ESS application: Quattro 48V/8-10-15kVA

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The problem

In most countries, a single fault-tolerant grid disconnect is required for ESS systems that can feed solar energy back into the grid.
The Quattro's 48V/8, 10 and 15kVA have a single isolation contactor on each of the two inputs and grid disconnection is therefore not single fault tolerant.

The solution

The Quattro's have been tested and certified for ESS when installed in conjunction with Ziehl's UFR1001E anti-islanding device and two, series-connected, contactors. Single fault tolerant grid disconnection is achieved by adding the UFR1001E and the two contactors.
The Quattro takes care of the other ESS-related requirements, such as reactive power control and correct response to grid frequency and voltage deviations.

ESS up to 180kVA

The solution is applicable to single phase and three phase systems, and up to 4 sets of three 15kVA units can be parallel connected to provide 144kW/180kVA inverter power and 2400A battery charging capacity.
The solution can be used with Solar Charge Controllers and/or with Solar Inverters.

Manual and instructions

For a general description of the UFR1001E, see Voltage and Frequency Relay Type UFR1001E | S222296
For the latest manual, see 12420-0701-32

See page 23 of the manual for power-up en programming the UFR1001E.
See below for a single phase and a three phase wiring example.

Note 1: the Quattro's must be set to the right country standard with "external ns protection".
Note 2: we do stock a pre-wired 63A Anti-Islanding box, see picture below.

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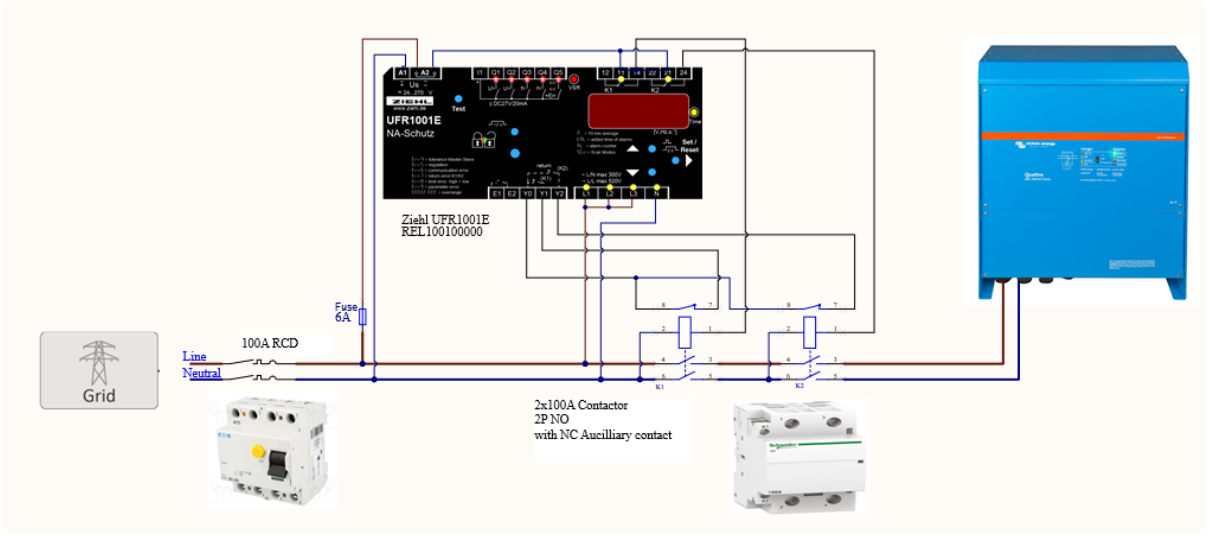
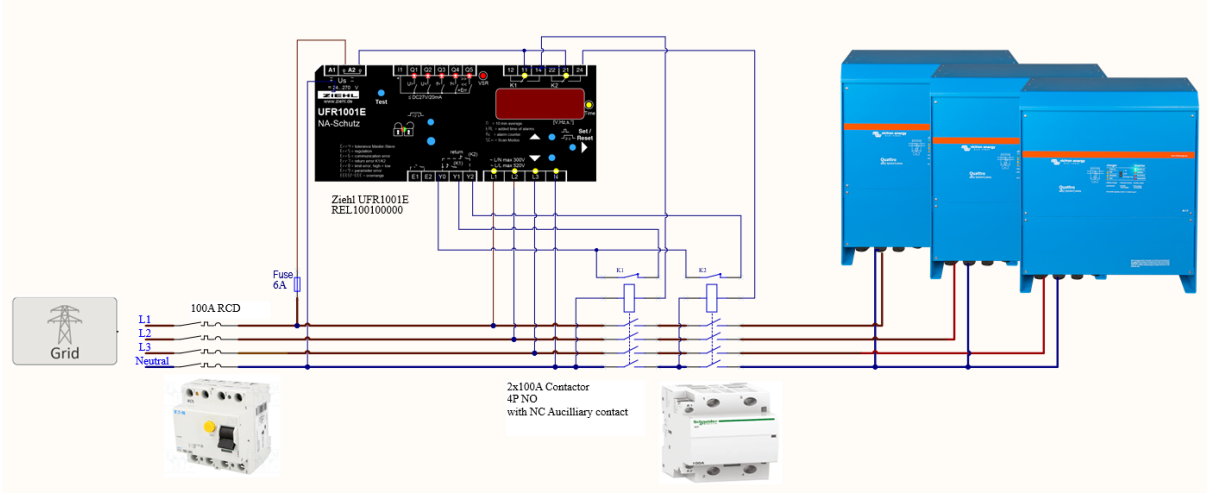
Single phase wiring diagram



Three phase wiring diagram



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Programming the Ziehl UFR1001E

1. Apply voltage to A1-A2
2. Slightly lift the key cover and turn 180°
3. Actuate the small blue button by firmly pressing the button cover (LED starts flashing) until the green LED is illuminated.
4. The Sealing is deactivated
5. Press ▲1x display InFo
6. Press ▶5x display Pr 1
7. Set the Program (Country) with ▲▼as in below table

Germany, VDE-AR-N 4105:2018	1 phase	Pr. 2
	3 phase	Pr. 7
Belgium, C10/11	1/3 phase	Pr. 16
Austria, TOR erzeuger	1/3 phase	Pr. 10
UK, G98/G99	1/3 phase	Pr. 20
South Africa and setting as in the parameter table	1 phase	Pr. 5
	3 phase	Pr. 6

   For other Europe EN50549-1 and Australia AS4777.2 see parameter table
8. For safety reasons, the mirror contact of both relay's should be monitored. Set "trEL response time Yx" to 5 in menu "rEL"
9. For other Countries apply the settings manually as in the next table.

Parameter table

Menu	Parameter /unit	Program	South Africa NRS097 3 phase + N Pr 5	South Africa NRS097 3 phase Pr 6	Europe EN50549-1 1 and 3 Phase Pr 5	Australia AS4777.2 1 and 3 Phase Pr 5
U⁻⁻	U⁻⁻ Alarm on/off		on	on	on	on
	U⁻⁻ Overvoltage	V	276	478	265	265
	H⁻⁻ Hysteresis	V	3,0	3,0	12	15
	dAL response time	s	0,16	0,16	0.10	0.10
	doF OFF-Delay	s	60	60	60	60
U⁻	U⁻ Alarm on/off		on	on	On	On
	U⁻ Overvoltage	V	253	438	276	260
	H⁻ Hysteresis	V	3,0	3,0	23	5
	dAL response time	s	2,0	2,0	0.2	1
	doF OFF-Delay	s	60	60	60	60
UN⁻	UN Alarm on/off		oFF	oFF	on	OFF
	UN Overvoltage	V	253	438	253	253
	HN Hysteresis	V	3,0	3,0	5	5.0
	dAL response time	s	0,10	0,10	300	0.10
	doF OFF-Delay	s	60	60	60	60
U_	U_ Alarm on/off		on	on	On	On
	U_ Undervoltage	V	196	339	186	180
	H_ Hysteresis	V	3	3	5	12
	dAL response time	s	10	10	0.5	1
	doF OFF-Delay	s	60	60	60	60
U_ _	U_ _ Alarm on/off		on	on	On	On
	U_ _ Undervoltage	V	115	199	184	103
	H_ _ Hysteresis	V	2,0	2,0	11.5	93.0
	dAL response time	s	0,20	0,20	0.30	0.30
	doF OFF-Delay	s	60	60	60	60
F⁻	F⁻ Alarm on/off		on	on	On	On
	F⁻ Overfrequency	Hz	52,00	52,00	52.7	52
	H⁻ Hysteresis	Hz	1,45	1,45	2.5	1.40
	dAL response time	s	4,0	4,0	30	0.10
	doF OFF-Delay	s	60	60	60	60
F_	F_ Alarm on/off		on	on	On	On
	F_ Underfrequency	Hz	47	47	47.5	47
	H_ Hysteresis	Hz	1,00	1,00	2	0.10
	dAL response time	s	0,2	0,2	30	0.10
	doF OFF-Delay	s	60	60	60	60
F_ _	F_ _ Alarm on/off		oFF	oFF	On	Off
	F_ _ Underfrequency	Hz	47,5	47,5	47	47.00
	H_ _Hysteresis	Hz	1,00	1,00	2.5	0.60
	dAL response time	s	0,10	0,10	0.2	0.10
	doF OFF-Delay	s	60	60	60	60
uSr	uSr Alarm on/off		Stby	Stby	off	off
	uSr Vector shift		10	10	7.0	7.0
	doF OFF delay	s	3	3	20	20
	dEon Suppression time	s	3	3	2	2
	uSr Number of phases		3Ph	3Ph	3Ph	3Ph
rEL	trEL Response time Yx		5.0	5.0	5.0	5.0
	doFA mode		I nd	I nd	ind	ind
	doFA OFF-delay All		0	0	0	0

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