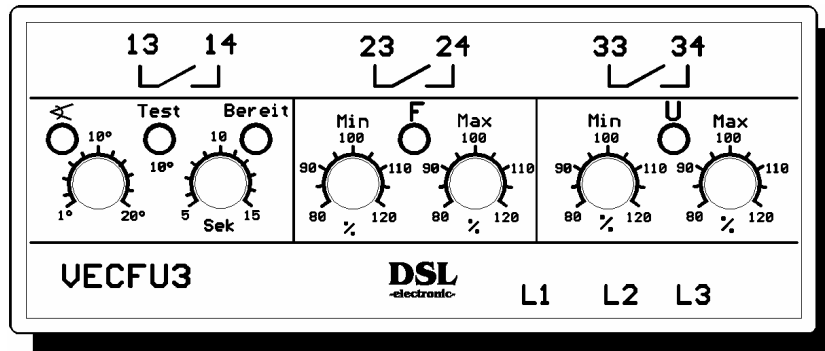


Mains / Generator Protection Relay VECFU3 (three wires) (Vector jump, frequency and voltage control)



Function

The VECFU3 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 VECFU3 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.

Immediately after 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.

However, the considerable mains load on the generator causes a correspondingly large phase shift in the generator voltage in the first few milliseconds after mains voltage failure. The generator controller then cannot adjust the generator quickly enough. The phase shift is detected immediately by the vector jump relay VECFU3 and the line breaker is triggered. Now the generator can run on in the off-mains network until the generator can be run parallel to the mains again after mains return and automatic synchronization.

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 VECFU3 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
- 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

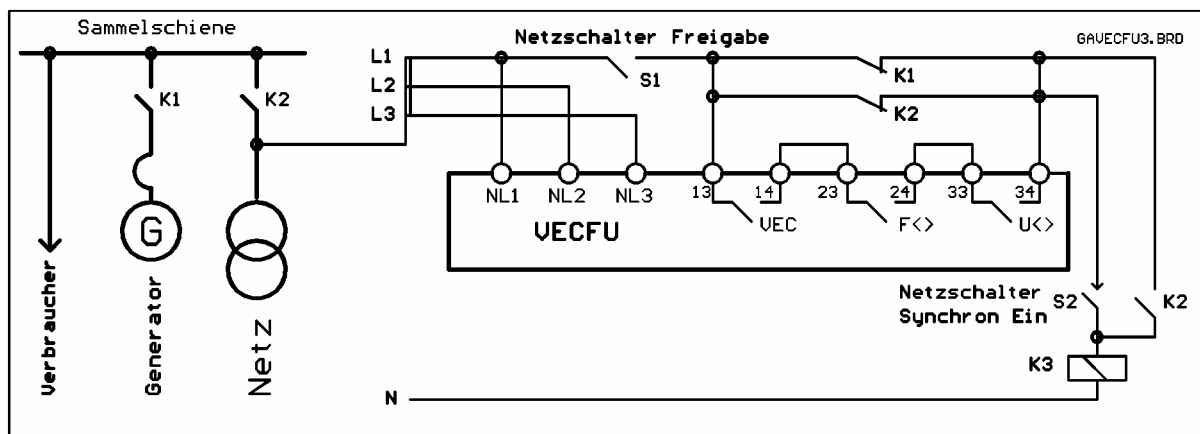
The unit is operating when all 4 LEDs are lit up. The settings for frequency and voltage deviations must usually be coordinated with the manufacturer of the generator. Small window settings and phase angles can cause premature unintentional switching off of the system, so that slightly higher values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

- Phase angle = 8°
- Underfrequency= 45Hz (90%)
- Undervoltage = 372V (93%)
- Waiting time = 10 seconds
- Overfrequency = 55Hz (110%)
- Overvoltage = 428V (107%)

Technical Data

Type	Mains / Generator Protection Relay with frequency and voltage control VECFU3 (Three wire)
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	400V (L-L) Other voltages on request
Rated frequency	50 Hz (60 Hz on request)
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 ⁵ switchings
Isolating voltage	3000V (Coil-Contact), 1000V (open contact)
Connecting terminals	Potentialfree, for wire connection up to 2.5 mm ²
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 VECFU3 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).