



LOVATO ELECTRIC S.P.A.

24020 GORLE (BERGAMO) ITALIA
 VIA DON E. MAZZA, 12
 TEL. 035 4282111
 TELEFAX (Nazionale): 035 4282200
 TELEFAX (International): +39 035 4282400
 E-mail info@LovatoElectric.com
 Web www.LovatoElectric.com



I
RELÈ VOLTMETRICO TRIFASE DI MINIMA E MASSIMA TENSIONE

GB
THREE-PHASE MINIMUM AND MAXIMUM VOLTAGE CONTROL RELAY

D
SPANNUNGWÄCHTER DREIPHASIG, UNTER- UND ÜBERSPANNUNG



DRV3-DRV3N

ATTENZIONE!

Questo apparecchio deve essere installato da personale qualificato, nel rispetto delle vigenti normative impiantistiche, allo scopo di evitare danni a persone o cose.

I prodotti descritti in questo documento sono suscettibili in qualsiasi momento di evoluzioni o di modifiche. Le descrizioni ed i dati a catalogo non possono pertanto avere nessun valore contrattuale.

DESCRIZIONE

- 3 tensioni nominali di linea selezionabili
- Soglie di minima e massima tensione regolabili
- Tempi d'intervento regolabili
- 2 uscite a rele' (Min, Max) con contatto in scambio
- Ripristino automatico con isteresi fissa (3%)
- LED :
 - presenza alimentazione
 - intervento per minima
 - intervento per massima
- 8 versioni :

per reti trifase senza neutro	
31 DRV3 110	100/110/127VAC
31 DRV3 230	220/230/240VAC
31 DRV3 400	380/400/415VAC
31 DRV3 460	440/460/480VAC
per reti trifase con neutro	
31 DRV3N 110	100/110/127VAC
31 DRV3N 230	220/230/240VAC
31 DRV3N 400	380/400/415VAC
31 DRV3N 460	440/460/480VAC

WARNING!

This equipment is to be installed by trained personnel, complying to current standards, to avoid damages and safety hazards.

Products illustrated herein are subject to alterations and changes without prior notice. Technical data and descriptions in the catalogue are accurate, to the best of our knowledge, but no liabilities for errors, omissions or contingencies arising therefrom are accepted.

DESCRIPTION

- 3 selectable rated voltages
- Minimum and maximum thresholds, separately adjustable
- Trip delays, separately adjustable
- 2 independent output relays with changeover contact
- Automatic reset , 3% hysteresis
- 3 LED's
 - Supply ON
 - Max trip
 - Min trip
- 8 versions :

for three-phase networks without neutral	
31 DRV3 110	100/110/127VAC
31 DRV3 230	220/230/240VAC
31 DRV3 400	380/400/415VAC
31 DRV3 460	440/460/480VAC
for three-phase networks with neutral	
31 DRV3N 110	100/110/127VAC
31 DRV3N 230	220/230/240VAC
31 DRV3N 400	380/400/415VAC
31 DRV3N 460	440/460/480VAC

ACHTUNG!

Um Personen- und Sachschaden zu vermeiden, darf dieses Gerät nur von fachkundigem Personal, unter Berücksichtigung der jeweils geltenden Vorschriften, installiert werden.

Die in diesem Katalog gezeigten Produkte können jederzeit ohne Vorankündigung geändert werden. Technische Daten und Beschreibungen sind richtig und wurden nach bestem Wissen und Gewissen erstellt.

BESCHREIBUNG

- 3 einstellbare Messbereiche
- Separate Einstellung von Unter- und Überspannung
- Separate Einstellung von Verzugszeiten
- Zwei Ausgangsrelais (Min, Max) mit 1 Wechsler (Normalzustand Relais an)
- Autom. Reset mit 3% Hysterese
- LEDs:
 - Netzkontrolle
 - Unterspannung
 - Überspannung
- 8 Typen:

Drehstromnetz ohne Nulleiter	
31 DRV3 110	100/110/127VAC
31 DRV3 230	220/230/240VAC
31 DRV3 400	380/400/415VAC
31 DRV3 460	440/460/480VAC
Drehstromnetz mit Nulleiter	
31 DRV3N 110	100/110/127VAC
31 DRV3N 230	220/230/240VAC
31 DRV3N 400	380/400/415VAC
31 DRV3N 460	440/460/480VAC

IMPIEGIO

- Controllo voltmetrico trifase per reti trifasi senza neutro (DRV3) o reti trifasi con neutro (DRV3N).
- Distacco delle utenze quando la tensione esce dal campo prefissato.
- Mancanza fase: solo con rigenerazione <70% Ue

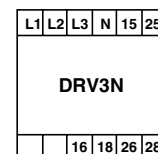
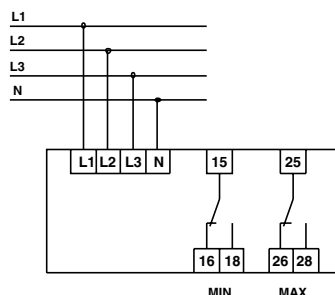
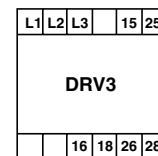
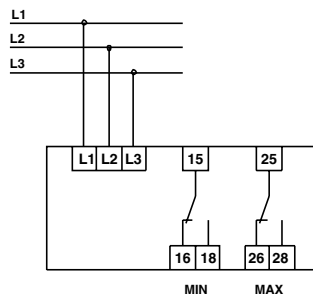
APPLICATION

- Three-phase voltage control for three-phase networks without neutral (DRV3) or three-phase networks with neutral (DRV3N).
- Load disconnection in case of overvoltage or undervoltage.
- Phase failure: only with phase regeneration <70% Ue

ANWENDUNG

- Überwachung von Drehstromnetz ohne Nulleiter (DRV3) oder mit Nulleiter (DRV3N).
- Phasenasufall: bei Rückinduktionsspannung unter 70% Ue

SCHEMI DI COLLEGAMENTO WIRING DIAGRAMS GERÄTEPLAN



FUNZIONAMENTO

La tensione da controllare e' applicata ai morsetti L1-L2-L3-(N) e fornisce anche l'alimentazione all'apparecchio (LED verde "ON").

Con i potenziometri "Max voltage" e "Min voltage" e' stabilita una finestra di controllo attorno al valore nominale di linea selezionato con il commutatore "Ue".

L'unita' interviene quando anche solo una delle tensioni concatenate (L1-L2, L2-L3, L1-L3) risulta al di fuori dei limiti prestabiliti.

- Condizioni normali

Quando la tensione ha un valore compreso entro la finestra di controllo, i rele' di uscita "Min" e "Max" sono energizzati, i LED "Min" e "Max" sono spenti.

- Intervento per massima

Quando la tensione supera la soglia "Max voltage" e l'anomalia permane per un tempo superiore a "Delay max", il rele' di uscita "Max" si diseccita e il LED rosso "Max" si accende.

Quando la tensione ritorna ad un valore inferiore a "Max voltage"-3% (isteresi), il ripristino e' automatico: il rele' di uscita "Max" torna ad eccitarsi e il LED "Max" si spegne.

- Intervento per minima

Quando la tensione scende al di sotto della soglia "Min voltage" e l'anomalia permane per un tempo superiore a "Delay min", il rele' di uscita "Min" si diseccita e il LED rosso "Min" si accende.

Quando la tensione ritorna ad un valore superiore a "Min voltage"+3% (isteresi), il ripristino e' automatico: il rele' di uscita "Min" torna ad eccitarsi e il LED "Min" si spegne.

Note:

- All'accensione, DRV3-DRV3N sono inibiti per 1,3s circa
- DRV3-DRV3N sono insensibili ad interruzioni della linea <40ms
- Quando la tensione e' <0.7 Ue per un tempo superiore a 60ms, i rele' di uscita si diseccitano istantaneamente.

OPERATING PRINCIPLE

The voltage to be controlled is applied to terminals L1-L2-L3-(N) and feeds the unit too (green "ON" LED).

"Max voltage" and "Min voltage" potentiometers establish a control window around the line rated voltage which value is selected by the rotary switch "Ue" on the front.

The unit trips when only one of the line voltages (L1-L2, L2-L3, L1-L3) exceeds the set limits.

- Normal conditions

If the voltage is within the control window, both output relays are energized, the "Min" and "Max" LED's are off.

- Maximum voltage trip

When the voltage exceeds the "Max voltage" limit of the control window and the overvoltage remains for more than time "Delay max", the "Max" output relay de-energizes and the "Max" LED switches on. When the voltage returns to a value less than "Max voltage"-3% (hysteresis), the reset is automatic; the "Max" output relay energizes and the "Max" LED switches off.

- Minimum voltage trip

When the voltage exceeds the "Min voltage" limit of the control window and the undervoltage remains for more than time "Delay min", the "Min" output relay de-energizes and the "Min" LED switches on. When the voltage returns to a value more than "Min voltage"+3% (hysteresis), the reset is automatic; the "Min" output relay energizes and the "Min" LED switches off.

Notes:

- At feeding, DRV3 is inhibited for about 1.3s
- DRV3 is immune to voltage dips <40ms
- When the voltage is <0.7 Ue for a time longer than 60ms, the output relay de-energizes instantaneously.

FUNKTION

Meß- und Versorgungsspannung an Klemme L1-L2-L3-(N) anschliessen (LED grün "ON"). Meßbereich mit Wahlschalter "Ue" (Phase-Phase) und Schalterpunkt mit Poti "Min/Max voltage" einstellen. Das Relais spricht bei Überschreiten der Spannungswelle jeder Phase an.

- Normalzustand

Bei Meßspannung innerhalb der Schaltwelle sind die, Relais "Min" und "Max" erregt, LEDs "Min" und "Max" sind gelöscht.

- Bei Überspannung

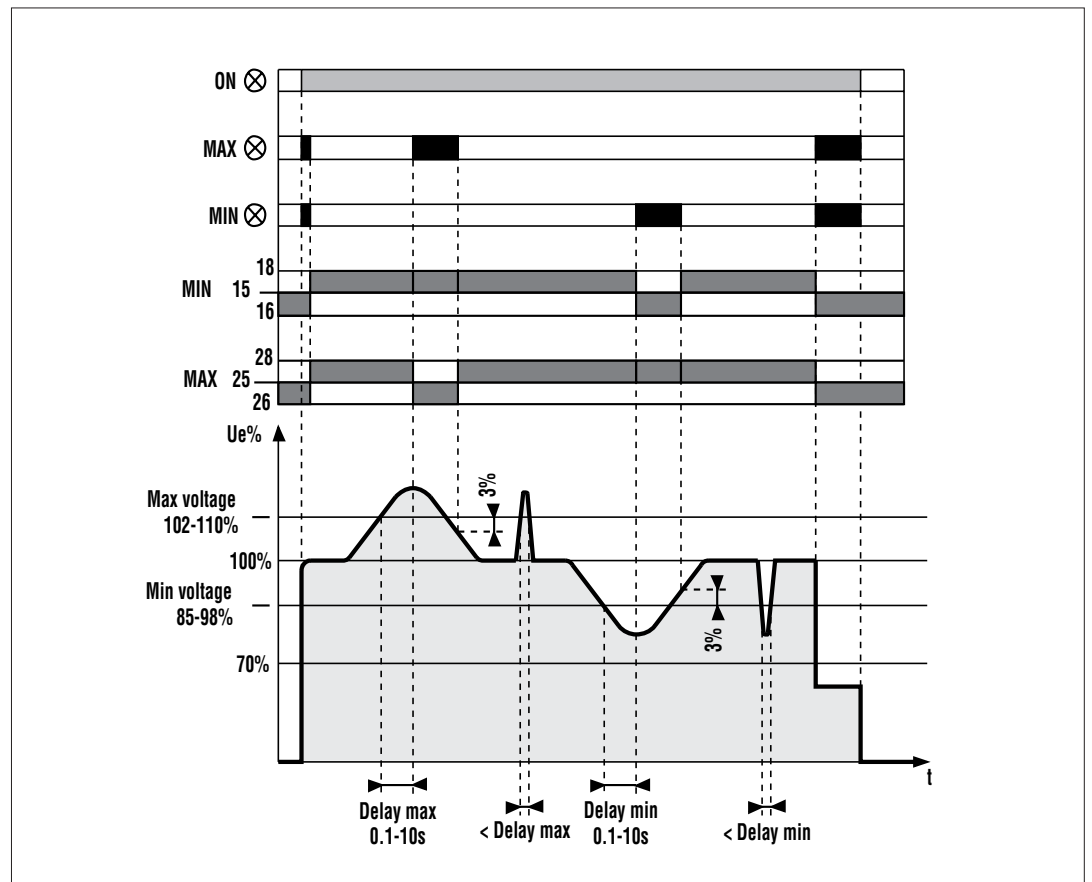
Bei Meßspannung über der Schaltwelle "Max voltage" und nach Ablauf der Zeit "Delay max", das Ausgangsrelais "Max" fällt ab und LED rot "Max" leuchtet. Bei Absenkung der Spannung unter "Max voltage" und -3% Hysterese: Reset erfolgt automatisch, Relais zieht an und LED "Max" ist gelöscht.

- Bei Unterspannung

Bei Meßspannung unter der Schaltwelle "Min voltage" und nach Ablauf der Zeit "Delay min", das Ausgangsrelais "Min" fällt ab und LED rot "Min" leuchtet. Bei Rückker der Spannung über "Min voltage" und +3% Hysterese: Reset erfolgt automatisch, Relais zieht an und LED "Min" ist gelöscht.

Bemerkung:

- Einschaltverzögerung ca. 1,3s (siehe Bild).
- DRV3(N) ist für Spannungsausfälle <40ms nicht anzuwenden.
- Bei Spannungssenkung unter 0,7 Ue über 60ms, das Ausgangsrelais fällt sofort ab.



TIPO TYPE TYP	DRV3 110 DRV3N 110	DRV3 230 DRV3N 230	DRV3 400 DRV3N 400	DRV3 460 DRV3N 460
ON 1 2 Vmin.	100V	220V	380V	440V
ON 1 2 Vmed.	110V	230V	400V	460V
ON 1 2 Vmax.	127V	240V	415V	480V
ON 1 2 Vmin.	100V	220V	380V	440V

IMPOSTAZIONE

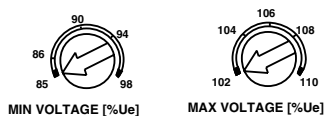
- a) Prima di alimentare l'apparecchio, selezionare la tensione nominale "Ue" della linea da controllare impostando i dip switch (vedi tabella); a questa tensione saranno riferite le soglie % di intervento ("Max voltage" e "Min voltage").
- b) Impostare le soglie d'intervento per massima e minima tensione mediante i potenziometri "Max voltage" e "Min voltage" rispettivamente:
"Max voltage" range 102÷110% Ue
"Min voltage" range 85÷98% Ue
Le scale % sono riferite al valore di tensione selezionato con il commutatore "Ue".

SETTING UP

- a) Select the rated voltage with rotary switch "Ue" before supplying the unit, according to the line voltage to be controlled selectable by dip switches (see side table); the "Max voltage" and "Min voltage" thresholds will be referred to this value.
- b) Set the maximum and minimum thresholds with the potentiometers "Max voltage" and "Min voltage" respectively:
"Max voltage" range 102-110% Ue
"Min voltage" range 85-98% Ue
The % values are referred to the rated voltage selected by the "Ue" rotary switch.

INBETRIEBSNAHME

- a) Vor der Speisung des Geräts die Nennspannung "Ue" der zu kontrollierenden Leitung über die Dip Switches einstellen (siehe Tabelle); die Anprechbereiche ("Max voltage" und "Min voltage") werden sich auf diese Spannung beziehen.
- b) Einstellung der Unter- und Überspannung an zwei Poti "Max voltage" und "Min voltage", Einstellmöglichkeit:
Max 102÷110% Ue
Min 85÷98% Ue
Die Skale-Werte in % entsprechen den gewählten Meßbereich "Ue".



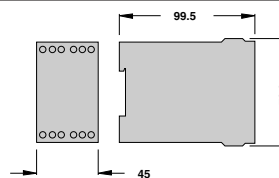
- c) Impostare i tempi d'intervento per massima e minima tensione mediante i potenziometri "Delay max" e "Delay min" rispettivamente:
campo di reg. "Delay max" 0,1÷10s
campo di reg. "Delay min" 0,1÷10s

- c) Set the maximum and minimum trip delays with the potentiometers "Delay max" and "Delay min" respectively:
"Delay max" range 0.1-10s
"Delay min" range 0.1-10s

- c) Separate Einstellung der Verzugszeiten durch Poti "Delay max" und "Delay min":
Einstellmöglichkeit "Delay max" 0,1÷10s
Einstellmöglichkeit "Delay min" 0,1÷10s



DIMENSIONI DIMENSIONS MASSE



CARATTERISTICHE TECNICHE

ALIMENTAZIONE

Tensione nominale Ue	secondo i tipi: 31 DRV3 (N) 110 100/110/127VAC 31 DRV3 (N) 230 220/230/240VAC 31 DRV3 (N) 400 380/400/415VAC 31 DRV3 (N) 460 440/460/480VAC
Frequenza nominale	50/60 Hz ±5%
Limiti di funzionamento	secondo i tipi: 31 DRV3 (N) 110 70...146VAC 31 DRV3 (N) 230 154...276VAC 31 DRV3 (N) 400 266...477VAC 31 DRV3 (N) 460 308...552VAC
Potenza massima assorbita	3,6VA - 3,3W
SOGLIE DI INTERVENTO / RIPRISTINO	
Set-point "Max voltage"	102...110% Ue (regolabile)
Set-point "Min voltage"	85...98% Ue (regolabile)
Errore di predisposizione	< 0,5%
Errore di ripetibilità	< ± 0,1% (a parametri costanti)
Errore dovuto alla variazione temperatura	< 0,1%
Tipo di ripristino	automatico
Isteresi al ripristino	3% fissa (riferita al set-point)
TEMPI DI INTERVENTO	
Ritardo "Delay max"	0,1...10s (regolabile)
Ritardo "Delay min"	0,1...10s (regolabile)
Tempo di ripristino	20ms (minimo)
Tempo di intervento per U < 70% Ue	60ms
Tempo di inibizione alla messa in tensione	1,3s
RELÈ DI USCITA	
Uscite	2
Tipo di uscita	1 contatto in scambio ciascuno
Tensione nominale	250VAC
Massima tensione di commutazione	380VAC

Corrente nominale termica (Ith)	8A
Corrente d'impiego	AC15 2,5A - 250VAC DC14 5A - 24VDC
Durata meccanica	30x10 ⁶ cicli
Durata elettrica (con carico nominale)	10 ⁵ cicli
ISOLAMENTO (ingresso-uscita)	
Tensione nominale d'isolamento Ui	500V
Tensione nominale di tenuta a impulso	5kV 1,2/50µs
Prova di tenuta a frequenza di esercizio	2,5kV (50Hz - 60s)
SEGNALAZIONI	
LED verde "ON":	presenza alimentazione
LED rosso "Max":	intervento per massima tensione
LED rosso "Min":	intervento per minima tensione
CONDIZIONI AMBIENTALI	
Temperatura d'impiego	-10...+60°C
Temperatura di stoccaggio	-30...+80°C
CONNESSIONI	
Tipo di terminali	vite a serrafilo imperdibile (M3,5)
Sezione conduttori	max 2x2,5mm ² filo rigido, 2x1,5mm ² filo flessibile preparato (anche con puntalini preisolati)
Coppia di serraggio	0,8÷1,2Nm
CONTENITORE	
Materiale	Poliammide autoestingente
Montaggio	a scatto su profilato ad omega EN 50022
Posizione di montaggio	qualsiasi
Grado di protezione	IP40 sul fronte IP20 connessioni
Peso	360g
OMOLOGAZIONI E CONFORMITÀ	
Omologazioni ottenute	RNR (Romanian ROS), EZÚ, GOST
Conforme alle norme	IEC/EN 60255-6



TECHNICAL CHARACTERISTICS

SUPPLY CIRCUIT

Rated operational voltage U _e	(as per types) 31 DRV3 (N) 110 100/110/127VAC 31 DRV3 (N) 230 220/230/240VAC 31 DRV3 (N) 400 380/400/415VAC 31 DRV3 (N) 460 440/460/480VAC
Rated frequency	50/60 Hz ±5%
Operation range	(as per types) 31 DRV3 (N) 110 70...146VAC 31 DRV3 (N) 230 154...276VAC 31 DRV3 (N) 400 266...477VAC 31 DRV3 (N) 460 308...552VAC
Max power consumption	3.6VA - 3.3W
OPERATING THRESHOLDS/RESET	
"Max voltage" set-point	102...110% U _e (adj.)
"Min voltage" set-point	85...98% U _e (adj.)
Setting accuracy	< 0.5%
Repeat accuracy	< ± 0.1% (at constant parameters)
Influence of temperature variation	< 0.1%
Reset type	automatic
Reset hysteresis	3% fixed (referred to the set-point)
OPERATING TIMES	
"Delay max"	0.1...10s (adj.)
"Delay min"	0.1...10s (adj.)
Reset time	20 ms (min.)
Response time for U <70% U _e	60ms
Inhibition time for supply "ON"	1.3s
RELAY OUTPUT	
Number of outputs	2 relays
Type of output	1 changeover contact each
Rated voltage	250VAC



TECHNISCHE EIGENSCHAFTEN

VERSORGUNG

Nennspannung (U _e)	(je nach Type) 31 DRV3 (N) 110 100/110/127VAC 31 DRV3 (N) 230 220/230/240VAC 31 DRV3 (N) 400 380/400/415VAC 31 DRV3 (N) 460 440/460/480VAC
Nennfrequenz	50/60 Hz ±5%
Betriebsgrenzen	(je nach Type) 31 DRV3 (N) 110 70...146VAC 31 DRV3 (N) 230 154...276VAC 31 DRV3 (N) 400 266...477VAC 31 DRV3 (N) 460 308...552VAC
Eigenverbrauch	3,6VA - 3,3W
EINSTELLPEGEL	
"Max voltage" Sollwert	102...110% U _e
"Min voltage" Sollwert	85...98% U _e
Einstellgenauigkeit	< 0,5%
Wiederholgenauigkeit	< ± 0,1% (bei gleichen Parameter)
Temperaturabhängigkeit	< 0,1%
Reset	automatisch
Hysterese	3% (bezogen auf Sollwert)
VERZUGSZEIT	
Einstellmöglichkeit Max	0,1...10s
Einstellmöglichkeit Min	0,1...10s
Wiederbereitschaftszeit	20ms (min.)
Reaktionszeit für U <70% U _e	60ms
Einschaltverzögerung	1.3s
AUSGANGRELAIS	
Ausgänge	2 Relais
Ausgangstyp	1 Wechsler
Nennbetriebsspannung	250VAC

Max switching voltage	380VAC
Rated thermal current (I _{th})	8A
Operational current	AC15 2.5A - 250VAC DC14 5A - 24VDC
Mechanical life	30x10 ⁶ ops
Electrical life (with rated load)	10 ⁵ ops
INSULATION (input-output)	
Rated insulation voltage U _i	500V
Rated impulse withstand voltage	5kV 1.2/50µs
Power frequency withstand voltage	2.5kV (60s to 50Hz)
INDICATIONS	
Green "ON" LED:	supply ON
Red "Max" LED:	Max trip
Red "Min" LED:	Min trip
AMBIENT CONDITIONS	
Operating temperature	-10...+60°C
Storage temperature	-30...+80°C
CONNECTIONS	
Type of terminals	clamp-screw (M3.5)
Conductor cross section	Max. 2x2.5mm ² solid, 2x1.5mm ² finely stranded (also with insulated ferrule)
Tightening torque	0.8-1.2Nm
HOUSING	
Material	Self-extinguishing polyamid
Mounting/Fixing	snap on rail EN 50022
Mounting position	any
Degree of protection	IP40 front IP20 terminals
Weight	360g
CERTIFICATION AND COMPLIANCE	
Certifications obteneue	RNR (Romanian ROS), EZÚ, GOST
Comply with standard	IEC/EN 60255-6

Max Schaltspannung	380VAC
Therm. Nennstrom (I _{th})	8A
Nennstrom	AC15 2,5A - 250VAC DC14 5A - 24VDC
Mech. Lebensdauer	30x10 ⁶ Schaltungen
Elektr. Lebensdauer	10 ⁵ Schaltungen
ISOLATIONSPANNUNG (Eingang-Ausgang)	
Nennisolationsspannung U _i	500V
Nennhaltespannung bei Impuls	5kV 1,2/50µs
Zwischen den beiden Kontaktgruppen	2,5kV (60s to 50Hz)
FUNKTIONSANZEIGE	
LED "ON" grün:	Netzkontrolle
LED "Max" rot:	Max trip
LED "Min" rot:	Min trip
UMGEBUNGSBEDINGUNGEN	
Betriebstemperatur	-10...+60°C
Lagertemperatur	-30...+80°C
ANSCHLÜSSE	
Klemmentyp	Schraube (M3,5)
Anschlußquerschnitte	2x2,5mm ² eindrätig 2x1,5mm ² feindrätig (auch mit Aderendhülse)
Anzugsmoment	0,8÷1,2Nm
GEHÄUSE	
Material	Polyamid selbstlöschend
Einbaulage	nach EN 50022
Montagelage	beliebig
Schutzart	IP40 gehäuse IP20 klemmen
Gewicht	360g
ZULASSUNGEN UND KONFORMITÄT	
Erreichte zulasungen	RNR (Romanian ROS), EZÚ, GOST
Übereinstimmungs mit den Normen	IEC/EN 60255-6