 hours after 1,5 hours charging time min. 84 hours after 24 hours charging time		
Calendar function	Up to 30 holidays with date or setable relatively, changing holidays (e.g. Easter) are supported		
Optical interface	According to IEC 62056-21 Mode C or via integrated webserver		
Interface for remote reading and remote parameterization	DLC communication according to EN50065 in a frequency band of 5 to 95 kHz (A band)		
OBIS compatibility	For display and optical interface according to IEC 62056-21		
Integrated disconnection device	L1, L2, L3	L1, L2, L3	L1
Activation of disconnection device	Depending on parameterizable criteria (power consumption, used-up credits) or by command of the control center		
Reclosing	Manually by the customer, must be enabled by control center		
Maximum switching current ^{*)}	100 A	80 A	80 A
Manipulation contacts	Separately available for terminal cover and calibration circuit		
Storing of values	Non-volatile FLASH memory		
Expansion slot	Expansion slot for one module (e.g. M-Bus)		
Pulse display	Proportional to energy by LED Pulse constant 500 pulses per kWh Pulse width 40 ms +/-10%		
Pulse contact	Possible with expansion module (MT-3630)		
Interfacing of branch meters	Possible with M-Bus expansion modules (MT-3621, MT-3622)		
Additional functions	Prepaid function: from a parameterizable count (loadable credit in kWh) counting backwards until activation of the disconnection device Option in case of activation: reduction of power demand or switching to emergency power demand		

^{*)} ensured by meter function

Technical Specifications

Analog Inputs

Analog Inputs	Types, Values, Ranges, Settings				
Rated current			TD-3510	TD-3511	TD-3512
	Number of phases		3	3	1
	I_{min}	EN50470-1	500 mA	250 mA	250 mA
	I_{tr}	EN50470-1	1 A	500 mA	500 mA
	I_B	Basic current IEC62052-11	10 A	5 A	5 A
	I_{ref}	Reference current EN50470-1			
	I_{max}	max. current in regard to accuracy class rating IEC62052-11 EN50470-1	100 A	60 A	60 A
	I_{TH1}	max. permissible continuous current, thermal limit	100 A ¹⁾	75 A	75 A
	I_{TH2}	max. permissible overcurrent, thermal for 2 h	128 A ¹⁾ (für 2 h)	80 A (für 1 h)	80 A (für 1 h)
	I_{Kmin}	min. short-circuit current	800 A (for 400 ms)	800 A (for 400 ms)	800 A (for 400 ms)
	I_{MB}	max. permissible short-time overcurrent (60 seconds)	200 A (typ) 150 A (min)	120 A (typ) 90 A (min)	120 A (typ) 90 A (min)
	I_{HW}	max. permissible short-time overcurrent (1 half wave) IEC62053-21	3000 A	1800 A	1800 A
	I_{st}	current detection (starting current)	40 mA	20 mA	20 mA
I_{NB}	Zero-range suppression	<20 mA	<10 mA	<10 mA	
Rated voltage	Number of phases		3	3	1
	U_N	Rated voltage: IEC62052-11	230 V	230 V	230 V
	U_{MB}	max. permissible short-time overvoltage	460 V	460 V	460 V
	Frequencies		50 Hz \pm 15% (up to incl. 20. harmonic) (according to EN50160)		
Influence of frequency for power calculation	Active power fundamental component up to the 20. harmonic Reactive power: only fundamental component			(It Norm EN50160) (according to EN50160)	
Accuracy class	Active energy acc.	MID:	KL A		
		IEC 62053-21:	KL 2		
	Reactive energy acc.	IEC 62053-21:	KL 3		
	Warm-up time:	30 minutes	=> residual error not verifiable		
	15 minutes	=> residual error typ. 0,2%			
	10 minutes	=> residual error typ. 0.3%			

¹⁾ with connection conductor cross-section 35 mm²

Circuit breaker

Circuit Breaker	Types, Values, Ranges, Settings			
Functions		TD-3510	TD-3511	TD-3512
	Number of phases	3	3	1
	Circuit breaker integrated	Yes	Yes	Yes
	I _{MS} max. switched current	100 A	80 A	80 A
	Power dissipation (typ, per Phase, I _{MAX})	5.5 W	2.4 W	2.4 W
	The circuit breaker does not correspond to a safety-related separation.			

Energy proportional pulse indication (P/Q)

Pulse indicaton	Types, Values, Ranges, Settings	
Default pulse constant:	Active energy	500 Pulses/kWh
	Reactive energy	500 Pulses/kvar
	Pulse width	40 ms ±10%

Power Supply

Supply Voltages	Types, Values, Ranges, Settings		
Operating voltage	230 VAC -20% / +15% (according to IEC62052-11) The voltage is picked of from the measurement circuits (before the circuit breaker, supplied from all phases)		
Power consumption 3-phase	TD-3511 TD-3510	DLC-transmitter inactive	approx. 5.4 W (1.8 W each phase) approx. 14 VA (L1 = 8.5 VA L2 = 2.7 VA L3 = 2.7 VA)
		DLC-transmitter active	approx. 7 W (2.2 W each phase) approx. 15 VA (L1 = 9 VA L2 = 3 VA L3 = 3 VA)
Power consumption	TD-3512	DLC-transmitter inactive	approx. 3.6 W approx. 9 VA
		DLC-transmitter active	approx. 4.5 W approx. 14 VA

Protection against contact, dust and water

	Types, Values, Ranges, Settings	Product Standard
Degree of protection	IP 51	IEC62052-11

Mechanics

Mechanics	Types, Values, Ranges, Settings		
Mechanical design of the device	Housing according to DIN 43857		
	TD-3510	TD-3511	TD-3512
Dimensions (WxHxD)	187 x 298 x 61 mm	187 x 298 x 61 mm	146 x 248 x 61 mm
Weight	approx. 1.350 g	approx. 1.200 g	approx. 700 g
Tightening torque of the sealing screw	The sealing screws are tightened with 0.3 Nm and afterwards turned back so far, until the cross hole is in the direction of the sealing-wire lead-through. (<1/2 revolution)		

Climatic Environmental Conditions

Parameter	Range	Testing Standard	Product Standard
Temperature min. (device environment)	-25°C		EN62052-11
Temperature max. (device environment)	+55°C		EN62052-11
Relative air humidity	<=95%		EN62052-11
Dry heat ¹⁾ 72 h	70°C	IEC 680068-2-2	EN62052-11
Cold ¹⁾ 72 h	-25°C	IEC 680068-2-1	EN62052-11
Moisture heat ¹⁾ 72 h	40°C	IEC 680068-2-78	EN62052-11
Heating	25°C		EN62052-11

¹⁾ ... not in operation



Warning

The meter TD-351x may not be mounted near to heat sources (e.g. heating- or dryer vents, air conditioners, lamps, etc.).

Mechanical Environmental Conditions

Not in operation, without packing

Parameter	Values	Testing Standard	Product Std.
Spring hammer	0,2 J	IEC60068-2-75	IEC62052-11
Oscillation 10...60 Hz	0.075 mm	IEC60068-2-6	IEC62052-11
Oscillation 60 150 Hz	1 g	IEC60068-2-6	IEC62052-11
Surge 18 ms	30 g	IEC60068-2-27	IEC62052-11
Heat and fire, 30 s		IEC60695-2-11	IEC62052-11
Terminals	960°C		
Housing	650°C		

Electrical Ambient Conditions

Immunity / EMC

Parameter	Value	Testing Standard	Product Standard
Nominal voltage AC	230 V		IEC 60038
Voltage tolerance AC	-20 / +15 %		IEC 62052-11
Immunity against discharge of static electricity (ESD)	15 kV-L	IEC 61000-4-2	IEC 62052-11
Immunity against electromagnetic fields amplitude modulated	I = In I = 0	10 V/m 30 V/m ³⁾	IEC 61000-4-3 IEC 62052-11
Immunity against electromagnetic fields pulse modulated		10 V/m	IEC 61000-4-3
Immunity against electromagnetic fields 50Hz continuous		100 A/m	IEC 61000-4-8
Immunity against electromagnetic fields 50Hz Short-term disturbance		300 A/m	IEC 61000-4-8
Fast transient disturbance common		4 kV ⁴⁾	IEC 61000-4-4 IEC 62052-11
Insulation surge voltage 1.2/50 µs common		6 kV	IEC 60060-1 IEC 62052-11
Clearance / creeping distance amplified insulation		5.5 / 6.3 mm	IEC 62052-11
Impulse voltage 1.2/50 µs normal ¹⁾			IEC 62052-11
	L2, L3 gegen N	6 kV	IEC 61000-4-5
	L _x gegen L _y (x, y = 1, 2, 3)	6 kV	IEC 61000-4-5
	L1 gegen N	4 kV ⁷⁾	IEC 61000-4-5
		5.5 kV	n.a. ⁶⁾
Immunity against induced HF voltage common normal		10 V ²⁾ 134/66 dBµV	IEC 61000-4-6 IEC 62052-11
Radio interference voltage - quasi peak value		class B	CISPR 22 IEC 62052-11
Radio interference voltage - mean value		class B	CISPR 22 IEC 62052-11
Disturbance voltage DLC Bandwidth (Broadband) 30 kHz (95 kHz) Disturbance voltage (out BW)		>5 kHz 5 V _{PK} see ⁵⁾	EN50065-1
Device impedance (receive/transmit)			
	3 kHz 9 kHz	≥10 Ω/arbitrary	
	9 kHz ... 95 kHz (in BW)	≥50 Ω/arbitrary	
	9 kHz ... 95 kHz (out BW)	arbitr./arb.	
	95 kHz ... 148.5 kHz	>5 Ω / >3 Ω	

¹⁾ only in differential mode (line to line),
acc. to IEC62052-11, chap. 7.5.6.

²⁾ for DLC-communication at levels between 3 V/m and 10 V/m the evaluation criterion B (acc. to EN50065-2-3) has to be applied.

³⁾ for DLC-communication at levels between 10 V/m and 30 V/m the evaluation criterion B (acc. to EN50065-2-3) has to be applied.

⁴⁾ peak voltage acc. to EN50065-2-3 (2 kV) is exceeded

⁵⁾ limiting values for surge voltage acc. to EN50065-1

⁶⁾ limited by the specifications of the safety coupling-capacitor of the DLC communication

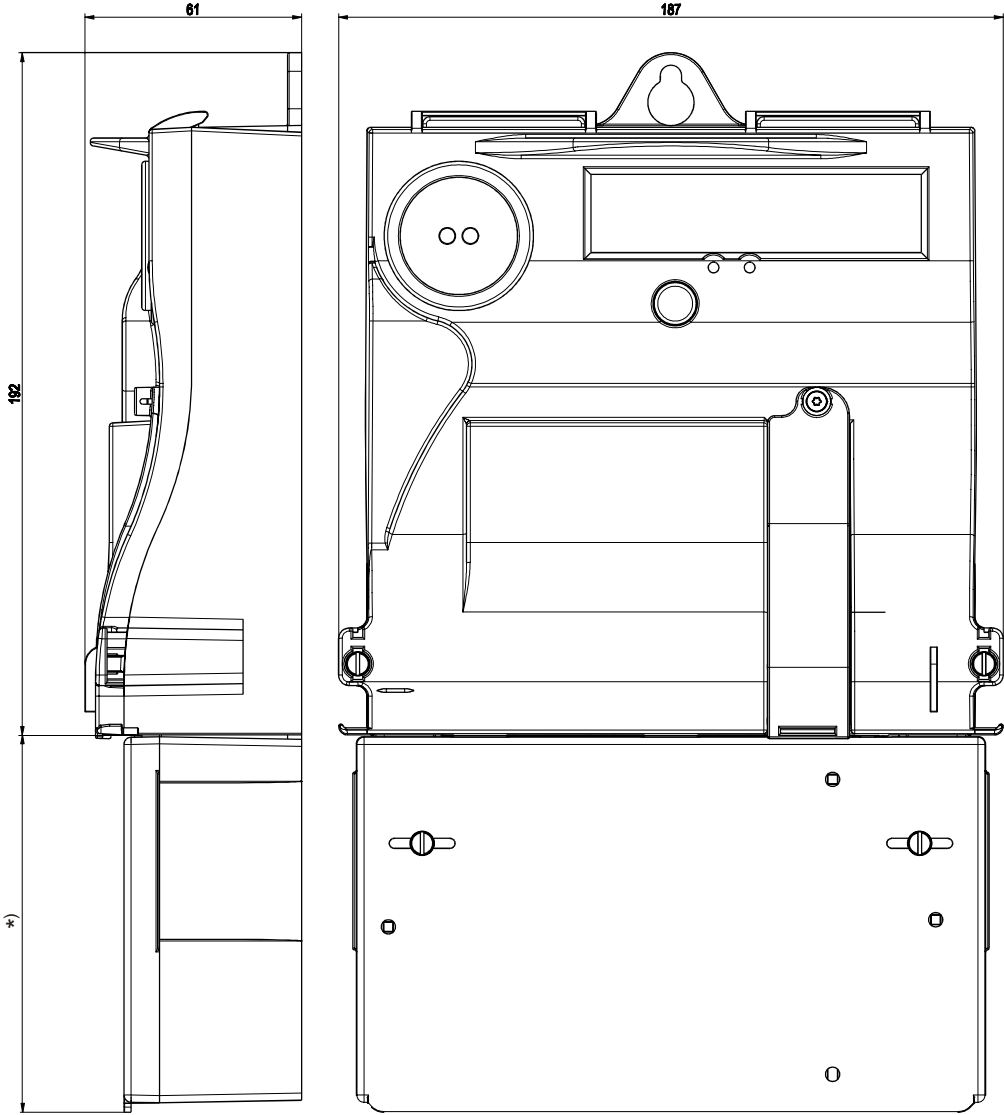
⁷⁾ the reduction ist caused by the generator-internal wiring

Insulation

Parameter	Value	Note
Protection class	2	
Peripheral voltage circuits	$U_N \leq 40V_{\text{eff}}$	These circuits are dimensioned as <u>secondary circuits</u> (cabling inside buildings)
	$40V_{\text{eff}} < U_N \leq 230/400V_{\text{eff}}$	These circuits are dimensioned as <u>primary circuits</u> (network cabling, no insulating transformer required, cabling outside buildings)
Overvoltage category	IV	according to VDE110, Tab.1 The value is to be ensured with high-voltage fuse.

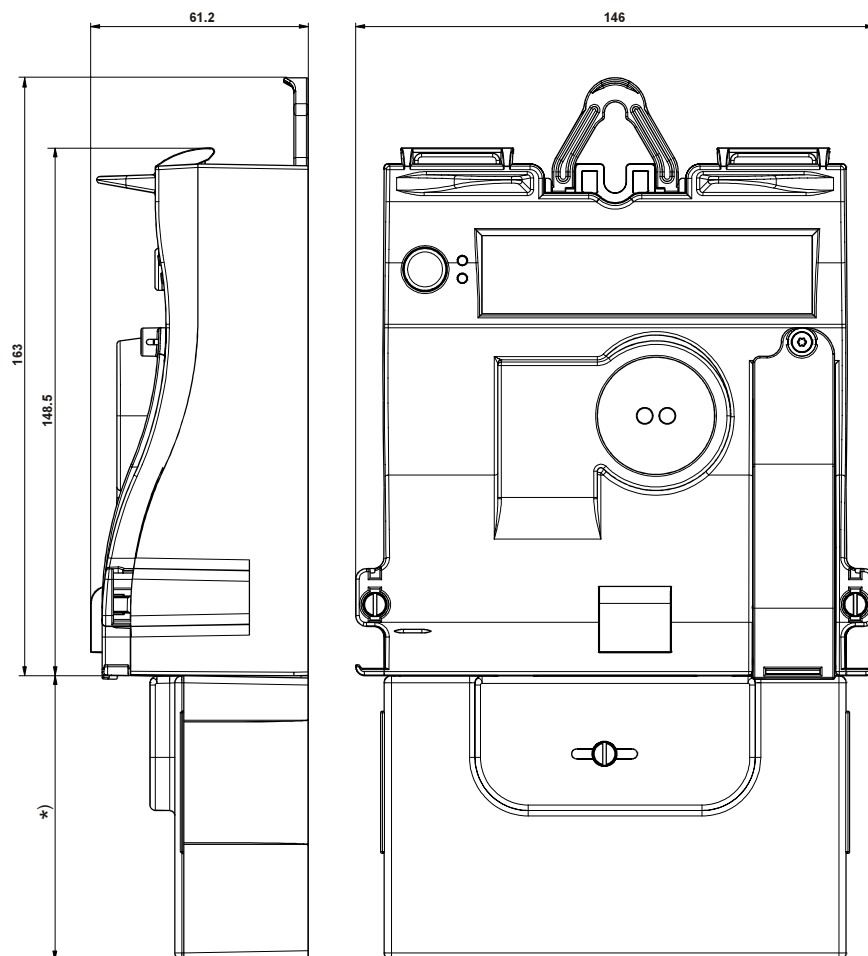
Drawings

Meter TD-3511 / TD-3510



*) This measure is dependent from the respective version of the terminal cover version (see AMIS Ordering Code)

Meter TD-3512



- *) This measure is dependent from the respective version of the terminal cover version (see *AMIS Ordering Code*)

Literature

Brochure AMIS	E50001-U330-A186
Data Sheet AMIS Meter TD-351x/EMVK30/EMAS30	M23-050-1
Data Sheet AMIS Data Concentrator CP-341x/CPC30	M23-051-1
Data Sheet AMIS Power Supply Module PS-3460	M23-052-1
Data Sheet AMIS Load-Switching Device TD-3520/TASU30	M23-053-1
Data Sheet AMIS Meters Protocol Converter TD-3530/TACU30	M23-054-1
AMIS Ordering Code	D23-039-1

Disclaimer of Liability

Although we have carefully checked the contents of this publication for conformity with the hardware and software described, we cannot guarantee complete conformity since errors cannot be excluded. The information provided in this manual is checked at regular intervals and any corrections that might become necessary are included in the next releases. Any suggestions for improvement are welcome.

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