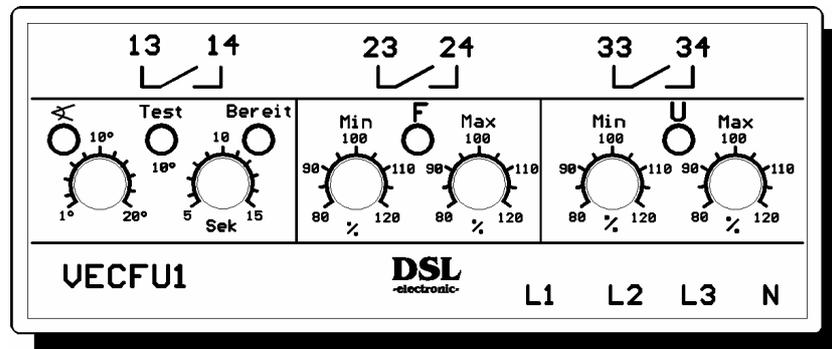


## Mains / Generator Protection Relay VECFU1 +20/-10% (four wires) (Vector jump, frequency and voltage control)



### Function

The VECFU1 detects a phase jump or an instantaneous phase change on a mains supply line and switches off the output relay if the setpoint (1-20°) is exceeded. An additional quartz-controlled frequency measurement and a convenient (3-phase) voltage measurement is also carried out. One output contact is available for each of these functions.

### Application

The Mains/Generator Protection Relay VECFU1 is used in particular in generator systems with synchronous generators for parallel operation with the public network as a so-called **vector jump relay** for protecting the generator if there are rapid phase jumps or short interruptions. It is also useful for intentional mains interruptions of the interconnected networks with a duration of 200 - 300ms via which 80 - 90% of network disturbances are eliminated.

### Reaction of VECFU1 to mains failures

Immediately after a vector jump or mains failure, the generator has to supply the entire network as, if a protective device is not present, the mains has not yet been separated from the generator. The currents from the generator to the mains increase until they reach high values, but they do not lead to short-circuit triggering until after 50 - 200ms. In parallel to this, the generator voltage drops rapidly and the (desirable) emergency power supply connected to the generator is finally switched off via the triggering of the short-circuit relay. The Mains/Generator Protection Relais VECFU1 now detects a phase jump or a mains voltage fail within a time space of 15 - 50ms depending of its development and triggers the opening of power switch. Now the running of the generator continues by island mode until the mains voltage is back again and after automatic synchronization the mains circuit breaker closes.

Another type of short interruption can also cause considerable damage to the generator is the short-circuit relay of the generator has not yet triggered after mains failure and the load has caused the generator phase to move so far that asynchronous switching takes place after mains return. The phase change is detected immediately by the vector jump relay VECFU1 and the generator is separated from the mains.

### Functional Circuits

- Vector jump function : 1 potential-free normally open contact, opens when there is a phase jump on conductor L1  
: LED display goes off when there is a phase jump
- "Ready" function : Adjustable waiting time until unit goes into readiness  
: LED display on completion of the waiting time
- Test function : For testing within the system, the test key provides a phase jump of 10° after activation. Triggering then takes place if the phase is set to 8°
- Unter-/overfrequency function : Window circuit, i.e. the output relay remains attracted between the minimum and maximum setting  
: The LED is on while the output relay is attracted

- Under-/overvoltage function : 3-phase voltage control ( N conductor must be present)
- Minimum setting : If the lowest voltage in each case falls to below the setpoint,  
: the output relays falls off
- Maximum setting : If the highest voltage in each case exceeds the setpoint,  
the output relay falls off
- The LED is on while the output relay is attracted

### Standard Settings

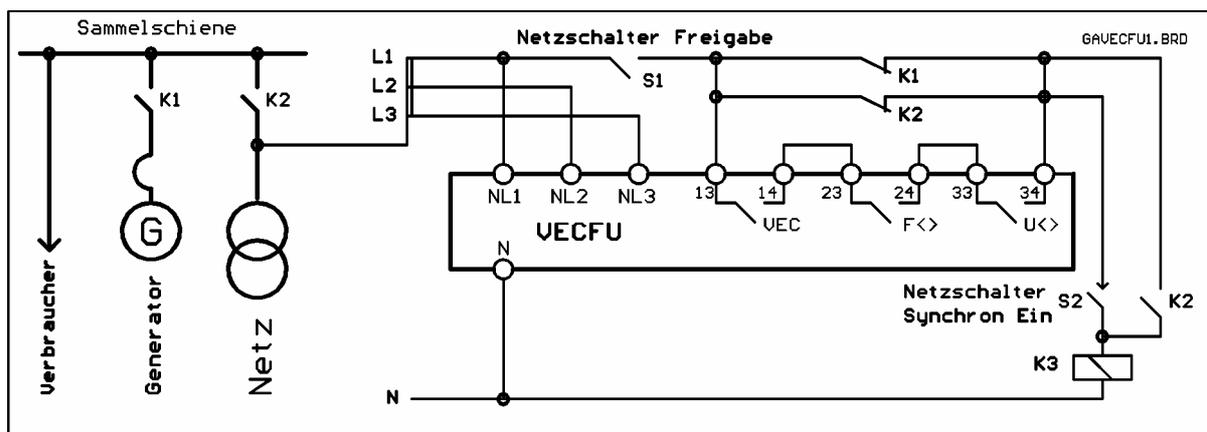
The unit is operating when all 4 LEDs are lit up. The settings for frequency and voltage deviations must usually be coordinated with the manufacture r of the generator. Small window settings and phase angles can cause premature unintentional switching off of the system, so that slightly hi gher values should be set in doubtful cases.

- Phase angle = 8°
- Underfrequency= 45Hz ( 90% )
- Undervoltage = 215V ( 93% )
- Waiting time = 10 seconds
- Overfrequency = 55Hz ( 110% )
- Overvoltage = 247V ( 107% )

### Technical Data

Type	Mains / Generator Protection Relay with frequency and voltage control VECFU1
Construction	Plastic housing on 35 mm hat rail acc. to DIN EN 50022 bzw. DIN 46277
Material of housing	Bayblend FR 1439/0240 modified ABS with burning prozection UL 94 VO
Dimensions, Weight	104x68x110mm (BxHxT), ca. 0.4 kg
Rated voltage	231V (L1-N) +20/-10%, Other voltages on request
Rated frequency	50 Hz (60 Hz on request)
Release settings	On front: +20/-10% voltage U, +/-20% frequency F
Release time VEC	10 - 50 ms (faster by adjustment to smaller angle, depends also on figure of phase changing)
Release time F and U	appr. 250 ms (Jump dF=1Hz, dU=10%)
Repeat accuracy	+/- 0,5% ( 0 - 60°C )
Power consumption	2.5 VA from L1-N
On period	100 %
Contact rating	5A/250VAC , 5A/30VDC , 0,015 Ohms , 10 <sup>5</sup> switchings
Isolating voltage	3000V (Coil-Contact), 1000V (open contact)
Connecting terminals	Potentialfree, for wire connection up to 2.5 mm <sup>2</sup>
Type of protection	Housing IP 40 , Terminals IP 20 (or VDE 0106T100/VBG4 )
Ambient temperature	-10 °C bis +55°C, 95% Hum
Mains isolating	EN 60 742 (Safety transformers)
General regulations	EN 50 178 (Electrical units in power current installation)
Radio interference	EN 55 022/B
EMV	EN 61000 und EN V 50 140
Installation position	Any
Maintenance	Maintenancefree

### Circuit Diagram



**Note:** Only one phase (L1 in this case) is necessary for detecting and measuring the phase change of the protective unit VECFU1 as the phase changes of the phase L1 also take place in all other phases with the same phase changes (frequency and phase are interconnected in three-conductor power supplies).