

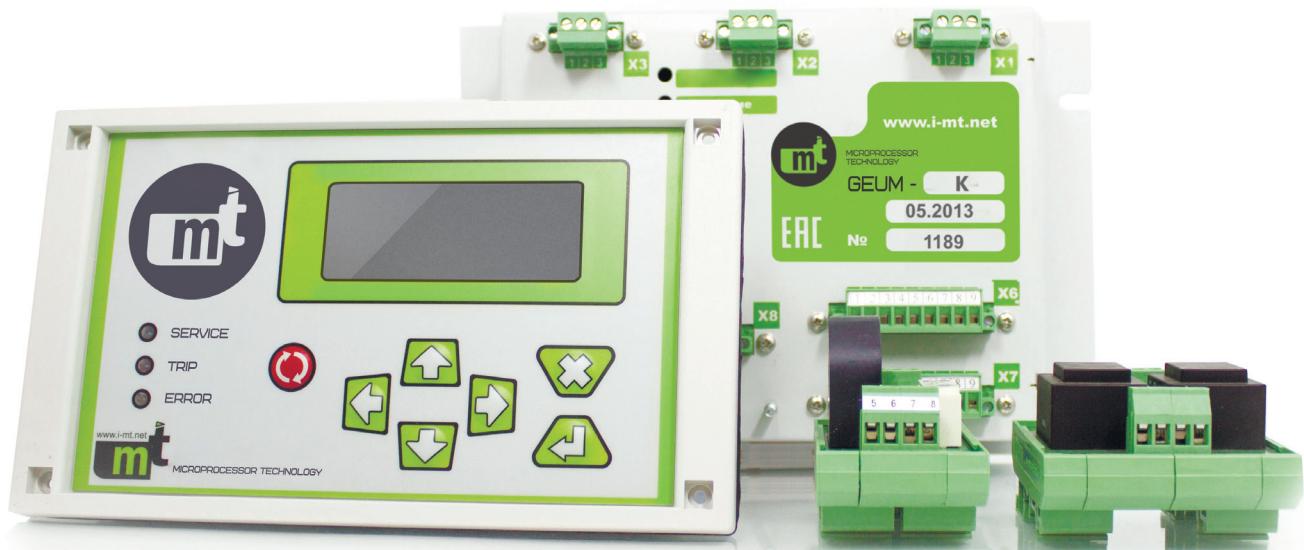
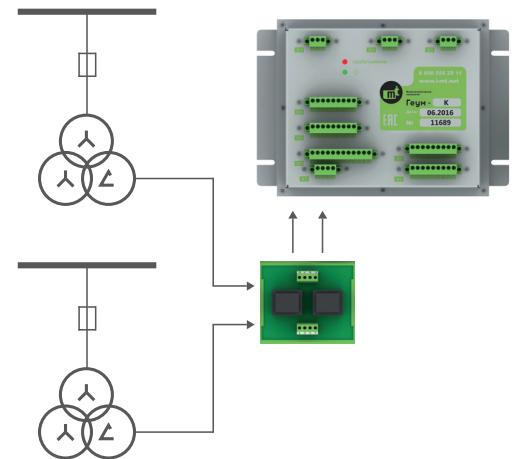


Geum

Geum is a technically advanced device for protection against single-phase earth faults. The main advantage of centralized protection is its low cost compared to stand-alone devices. Obvious savings — instead of 16 stand-alone devices, it is enough to install one device, which by its principle is capable of faster and more stable recognition of a ground fault.

The kit consists of a protection unit that performs the basic functions of the device, RTU-I and RTU-U modules for connecting current and voltage circuits, RTU-I which has output relays that control circuit breakers, HMI and navigation panel.

Geum is a unique centralized protection system. It collects information from all zero sequence transformers into one central unit and on the basis of this information, Geum recognizes the part of the network where an earth fault has occurred.



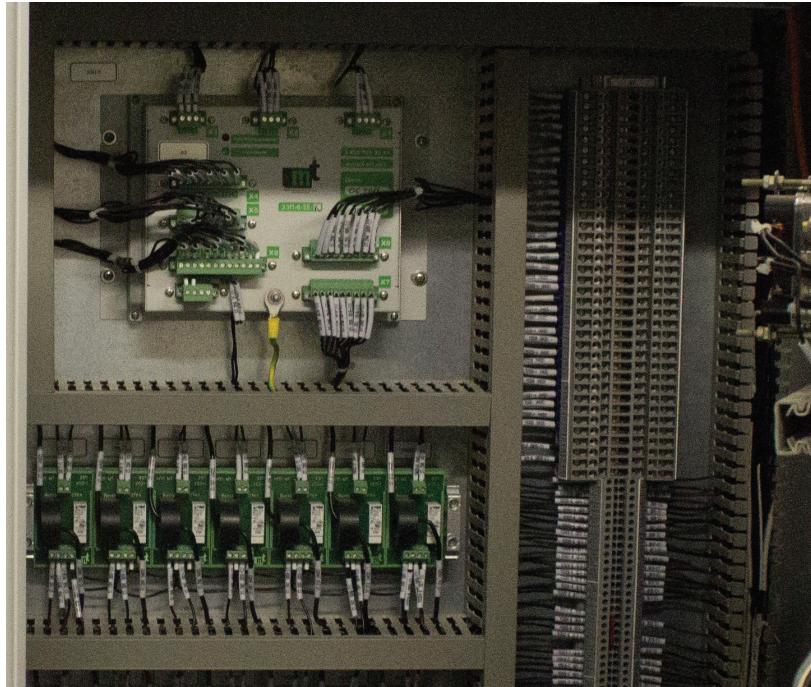
Centralized Protection Against Single-Phase Earth Faults.

Instant Identification of Damaged Feeders.

Geum is a unique earth fault solution on the market, which can be used at medium voltage networks. Its algorithms provide all necessary protection functions and localize a damaged area in the required time. After applying Geum solution on your networks there is no need to follow outdated procedures.

Geum products are covered by

10 years warranty



Protection of substations in networks with uncompensated neutral is carried out by the Geum-I block. The protection is started upon the occurrence of a zero-sequence voltage in the network, which signals the occurrence of a single-phase earth fault. The operation of the device is based on comparing the zero sequence currents of all connections. The device takes the decision on which section of the fault zone, according to a complex algorithm that analyzes the mutual direction and relative comparison of currents. This data is enough to detect faults at any point in the network.

To protect substations in networks with compensated neutral, a special version of the block is issued - Geum-K. Geum-C device by the principle of operation is similar to Geum-I device, the only difference is that Geum-C reacts to higher harmonics of zero sequence currents, since the direction and value of the fundamental current in such networks vary and depends on the compensation mode.

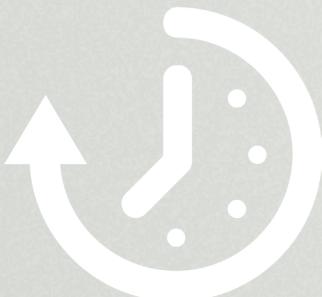
For substations with a number of connections of more than 16, it is possible to install two or more blocks required by the number of connections, while the blocks are connected according to the industrial CAN protocol. The interconnected blocks act as a single unit and when they are activated, they give the same result, reflecting the actual place of the fault, taking into account the total number of outgoing feeders of the substation.

Geum

80%

of all emergency events in MV networks are due to single-phase earth faults.

When a fault occurs, all equipment in the network is exposed to voltage that can exceed **the nominal by 4 times**.



The amount of damage directly depends on identification time of a fault location place.



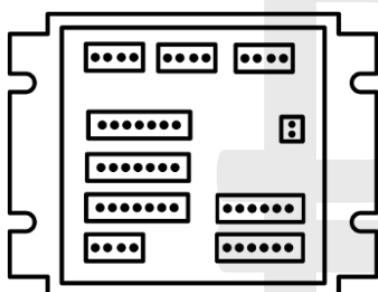
As in most cases, it is necessary to apply a sequential consumers switching-off approach to identify fault locations

As a result, traditional approach can lead to **several hours of searching time!**

Geum instantly identifies damaged feeders and selectively switches them off

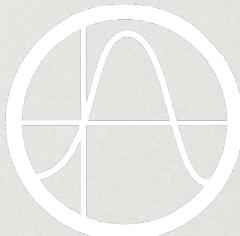
■ Protection up to 128 feeders

Geum centralized solution is designed to save your money. One protection device covers up to 16 lines. It can be both lines of two busbars or all in one busbar. It is possible to combine up to 8 blocks into a single network via a communication channel. The digital communication bus provides the collaboration of 8 devices.



The cost of protecting of each individual feeder significantly reduces.

$$\times 8 = 128$$

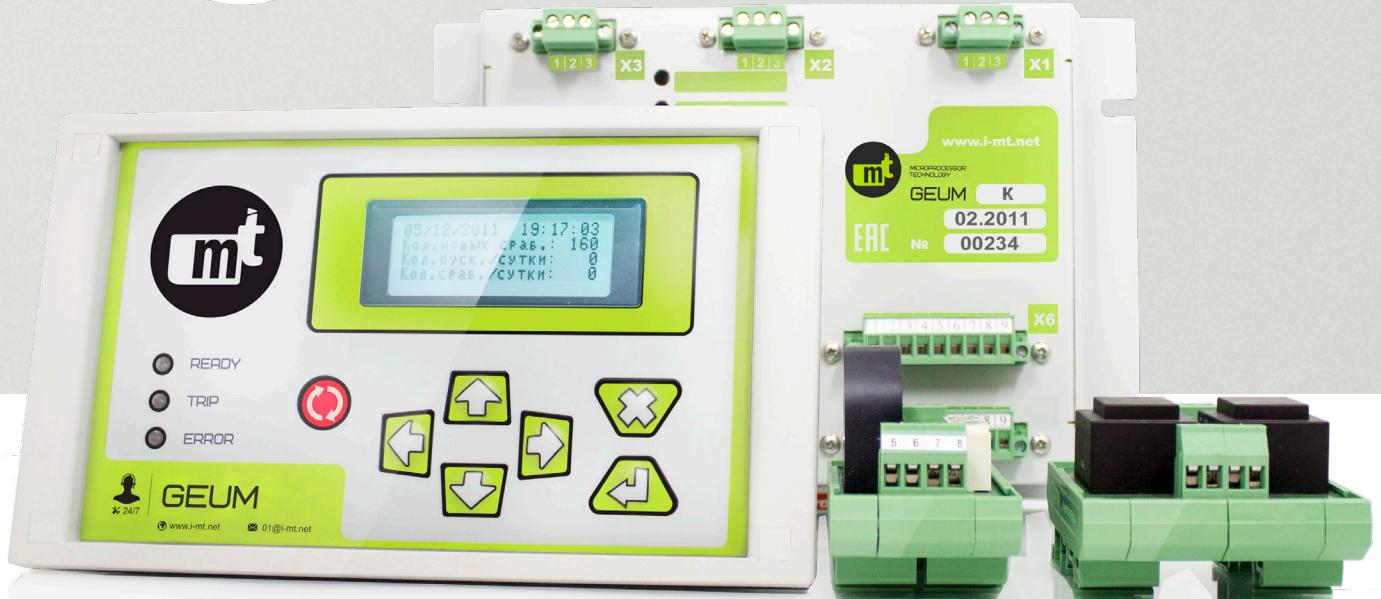


Geum provides continuous measurement of currents across all 16 channels, allows you to record waveforms of emergency processes.



With intermittent arc faults, a common situation is when the device cannot fix the accident due to a timer reset.

Geum has a special algorithm for working in such situations. It triggers strictly in accordance with the time delay from the very beginning of the fault occurrence.



■ It's not necessary to perform settings calculation with Geum

For the correct settings calculation of the earth fault protection, you need to know the parameters of the entire network. Due to the fact that it is difficult to get relevant data for the design organization at the project design stage, referral values are often used, which do not coincide with real ones.

Quite often, this leads to false trips or failures.

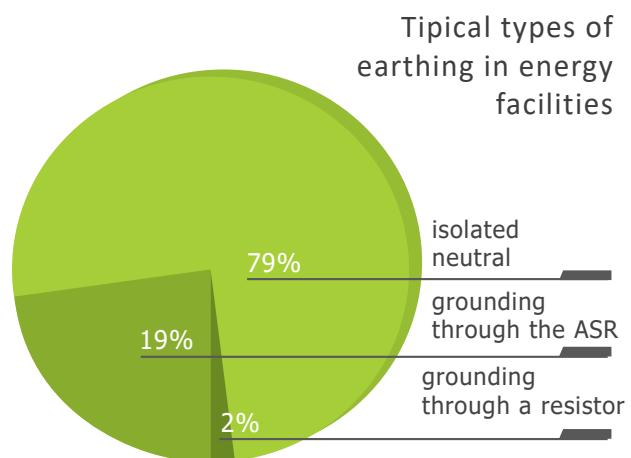
Geum eliminates the need for complex settings calculations. **In most cases, it is enough to apply directional current determination approach to identify correctly the fault feeder.** In cases where phasing of current circuits is not performed, it is necessary to apply the principle of relative measurement or an algorithm with inrush currents.

It is recommended to start the protection according to the zero sequence voltage with a setting of 30 V.

Technical details

Geum is designed to work in the following network types:

- with isolated neutral
- compensated neutral
- with neutral ground through resistor
- with combined earthing of the network neutral (parallel connection of the quenching reactor (QR) and a resistor or inclusion of a resistor in the power winding of the QR device)

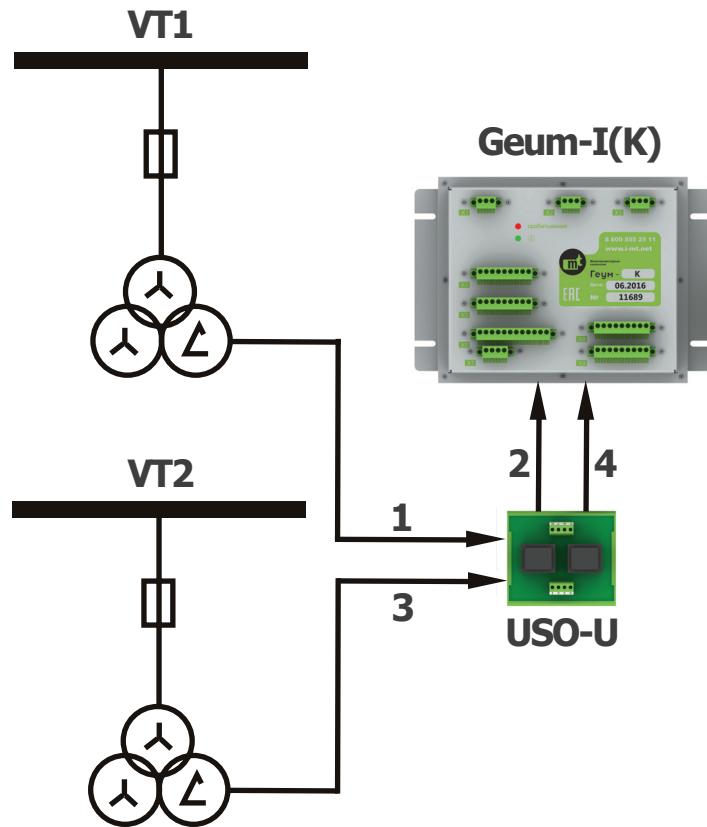


Geum maintains its operability in case of quenching reactor service states and in case of compensation lose

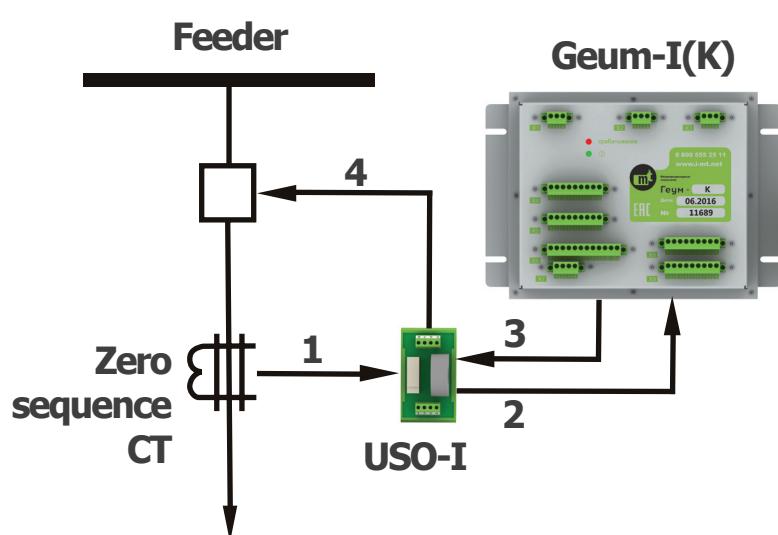
Main functions:

- Identification of damaged feeder for any type of earth faults
- Stable protection operation in case intermittent earth faults
- Individual selection of tripping feeder
- Ferroresonance Detection Algorithm
- Automation of monitoring the status of a resistor for neutral earthing with monitoring of its thermal condition and fault identification
- Zero Sequence Emergency Disturbance Recorder
- Event recorder
- Visual control of parameters and current values of capacitive current
- Automatic Clock Correction Mode
- Transfer of controlled parameters and logical signals via a serial communication channel (RS485) to the dispatcher's PC

Technical details



SYMBOL	LINES DESCRIPTION	CONNECTION TYPE
1	Voltage circuits 3Uo from VT1 to USO-U	Cable with copper conductors S = 1,5mm ²
2	3Uo voltage circuits (VT1) from USO-U to Geum	Twisted pair S = 0.5mm ²
3	Voltage circuits 3Uo from VT2 to USO-U	Cable with copper conductors S = 1,5mm ²
4	3Uo voltage circuits (VT2) from USO-U to Geum	Twisted pair S = 0.5mm ²



SYMBOL	LINES DESCRIPTION	CONNECTION TYPE
1	Current circuits from zero sequence CT to USO-I	Cable with copper conductors S = 1,5mm ²
2	CT circuits from USO-I to Geum	Twisted pair S = 0.5mm ²
3	USO-I trip coil relay circuit	Twisted pair S = 0.5mm ²
4	Trip circuit of relay contacts	Cable with copper conductors S = 1,5mm ²

Technical characteristics

Digital inputs

Number of inputs	3
Rated voltage of input signals, V	220
Reliable voltage level, not less, V	140
Reliable failure voltage level, not less than, V	100
Duration of the input signal sufficient to trigger the input circuit, not less than, ms	15
Power consumption at rated voltage, no more, W	0,5

Digital outputs

Number (of protection units / USO)	2/16
Switching at DC current with 250 V (opening) at active-inductive load and time constant up to 0.05 s, no more, A	0,25
Switching at AC current with 400 V (opening) at active-inductive load and time constant up to 0.05 s, no more, A	4
Switched at AC current with 260 V (opening) at active-inductive load and time constant up to 0.05 s, no more, A	7

Nominal power supply

Rated voltage (AC/DC), V	220
Operating voltage range (AC), V	85-265
Operating voltage range (DC), V	120-370
Power consumption, W	6
Power consumption (in tripping mode), W	7,5

Disturbance recorder

Pre-emergency recording	130 points
Sample rate	14-126 samples per cycle
Duration, s	0,75-65

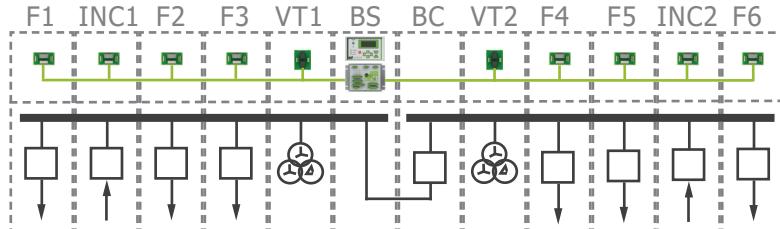
Technical characteristics

Analog inputs

Number of inputs for zero sequence currents	up to 16
Nominal frequency (AC), Hz	50±5
Range of input currents of the fundamental harmonic (secondary currents), A	0,01-10
Number of inputs for zero sequence voltages	up to 2
Input voltage range of the fundamental harmonic, V	10-250

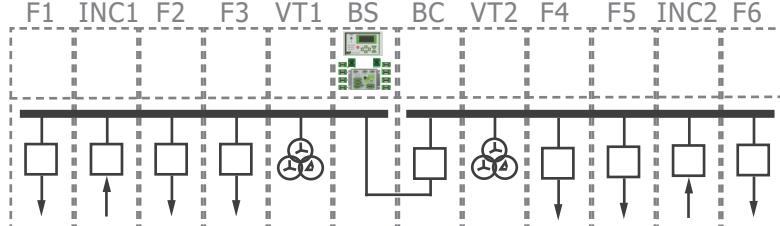
Installation options

1



You can easily install Geum on existing substations. USO units in this case are distributed in LV compartments of a switchgear.

2



In case of full modernization on the substation, Geum and all its components could be installed in one LV compartment of bus switch cubicles.

3

Benefit from a compact panel version of Geum solution.
Especially convenient for new energy facilities.
Geum panel solutions are practical and easy to use approach.

