




3.4 3-Phase Monitoring

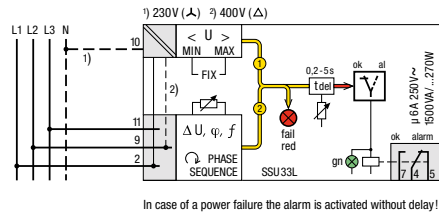


Application	Types	Monitoring	Monitoring ratings	Output contacts	Design
3 Phase monitoring	SSU33L		\sphericalangle 230 V, Δ 400 V	1 CO	11 pin
Mains monitoring relay, 50 Hz	SSU34		100 V, 400 V, 500 V	2 CO	50 mm
Mains monitoring relay, 60 Hz	SSU36		208 V, 460 V, 480 V	2 CO	50 mm

Type: SSU33L/... V

1 change over alarm contact 6 A 250 V

Monitoring function



The SSU33 (50Hz) provides comprehensive monitoring of three-phase mains supplies with or without neutral. The following mains faults are monitored: Error signal ① U (V_λ, V_Δ): Exceeding or dropping below the fixed voltage values U_{min}/U_{max} for L1-N or L1-L2 (no differential voltage, phase position or frequency fault).



Error signal ② U, Δφ, Δf:

One or more of the three voltages, phase positions, phase sequence or the mains frequency are diverging from the required value. Depending on the nature of their occurrence Δ-errors are evaluated cumulatively. Any error is signalled by the red LED and is reported after expiry of the set alarmdelay time. In the correct status (ok) the green LED is illuminated (4-5 open, 4-7 closed).

Measuring circuit data

	Type star with N	Type delta
Nominal mains voltage	230 V	400 V
Constant under voltage threshold ± 5 %	L1 – N ≤ 160 V	L1-L2 ≤ 280 V
Constant over voltage threshold ± 5 %	L1 – N ≥ 275 V	L1-L2 ≥ 480 V
Difference voltage adjustment range ¹⁾	20 ... 100 V	20 ... 100 V to N
φ adjustment range ¹⁾	3 ... 15 °	3 ... 15 °
f adjustment range ¹⁾	3 ... 15 Hz	3 ... 15 Hz

¹⁾ adjustment with the same rotary knob

Time data

Alarm delay adjustment range	0.2 ... 5 s
Reset time	50 ms

Contacts

Type / Material	1 CO, micro disconnection / AgNi
Rated operational current	6 A
Max. inrush current (10 ms)	30 A
Max. switching voltage	250 V
Max. AC load AC-1 (Fig.1)	1500 VA
Max. DC load DC-1, 30 V / 250 V (Fig.2)	180 W / 75 W
Recommended min. contact load	10 mA / 12 V

Power supply data

	Type star with N	Type delta
Nominal mains voltage	230 V	400 V
Operating voltage range	160 ... 275 V	280 ... 470 V
Power consumption	1.5 W	1.5 W
Input current	1.5 mA	1.5 mA
Frequency	50 Hz	50 Hz

Insulation

Test voltage between contacts and supply	2 kVrms 1 minute (basic insulation)
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General specifications

Ambient temperature storage /operation	-40 ... +85 °C / -25 ...+60 °C
Mechanical life of contacts	30 x 10 ⁶ operations
Ingress protection degree	IP 40 when plugged in
Housing material	Lexan, alu front plate
Weight	300 g

Standard types

AC 230 50 Hz	SSU33L/AC230V (Star connection)
AC 400 50 Hz	SSU33L/AC400V (delta connection)

Accessories: Socket:
Retention clip:
Front panel mounting set:

S-3B
HF-24
FZ-23

Connection diagram

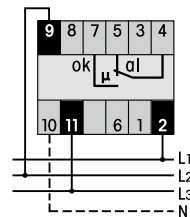


Fig.1 AC voltage endurance

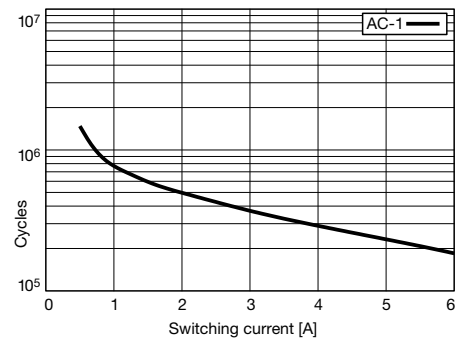
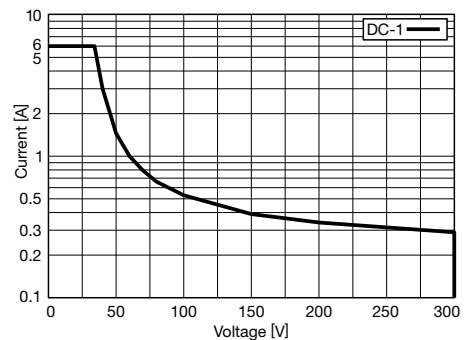
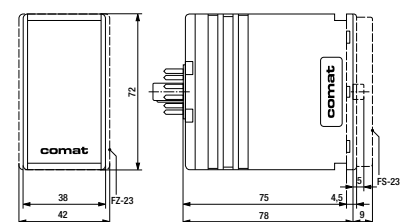


Fig. 2 DC load limit curve



Dimensions [mm]



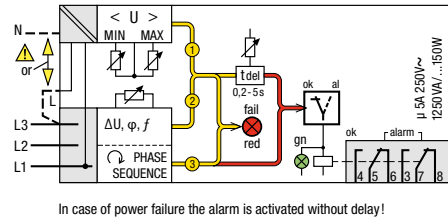
Technical approvals, conformities

EN 60947 CE RoHS

Type: SSU34/... V

Monitoring relay for under / over voltage, phase sequence, phase loss, phase angle, frequency, asymmetry. Star or delta operation. 2 change over alarm contacts 6 A 250V

Monitoring function



In case of power failure the alarm is activated without delay!

The SSU34 (50Hz) provide comprehensive monitoring of three-phase mains supplies with or without neutral.

The following mains faults are monitored:

Error signal ① U (V_{Δ} , V_{λ}):

Exceeding or dropping below the set voltage values U_{min}/U_{max} for L1-N or L1-L3,L (no differential voltage, phase position or frequency fault).

Error signal ② ΔU , $\Delta \phi$, Δf :

One or more of the three voltages, phase positions, or the mains frequency are diverging from the required value. Depending on the nature of their occurrence Δ -errors are evaluated cumulatively.

Error signal ③:

Connection polarity reversal (wrong phase-sequence). Any error is signalled by the red LED "fail" and is reported after expiry of the set alarm-delay time (for error signal ③ undelayed) via 5-6 and 7-8.

In the correct status (ok) the green LED is illuminated (5-6 and 7-8 open, 5-4 and 7-3 closed).

Measuring circuit data

Nominal mains voltage	100 V	400 V	500 V
Under voltage adj. range [V] ¹⁾	40 ... 55	160 ... 225	200 ... 280
Over voltage adj. range [V] ¹⁾	61 ... 70	235 ... 275	300 ... 350
Δ voltage adj. range [V] ^{1) 2)}	5 ... 25	20 ... 100	20 ... 100
$\Delta \phi$ adjustment range [°] ²⁾	3 ... 15	3 ... 15	3 ... 15
Δf adjustment range [Hz] ²⁾	3 ... 15	3 ... 15	3 ... 15

¹⁾ L - N ²⁾ adjustment with the same rotary knob

Time data

Alarm delay adjustment range	0.2 ... 5 s
Reset time	100 ... 400 ms

Contacts

Type / material	2 CO, micro disconnection / AgNi
Rated operational current	5 A
Max. inrush current (20 ms)	15 A
Max. AC switching voltage AC-1	250 V
Max. AC load AC-1 (Fig.1)	1250 VA
Max. DC load 30 V / 250 V DC-1	150 W / 60 W
Recommended min. contact load	10 mA / 12 V

Power supply data

Nominal mains voltage	100 V	400 V	500 V
Operating voltage range [V] ¹⁾	35 ... 70	140 ... 285	180 ... 360
Power consumption [W]	≤ 1.5	≤ 1.5	≤ 1.5
Input current [mA]	150	30	25
Frequency [Hz]	50	50	50

Insulation

Test voltage between contacts and supply	3 kVrms 1 minute (basic insulation)
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General specifications

Ambient temperature storage /operation	-40 ... +85 °C/-10 ...+60 °C
Mechanical life of contacts	30 x 10 ⁶ operations
Ingress protection degree	Housing: IP 40, terminals: IP 20
Max. screw torque	0.5 Nm
Housing material / Weight	Lexan / 350 g

Standard types

50 Hz , AC 100, 400, 500

SSU34/AC...V

"..." enter the voltage for full type designation



Connection diagram

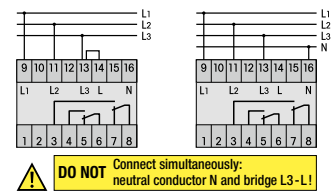


Fig. 1 AC electrical endurance

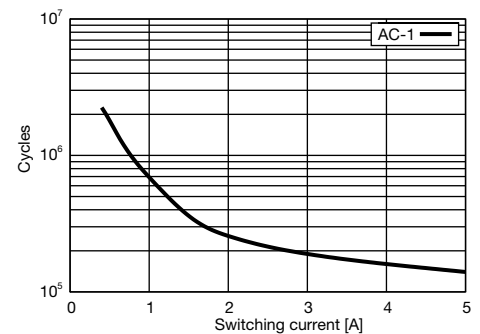
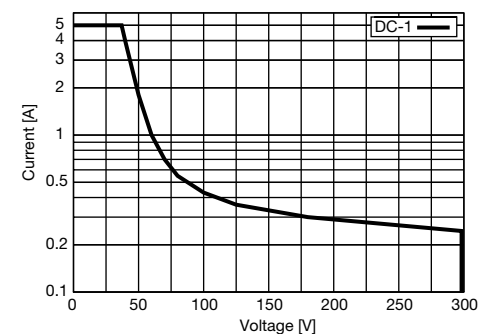
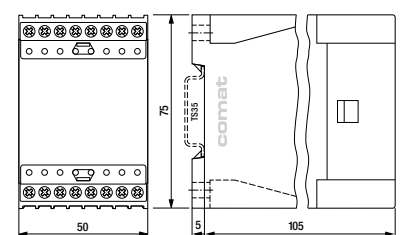


Fig. 2 DC load limit curve



Dimensions [mm]



Technical approvals, conformities



SSU36

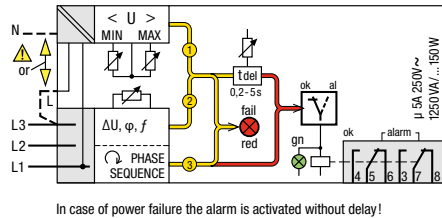
60 Hz, 3 phase monitoring relay DIN Rail mounting according to DIN 43 880



Type: SSU36/... V

Monitoring relay for under / over voltage, phase sequence, phase loss, phase angle, frequency, asymmetry. Star or delta operation. 2 change over alarm contacts 6 A 250V

Monitoring function



The SSU36 (60Hz) provide comprehensive monitoring of three-phase mains supplies with or without neutral.

The following mains faults are monitored:

Error signal **U** (V_{Δ} , V_{λ}):

Exceeding or dropping below the set voltage values U_{min}/U_{max} for L1-N or L1-L3,L (no differential voltage, phase position or frequency fault).

Error signal **ΔU , $\Delta\phi$, Δf :**

One or more of the three voltages, phase positions, or the mains frequency are diverging from the required value. Depending on the nature of their occurrence Δ -errors are evaluated cumulatively.

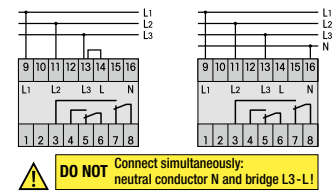
Error signal **☉**:

Connection polarity reversal (wrong phase-sequence). Any error is signalled by the red LED "fail" and is reported after expiry of the set alarm-delay time (for error signal **☉** undelayed) via 5-6 and 7-8.

In the correct status (ok) the green LED is illuminated (5-6 and 7-8 open, 5-4 and 7-3 closed).



Connection diagram



Measuring circuit data

Nominal mains voltage	208 V	460 V	480 V
Under voltage adj. range [V] ¹⁾	85 ... 115	186 ... 260	194 ... 270
Over voltage adj. range [V] ¹⁾	125 ... 145	270 ... 318	284 ... 332
Δ voltage adj. range [V] ^{1) 2)}	10 ... 50	20 ... 100	20 ... 100
$\Delta\phi$ adjustment range [°] ²⁾	5 ... 24	4 ... 21	4 ... 21
Δf adjustment range [Hz] ²⁾	3 ... 22	3 ... 19	3 ... 19

¹⁾ L - N ²⁾ adjustment with the same rotary knob

Time data

Alarm delay adjustment range	0.2 ... 5 s
Reset time	100 ... 400 ms

Contacts

Type / material	2 CO, micro disconnection / AgNi
Rated operational current	5 A
Max. inrush current (20 ms)	15 A
Max. AC switching voltage AC-1	250 V
Max. AC load AC-1 (Fig.1)	1250 VA
Max. DC load 30 V / 250 V DC-1	150 W / 60 W
Recommended min. contact load	10 mA / 12 V

Power supply data

Nominal mains voltage	208 V	460 V	480 V
Operating voltage range [V] ¹⁾	75 ... 150	160 ... 331	170 ... 346
Power consumption [W]	≤ 1.5	≤ 1.5	≤ 1.5
Input current [mA]	70	25	25
Frequency [Hz]	60	60	60

Insulation

Test voltage between contacts and supply	3 kVrms 1 minute (basic insulation)
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General specifications

Ambient temperature storage /operation	-40 ... +85 °C / -10 ... +60 °C
Mechanical life of contacts	30 x 10 ⁶ operations
Ingress protection degree	Housing: IP 40, terminals: IP 20
Max. screw torque	0.5 Nm
Housing material / Weight	Lexan / 350 g

Standard types

60 Hz, AC 208, 460, 480

"..." enter the voltage for full type designation

SSU36/AC...V

Fig. 1 AC electrical endurance

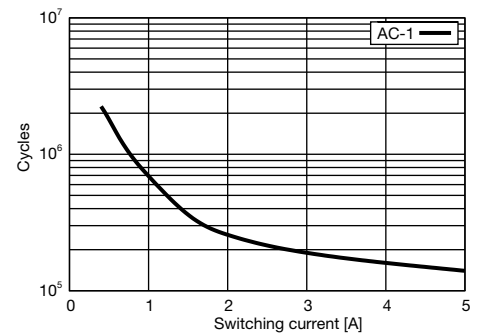
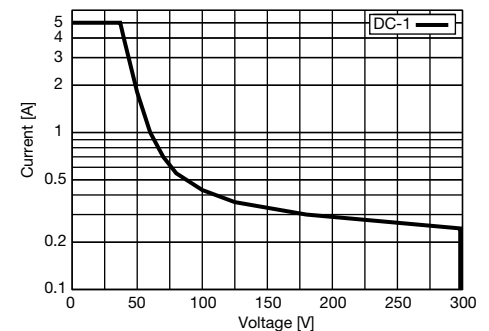
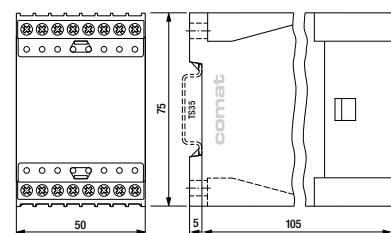


Fig. 2 DC load limit curve



Dimensions [mm]



Technical approvals, conformities

EN 60947

