

3-Phase Energy meter with Serial S-Bus interface

Energy meters with an integrated Serial S-Bus interface allow direct reading of all relevant data, such as energy (Total and partial), current and voltage for every phase and active and reactive power for every phase and for the three phases.

Main features

- ▶ 3-phase energy meter, 3 × 230 / 400 VAC 50 Hz
- ▶ Direct measurement up to 65 A
- ▶ Display of active power, voltage and current for every phase
- ▶ Display of active power for all phase
- ▶ S-Bus Interface to query the data
- ▶ Reactive power for every and/or all Phase available through interface
- ▶ Up to 254 meter can be connected to the S-Bus Interface
- ▶ 7-digit display for 1 or 2 tariffs
- ▶ Lead seal possible with cap as accessory
- ▶ Accuracy class B according to EN50470-3, accuracy class 1 according to IEC62053-21



Order Number

Standard Version: ALE3D5FS10C2A00
 MID Version: ALE3D5FS10C3A00
 Sealing caps: 4 104 7485 0

Technical data

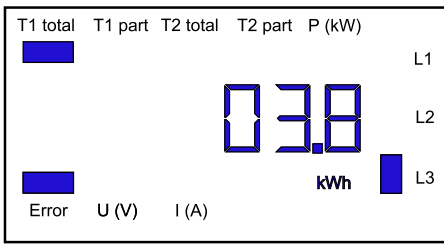
Precision class	B according to EN50470-3, 1 according to IEC62053-21
Operating voltage	3 × 230 / 400 VAC, 50 Hz Tolerance -20% / +15%
Reference/ maximum current	$I_{ref} = 10 \text{ A}$, $I_{max} = 65 \text{ A}$
Starting/minimum current	$I_{st} = 40 \text{ mA}$, $I_{min} = 0.5 \text{ A}$
Power consumption	Active 0.4 W per phase
Counting range	00'000.00... 99'999.99 100'000.0... 999'999.9
Display	LCD backlit, digits 6 mm high
Display without mains power	Capacitor based LCD max. 2 times over 10 days
Pulses per kWh	LED: 1000 Imp./kWh

Mounting

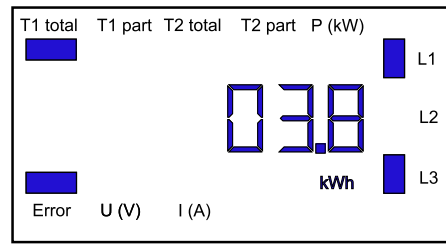
Mounting	On 35 mm rail, according to EN60715TH35
Terminal connections main circuit	Conductor cross-section 1.5–16 mm ² , screwdriver Pozidrive no. 1, slot no.2, torque 1.5–2 Nm
Terminal connections control circuit	Conductor cross-section max. 2.5 mm ² , screwdriver Pozidrive no. 0, slot no.2, torque 0.8 Nm
Insulation characteristics	– 4 kV / 50 Hz test according to IEC62053-21 for Energy Meter part – 6 kV 1.2/50 μs surge voltage according to IEC62052-11 – 2 kV/50 Hz test according to IEC62053-21 for Interface – Device protection class II
Ambient temperature	–25 °...+55 °C
Storage temperature	–30 °...+85 °C
Environment	Mechanical M2 Electromagnetic E2
Relative humidity	75 % without condensation
EMC/interference immunity	– Surge voltage according to IEC61000-4-5 at main circuit 4 kV at S-Bus interface 1 kV – Burst voltage according to IEC61000-4-4, at main circuit 4 kV at S-Bus interface 1 kV – ESD according to IEC61000-4-2, contact 8 kV, air 15 kV

Error indication

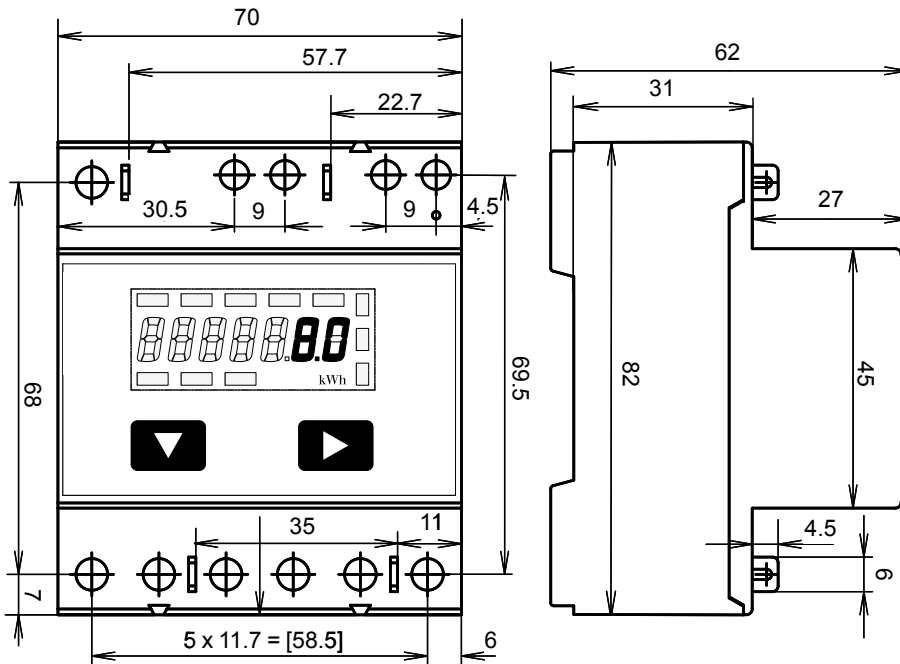
Example: connection error at L3



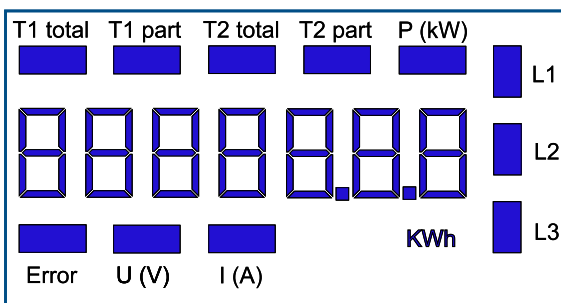
Example: connection error at L1 and L3



Dimensioned drawings

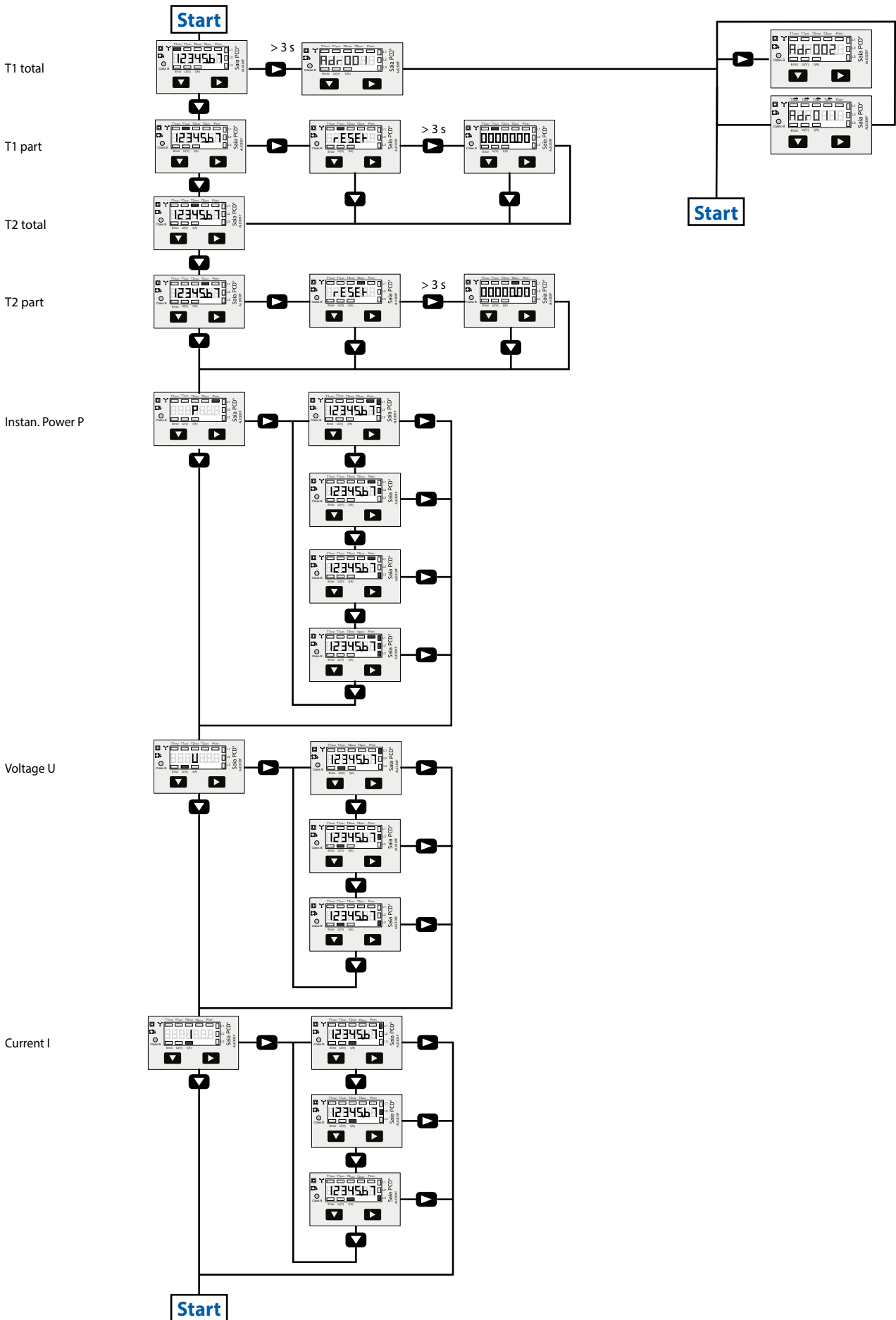


Display elements, direct measurement

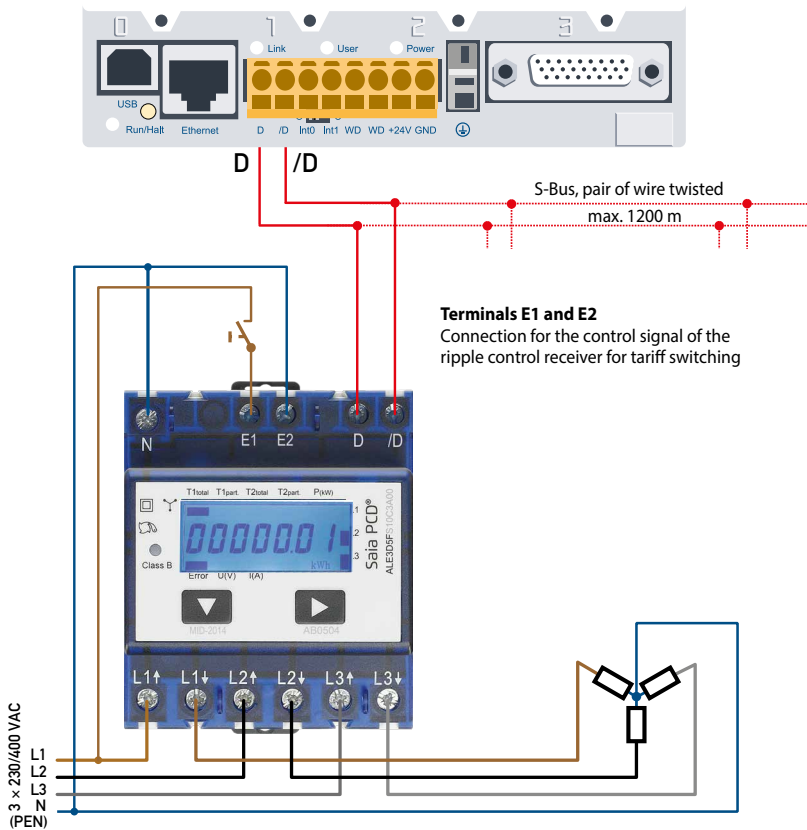


- ▶ T1 total Indicates the total consumption for tariff 1
- ▶ T1 part Indicates the partial consumption for tariff 1. This value can be reset
- ▶ T2 total Indicates the total consumption for tariff 2
- ▶ T2 part Indicates the partial consumption for tariff 2. This value can be reset
- ▶ P (kW) Indicates the instantaneous output per phase or for all phases
- ▶ U (V) Indicates the voltage per phase
- ▶ I (A) Indicates the current per phase
- ▶ kWh Indicates the unit kWh for display of consumption
- ▶ L1/L2/L3 Whenever the display shows P, U, I or Error. The corresponding phase will be indicated
- ▶ Error When phase is absent or current direction is wrong. The corresponding phase will also be indicated

Menu to display the value on LCD



Wirings Diagram



Technical data S-Bus

Bus system	S-Bus
Transmission rate	4800-9600-19'200-38'400-57'600-115'200. The transmission Baud rate is automatically detected
Transmission mode	Data
Bus length (max.)	1200 m (without repeater)
Response time:	Write : 60 ms Read : 60 ms

- ▶ The interface works only if the Phase 1 is connected.
- ▶ The communication is ready 30 s after the Power On
- ▶ The use of Energy meter in Bus with intensive communication could reduce the performance of the Bus
- ▶ Refresh Time for the data is 10 s. For this reason one energy meter should be not polled faster as 10 s.
- ▶ 254 devices could be connected to the S-Bus. Over 128 devices, a repeater should be used.
- ▶ The interface don't have a terminal resistor, this should be provided external.
- ▶ For a description of the used registers please look at the Register Page

Data transmission

- ▶ Only «read/write» register instructions are recognized.
- ▶ Only one register can be written at a time.
- ▶ The device will respond „NAK” if more than 1 register is written.
- ▶ Up to 10 Registers could be read at a time.
- ▶ The device will respond „NAK” if more than 10 registers are read.
- ▶ The device will not respond to any unknown query.
- ▶ The device has a voltage monitoring system. In case of voltage loss, registers are stored in EEPROM (transmission rate» etc.)

Change the S-Bus address direct on device

- ▶ To modify the S-Bus address, press 3 sec on ▶ touch
- ▶ In menu, ▼ increase address by 10, ▶ increase by 1
- ▶ Once the address is selected wait for the root menu to come back

Register

The following registers are available. The registers 4, 10, 13 and 18 are not used and will give always the answer 0.

R	Read	Write	Description	Unit
0	X		Firmware-Version	Ex: „11“= FW 1.1
1	X		Number of supported registers	will give „41“
2	X		Number of supported flags	will give „0“
3	X		Baudrate	BPS
4	X		Not used	will give a „0“
5	X		Type/ASN function	will give „ALE3“
6	X		Type/ASN function	will give „D5FS“
7	X		Type/ASN function	will give „10Cx“ x : 2 = non MID x : 3 = MID
8	X		Type/ASN function	will give „A00“
9	X		HW Vers. Modif	Ex: «12»= FW 1.2
10			Not used	will give a „0“
11	X		Serial number	Serial number high
12	X		Serial number	Serial number low
13			Not used	will give a „0“
14	X		Status/Protect	„0“ = no Problem „1“ = Problem with last communication request
15	X		S-Bus Timeout	ms
16	X	X	S-Bus Address	
17	X		Error Flags	0 : No error 1 : Error Phase 1 2 : Error Phase 2 3 : Error Phase 1 and 2 4 : Error Phase 3 5 : Error Phase 1 and 3 6 : Error Phase 2 and 3 7 : Error Phase 1, 2 and 3
18			Not used	will give „0“
19	X		Tariff flag	0 is Tariff 1 4 is Tariff 2
20	X		WT1 total Counter Energy Total Tarif 1	10 ⁻² kWh. (multiplier 0,01) Ex: 00912351= 009123,51 kWh
21	X	X	WT1partial Counter Energy partial Tarif 1 To reset the counter, 0 should be write	10 ⁻² kWh. (multiplier 0,01) Ex: 00912351= 009123,51 kWh
22	X		WT2 total Counter Energy Total Tarif 2	10 ⁻² kWh. (multiplier 0,01) Ex: 00912351= 009123,51 kWh
23	X	X	WT2partial Counter Energy partial Tarif 2 To reset the counter, 0 should be write	10 ⁻² kWh. (multiplier 0,01) Ex: 00912351= 009123,51 kWh
24	X		URMS phase 1 Effective Voltage of Phase 1	V Ex: 230 = 230 V
25	X		IRMS phase 1 Effective Current of phase 1	10 ⁻¹ A (multiplier 0,1) Ex: 314 = 31,4 A
26	X		PRMS phase 1 Effective active Power of phase 1	10 ⁻² kW (multiplier 0,01) Ex: 1545 = 15,45 kW
27	X		QRMS phase 1 Effective reactive power of phase 1	10 ⁻² kVA (multiplier 0,01) Ex: 1545 = 15,45 kVAr
28	X		cos phi phase 1	10 ⁻² (multiplier 0.01) Ex: 67 = 0.67
29	X		URMS phase 2 Effective Voltage of Phase 2	V Ex: 230 = 230 V
30	X		IRMS phase 2 Effective Current of phase 2	10 ⁻¹ A (multiplier 0,1) Ex: 314 = 31,4 A
31	X		PRMS phase 2 Effective active Power of phase 2	10 ⁻² kW (multiplier 0,01) Ex: 1545 = 15,45 kW
32	X		QRMS phase 2 Effective reactive power of phase 2	10 ⁻² kVA (multiplier 0,01) Ex: 1545 = 15,45 kVAr
33	X		cos phi phase 2	10 ⁻² (multiplier 0.01) Ex: 67 = 0.67
34	X		URMS phase 3 Effective Voltage of Phase 3	V Ex: 230 = 230 V
35	X		IRMS phase 3 Effective Current of phase 3	10 ⁻¹ A (multiplier 0,1) Ex: 314 = 31,4 A
36	X		PRMS phase 3 Effective active Power of phase 2	10 ⁻² kW (multiplier 0,01) Ex: 1545 = 15,45 kW
37	X		QRMS phase 3 Effective reactive power of phase 3	10 ⁻² kVA (multiplier 0,01) Ex: 1545 = 15,45 kVAr
38	X		cos phi phase 3	10 ⁻² (multiplier 0.01) Ex: 67 = 0.67
39	X		PRMS total Effective active Power of all phase	10 ⁻² kW (multiplier 0,01) Ex: 1545 = 15,45 kW
40	X		QRMS total Effective reactive power of all phase	10 ⁻² kVA (multiplier 0,01) Ex: 1545 = 15,45 kVAr

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