Electricity meter, 1-phase or 3-phase

- For 1-phase and 3-phase power grids
- For heat pumps in conjunction with Vitotronic 200, type WO1C
- For Vitocal 161-A DHW heat pump

Safety instructions

⚠️ **Please follow these safety instructions closely to prevent accidents and material losses.**

Safety instructions explained

⚠️ **Danger**
This symbol warns against the risk of injury.

! **Please note**
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Installation, commissioning, inspection, maintenance and repairs must only be carried out by a competent person (heating engineer/installation contractor).

Before working on the appliance/heating system, isolate the system from the power supply (e.g. by removing a separate mains fuse or by means of a mains isolator) and safeguard against unauthorised reconnection.

Note
In addition to the control circuit, there may be several power circuits (e.g. compressor, instantaneous heating water heater).

⚠️ **Danger**
If not all electrical circuits are isolated, injury through electric shock and appliance damage may result.
Isolate all existing electrical circuits from the power supply and safeguard against reconnection.

Repairing components that fulfil a safety function can compromise the safe operation of your system.
For replacements, use only original spare parts supplied or approved by Viessmann.

Application

Power generated by the photovoltaic system can be used to operate the heat pump and other heating system components (on-site energy consumption). For this, one or more energy consumers can be connected to the photovoltaic system (e.g. heat pump or washing machine).
In the case of on-site power consumption by the heat pump, an electricity meter must be connected to the heat pump control unit via Modbus.

The following connections are possible:
■ 1-phase electricity meter for 1-phase power grids (power supply utility):
  – The PV system feed-in can be 1-phase.
  – The heat pump connection can be 1-phase.
■ 3-phase electricity meter for 3-phase power grids (power supply utility):
  – The PV system feed-in can be 1-phase, 2-phase or 3-phase.
  – The heat pump connection can be 1-phase or 3-phase.
■ 3-phase electricity meter for 1-phase power grids (power supply utility):
  – Jumpers on the 3-phase electricity meter must be wired
  – The PV system feed-in can be 1-phase, 2-phase or 3-phase.
  – The heat pump connection can be 1-phase.

Through the electricity meter, the heat pump control unit receives information about whether and how much (residual) energy is available from the PV system.

This enables the heat pump control unit to efficiently regulate on-site power consumption by the components connected to the heat pump (e.g. DHW heating).

Note
The electricity meter is not approved for power supply utility billing. The electricity meter therefore does not need to be calibrated.

Software versions in conjunction with the Vitotronic 200, type WO1C

The electricity meters can be used in conjunction with the following software versions or newer:
■ Controls:
  B920W217
■ Heat pump:
  4.33
■ Coding card:
  41..-0...

Calling up the software versions

Service menu:
1. Hold down **OK** + ☰: simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"System information"**

5547 083 GB

System information

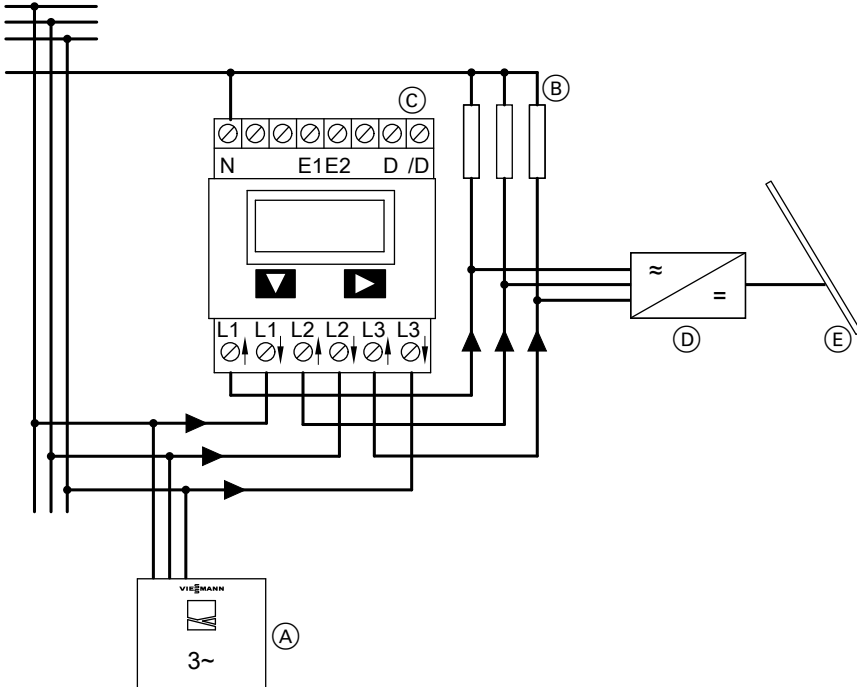|	
Control	B920W217 / C
	B920W217 / 000
Heat pump	4.33 / 00
Coding card	41A6:00 / 00
Refrigerant circ ctrllr 1	[1] / 00 / 00
Refrigerant circ ctrllr 2	[2] / 00 / 00
Ventilation	F0 / 0F
Wireless components	2.1 / 1 /-- / 1

Mo 21.04.2014 12:02 h

Terminate with   OK

Energy supplied by the grid (power supply utility)
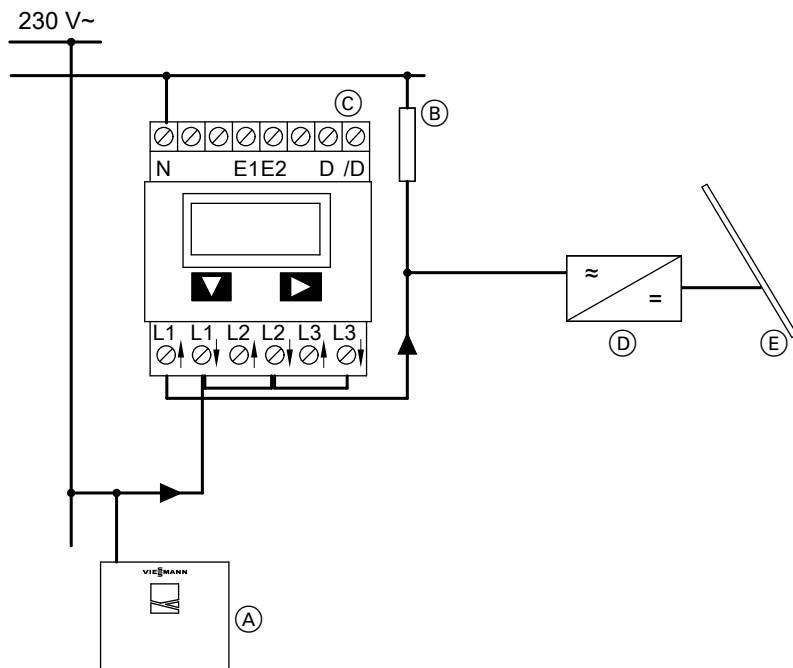
3-phase electricity meter, 3-phase heat pump

3 x 230 V~/ 400 V~

Ⓐ 3-phase heat pump
Ⓑ Further consumers of power gener-
    ated on site

Ⓒ 3-phase electricity meter
Ⓓ Inverter
Ⓔ PV modules

3-phase electricity meter, 1-phase heat pump

3 x 230 V~/ 400 V~
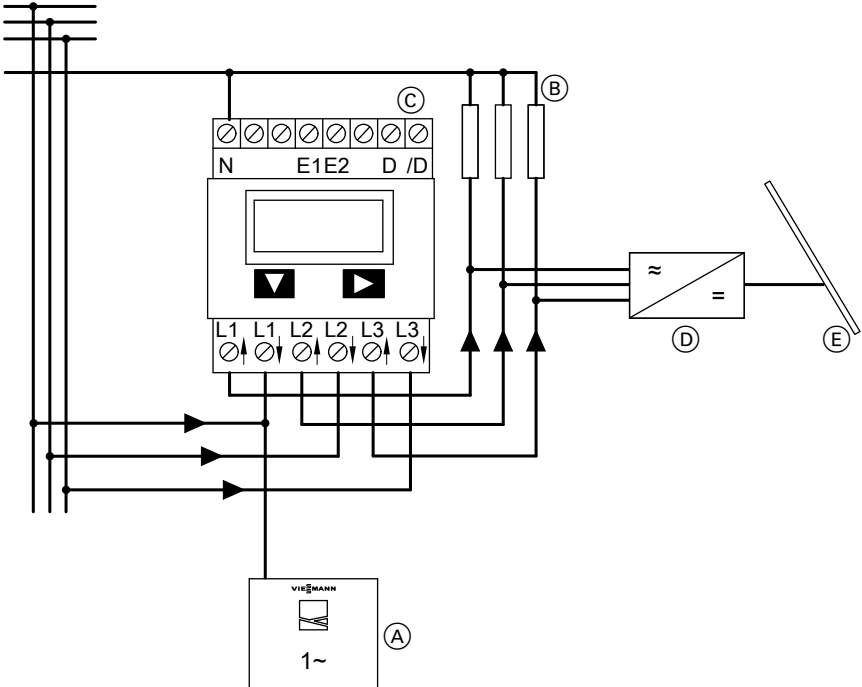
Ⓐ 1-phase heat pump
Ⓑ Further consumers of power gener-
   ated on site
Ⓒ 3-phase electricity meter
Ⓓ Inverter
Ⓔ PV modules

3-phase electricity meter in 1-phase grid, 1-phase heat pump

Ⓐ 1-phase heat pump
Ⓒ 3-phase electricity meter with jump-
    ers

Ⓓ Inverter
Ⓔ PV modules

*Note regarding energy supplied by
the grid (power supply utility)*
*With this type of wiring, the electricity
meter shows the output with a minus
sign in front of it. The heat pump should
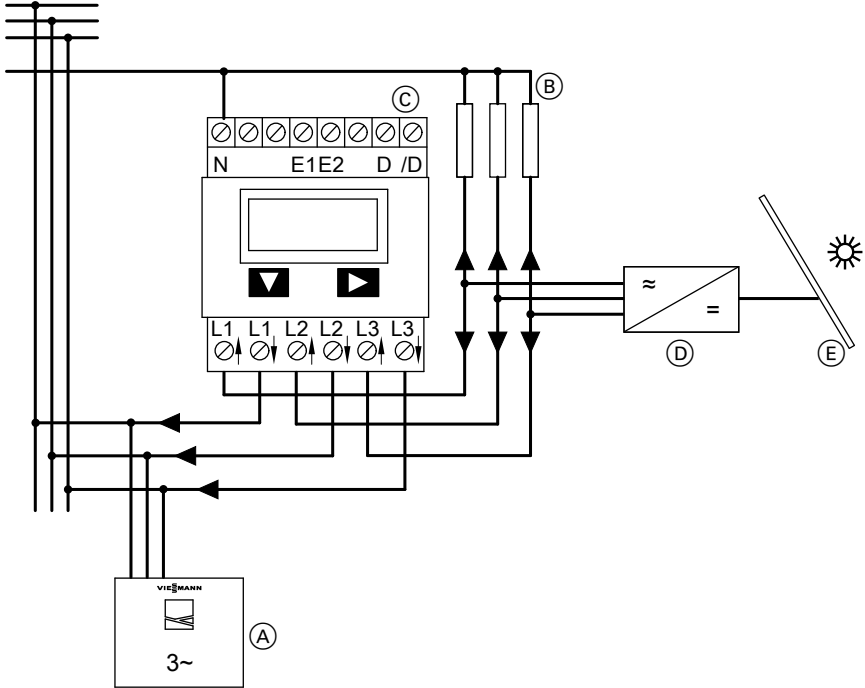not consume any energy.*

Example:
*The sun is not shining and other energy
consumers are in operation, e.g. the
cooker.*

Energy fed into the grid (power supply utility)

3-phase electricity meter, 3-phase heat pump

3 x 230 V~/ 400 V~

Ⓐ Heat pump
Ⓑ Further consumers of power gener-
  ated on site

Ⓒ 3-phase electricity meter
Ⓓ Inverter
Ⓔ PV modules

3-phase electricity meter, 1-phase heat pump

3 x 230 V~/ 400 V~

Ⓐ Heat pump
Ⓑ Further consumers of power gener-
ated on site

Ⓒ 3-phase electricity meter
Ⓓ Inverter
Ⓔ PV modules

5547 083 GB
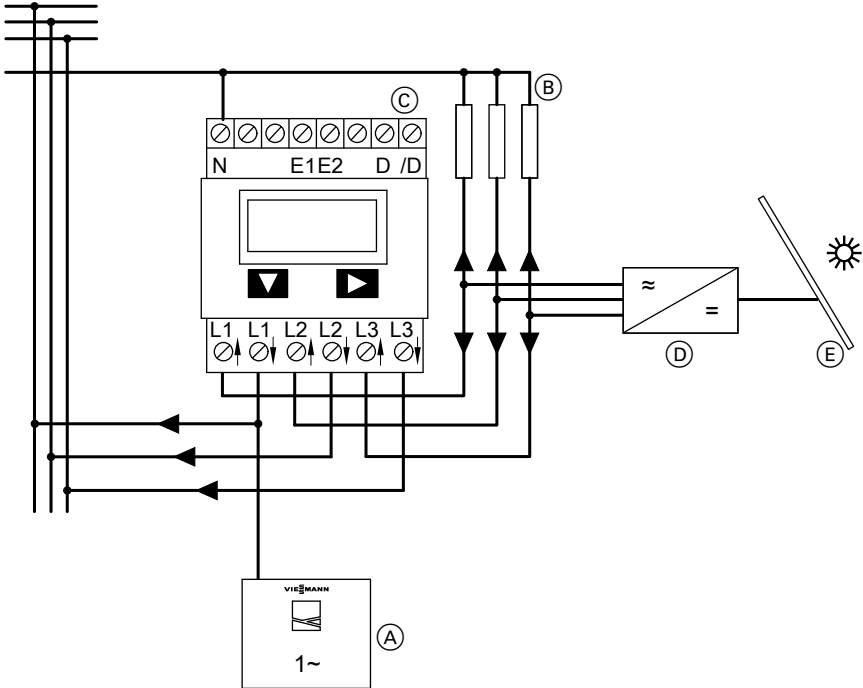
3-phase electricity meter in 1-phase grid, 1-phase heat pump

Ⓐ 1-phase heat pump
Ⓒ 3-phase electricity meter with jump-
ers

Ⓓ Inverter
Ⓔ PV modules

Note regarding energy fed into the
grid (power supply utility)
With this type of wiring, the electricity
meter shows the output without a plus/
minus sign in front of it. The heat pump
should consume energy.

Example:
The sun is shining and there are few
other energy consumers in operation.

## Installing the electricity meter in the distribution panel

1. ⚠ **Danger**
   During insolation, PV modules can generate life-threatening voltages. Contact with live parts (e.g. terminals) can lead to burns and electric shock, even if the PV modules are not connected.
   ■ First disconnect the inverter from the AC grid (AC side of the inverter).
   ■ Then disconnect the DC isolator from the DC grid (DC side of the inverter).
   ■ If required, cover PV modules with **lightproof** films or materials.
   ■ Observe VDEW guidelines and technical connection requirements of the grid operator (power supply utility).

2. Install electricity meter on a mounting rail in the distribution panel:

Distribution panel scheme
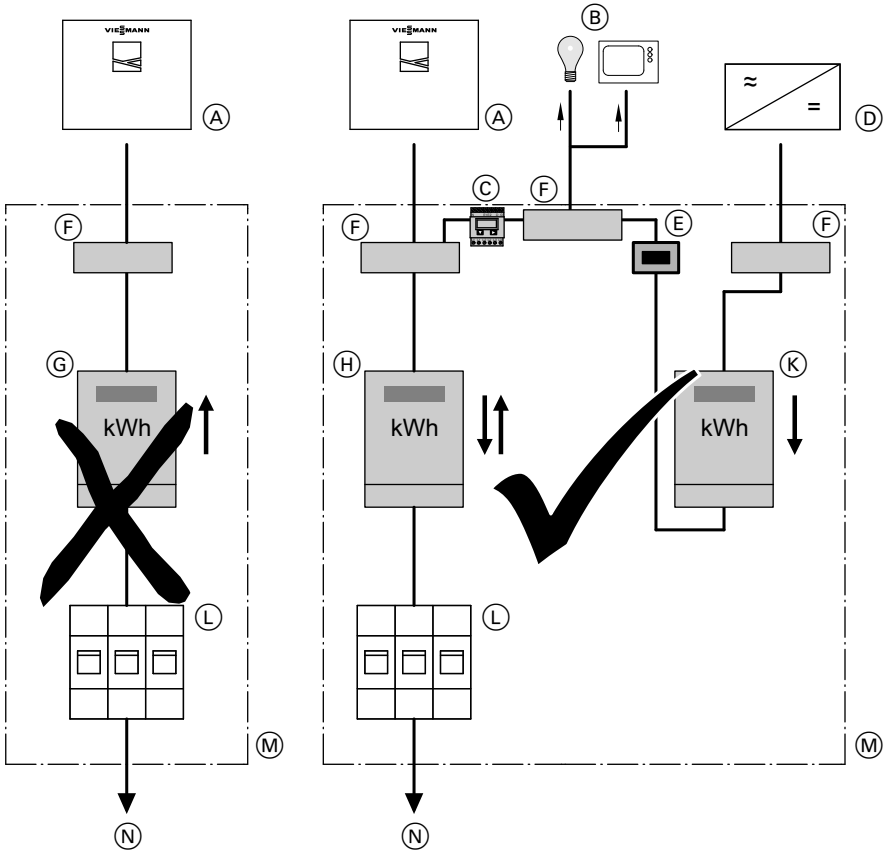
Ⓐ Heat pump
Ⓑ Further household consumers of power generated on site
Ⓒ Electricity meter 1-phase/3-phase
Ⓓ Inverter
Ⓔ Isolator for the PV system
Ⓕ Terminal

Ⓖ Double-tariff meter (for special tariff for heat pumps)
Not permissible in conjunction with PV systems for on-site power consumption
Ⓗ Bi-directional meter (for PV systems for on-site power consumption): Energy supplied by grid (power supply utility) and energy fed into grid (power supply utility)

Ⓚ Meter with reverse block:
For energy generated by PV sys-
tem
Ⓛ Isolator for domestic power supply
connection (distribution panel)

Ⓜ Distribution panel
Ⓝ Domestic distribution box

Connecting the electricity meter to the heat pump

1. Isolate the heat pump from the power
supply and open it.

Heat pump installation and
service instructions

2. Wire up the electricity meter accord-
ing to the wiring diagram below.
■ Information regarding electrical
connections and the heat pump
power supply:

Heat pump installation and
service instructions

■ Connection to the grid (power sup-
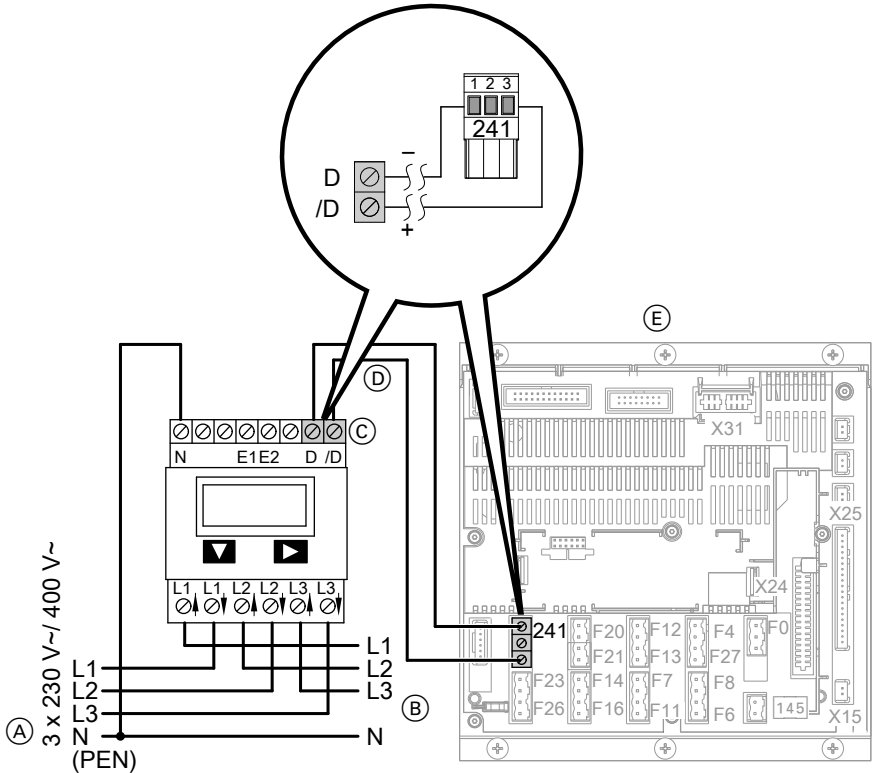ply utility):

! **Please note**
An incorrect direction of
electric current leads to high
consumption of electricity
from the grid (power supply
utility).
Check direction of electric
current (see chapter
"Checking the direction of
electric current" page 18).
If required, check and
adjust wiring.

■ 3-phase electricity meter:
For connection versions for
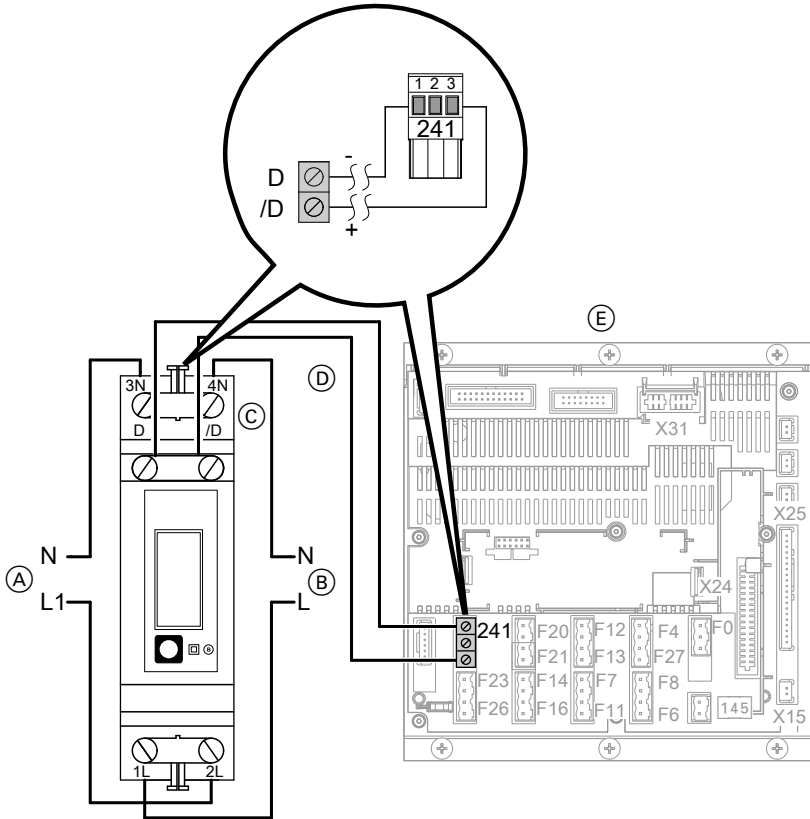1-phase and 3-phase grids (power
supply utility), see from page 4

Connecting a 3-phase electricity meter to the Vitotronic 200, type WO1C

(A) To the heat pump/power supply utility

(B) To the isolator for the PV system/ to further household consumers

(C) 3-phase electricity meter

(D) On-site connecting cable, Modbus LiYCY 2x0.34, shielded

(E) Controller and sensor PCB of the Vitotronic 200, type WO1C

241 Modbus
Cores are **not** interchangeable

Connecting a 1-phase electricity meter to the Vitotronic 200, type WO1C
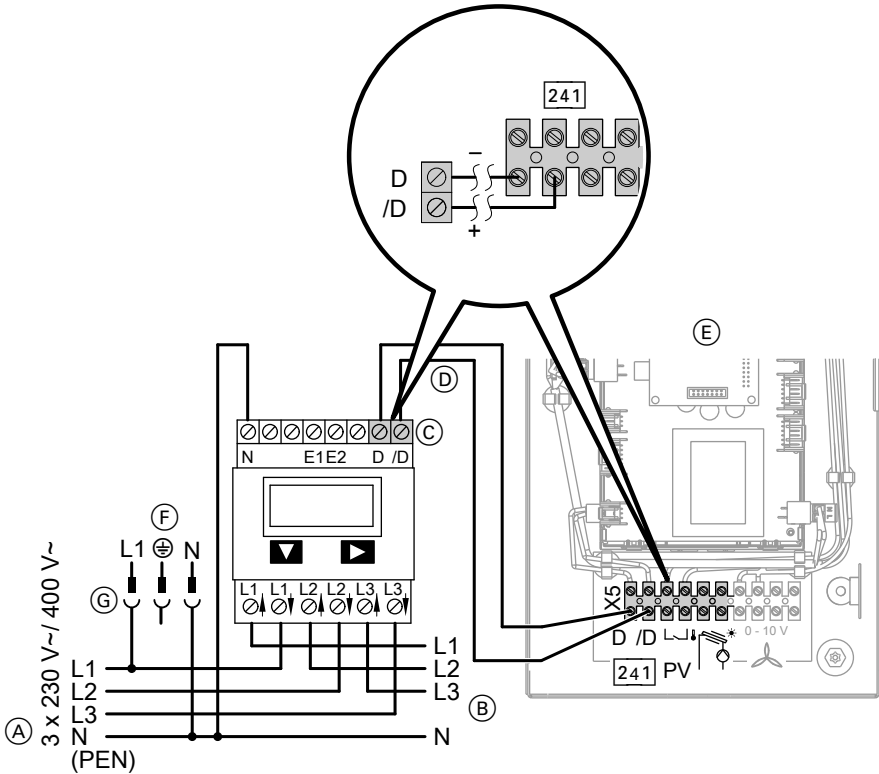

Ⓐ To the heat pump/power supply
    utility
Ⓑ To the isolator for the PV system/
    to further household consumers
Ⓒ 1-phase electricity meter
Ⓓ On-site connecting cable, Modbus
    LiYCY 2x0.34, shielded

Ⓔ Controller and sensor PCB of the
    Vitotronic 200, type WO1C
241 Modbus
    Cores are **not** interchangeable

Connecting a 3-phase electricity meter to the heat pump control unit of the Vitocal 161-A

Ⓐ To the power supply utility
Ⓑ To the isolator for the PV system/ to further household consumers
Ⓒ 3-phase electricity meter
Ⓓ On-site connecting cable, Modbus LiYCY 2x0.34, shielded
Ⓔ Vitocal 161-A wiring chamber
Ⓕ Standard heat pump plug
Ⓖ Mains socket for heat pump
241 Modbus
Cores are **not** interchangeable

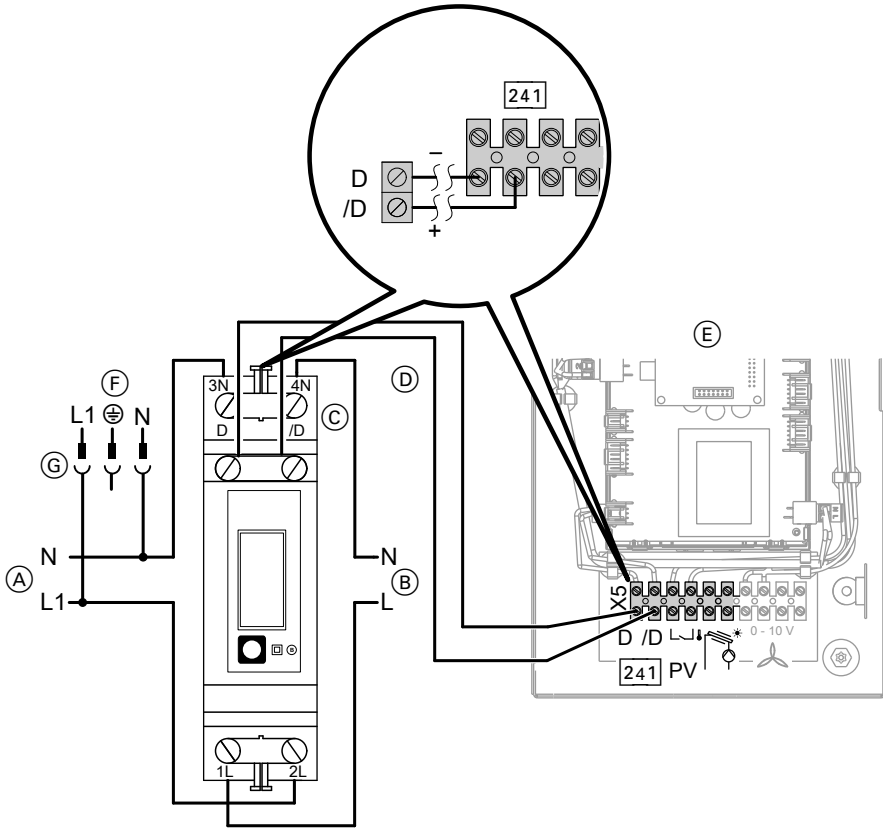**Connecting a 1-phase electricity meter to the heat pump control unit of the Vitocal 161-A**

Ⓐ To the power supply utility
Ⓑ To the isolator for the PV system/ to further household consumers
Ⓒ 1-phase electricity meter
Ⓓ On-site connecting cable, Modbus LiYCY 2x0.34, shielded
Ⓔ Vitocal 161-A wiring chamber
Ⓕ Standard heat pump plug
Ⓖ Mains socket for heat pump
241 Modbus
Cores are **not** interchangeable

Commissioning

1. Close the heat pump and switch on the power supply:

   Heat pump installation and service instructions

2. Set "Adr 060" on the electricity meter.

   Electricity meter 1-phase:
   - ☐ Press 3 x; cursor (bar) is on U(V).
   - ☐ Press and hold for at least 3 s, "Adr 001" appears.
   - ☐ Press 1 x, "Adr ..." changes in increments of 1.
     or
   - ☐ Press and hold for at least 2 s, "Adr ..." changes in increments of 10.
     To end the setting process, wait approx. 20 s.

   Electricity meter 3-phase:
   - ► Press and hold for at least 3 s, "Adr 001" appears.
   - ► Press 1 x, "Adr ..." changes in increments of 1.
     or
   - ▼ Press 1 x; "Adr ..." changes in increments of 10.
     To end the setting process, wait approx. 20 s.

3. Carry out settings and function test on the heat pump control unit: See following chapter

4. **!** **Please note**
   An incorrect direction of electric current leads to high consumption of electricity from the grid (power supply utility). Check direction of electric current (see chapter "Checking the direction of electric current" page 18). If required, check and adjust wiring.

Settings and function test on the Vitotronic 200, type WO1C

- ■ Activate electricity meter.
- ■ Enable functions for on-site power consumption.
- ■ Set the set temperatures for the selected energy consumers and functions.
- ■ Carry out a subscriber check for Modbus subscribers.

   Service instructions "Vitotronic 200, type WO1C"

Settings on the heat pump control unit of the Vitocal 161-A

Activate service menu and set parameter P U O.

Activating the service menu:
1. Press and hold **OK** for approx. 5 s until P S appears
2. Press **OK** to confirm
3. ▼ for 9 5 7
4. Press **OK** to confirm
5. Set parameter P U O

Values for parameter P U O:
0 No enabling
1 Switching contact PV (floating N/O contact)
2 1-phase electricity meter (Modbus)
3 3-phase electricity meter (Modbus)

Checking the direction of electric current

Display on electricity meter

Energy supplied by the grid (power supply utility):
■ The electricity meter shows the output with a minus sign in front of it:

Note
Up to 3 fault bars are displayed on the electricity meter. This does not affect the function of the heat pump control unit.

Energy fed into the grid (power supply utility):
■ The electricity meter shows the output without a plus/minus sign in front of it.

Additional display on the Vitotronic 200, type WO1C

Menu:
1. **"Diagnosis"**
2. **"Photovoltaics"**
3. **"PV statistics"**
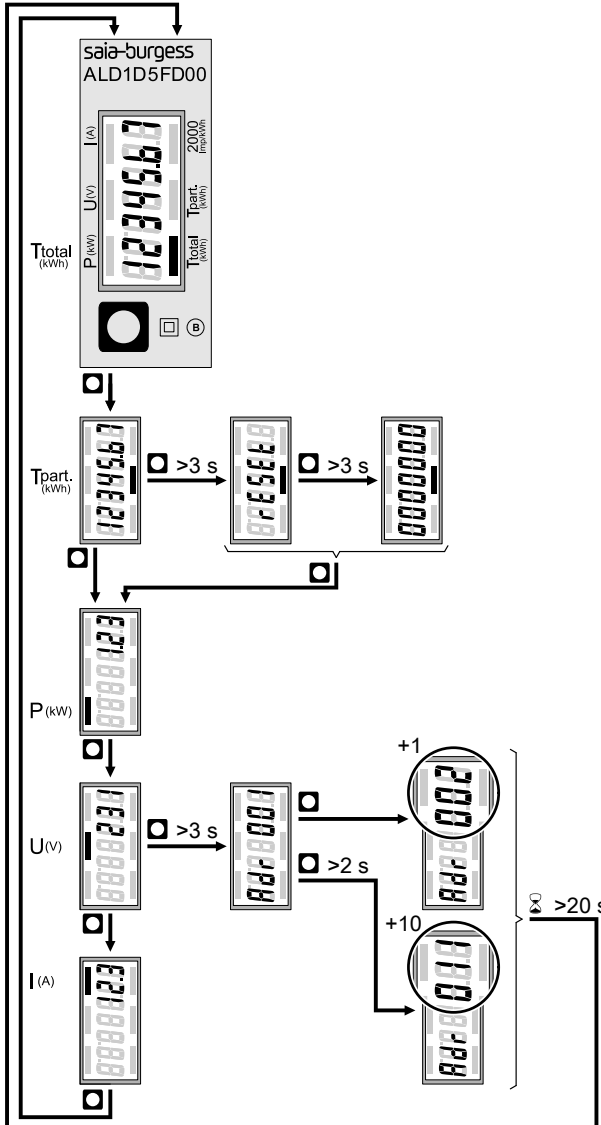
Energy supplied by the grid (power supply utility):
■ 素←⇧
■ The output is shown with a minus sign in front of it.

Energy fed into the grid (power supply utility):
■ 素←⇧
■ The output is shown with a plus sign in front of it.

## Calling up information on the electricity meter

1-phase electricity meter

|			
Ttotal (kWh)	Total consumption with use of power generated on site, in kWh	P(kW)	Current (effective) output in kW
Tpart. (kWh)	Partial consumption with use of power generated on site, in kWh	U(V)	Mains voltage in V
		Adr	For setting the electricity meter address, see page 17
	Note	I(A)	Current for energy consumers in A
	Tpart. can be reset to zero.	2000 Imp/kWh	Pulses according to the output drawn with 2000 meter pulses per kWh

Commissioning (cont.)

3-phase electricity meter
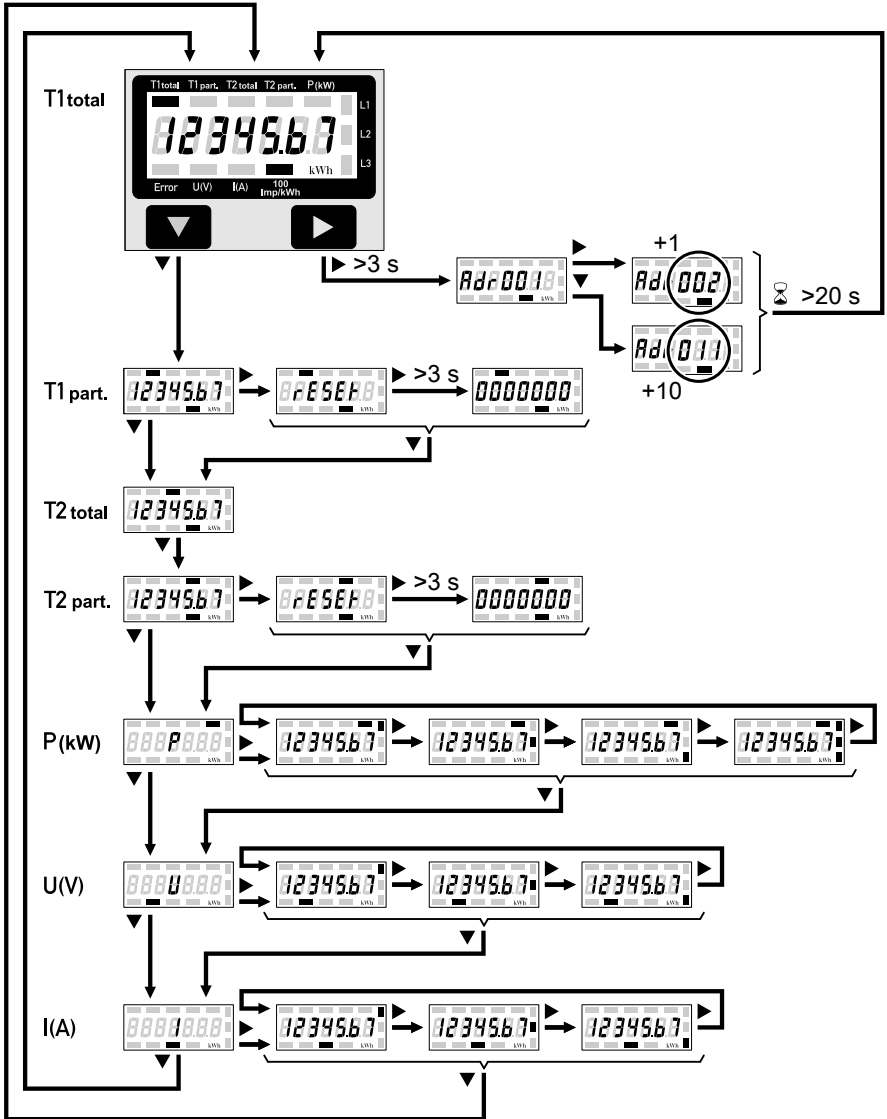
T1total	Total consumption with use of power generated on site, in kWh	P(kW)	Current (effective) output in kW for phase L1, L2, L3 or for all phases together
Adr	For setting the electricity meter address, see page 17	U(V)	Voltage in V for phase L1, L2 or L3
T1part.	Partial consumption with use of power generated on site, in kWh	I(A)	Current for energy consumers in A for phase L1, L2 or L3
	Note *T1part. can be reset to zero.*	100 Imp/kWh	Pulses according to the output drawn with 100 meter pulses per kWh
T2total	Total consumption with use of power generated on site, in kWh, for a second tariff, if available	kWh	Display active with values in kWh (e.g. for T1 total)
		L1, L2, L3	Phase for which the value applies with P, U, I, Error
	Note *Double-tariff meter not permissible in conjunction with PV systems for own energy consumption.*	Error	Phase L1, L2, L3 is missing or direction of current is incorrect
T2part.	Partial consumption with use of power generated on site, in kWh, for a second tariff, if available		
	Note *T2part. can be reset to zero.*		
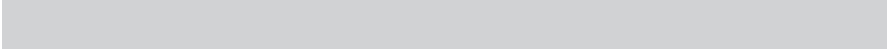
Applicability

Serial No.:
7506156   7506157