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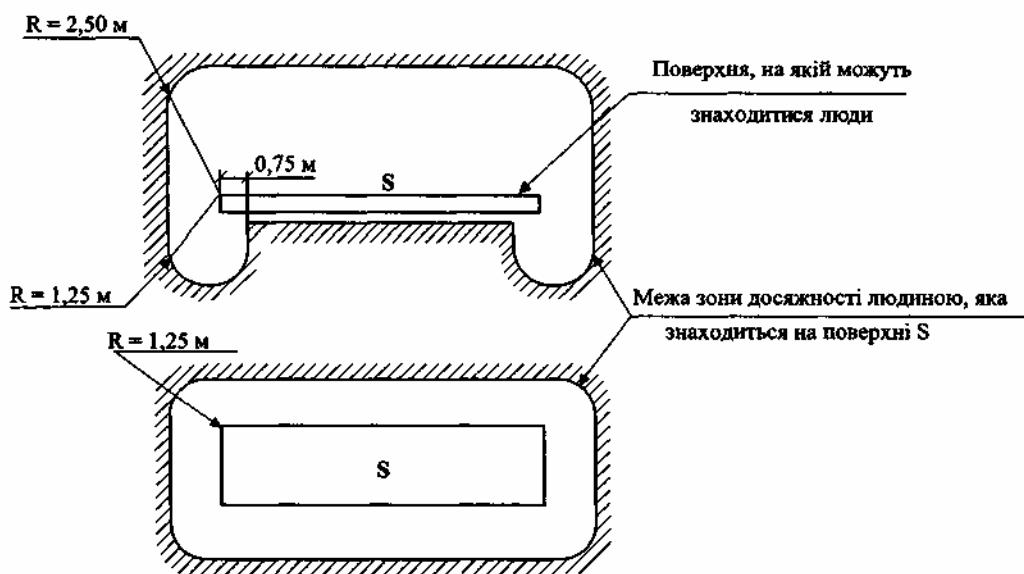
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$120 < U_0 \leq 230$	0,4	5	
$230 < U_0 \leq 400$	0,2	0,4	
$U_0 > 400$	0,1	0,1	

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$R_B/R_E \leq 50/(U_o - 50)$,

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$$R_A \times l_d \leq 50; \quad (2.4)$$

$$R_A \times l_d \leq 120, \quad (2.5)$$

$R_A -$

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$$2 I_a \times Z_s \leq U; \quad (2.6)$$

$$2 Z_s' \leq U_0, \quad (2.7)$$

$U -$, ; $U_0 -$

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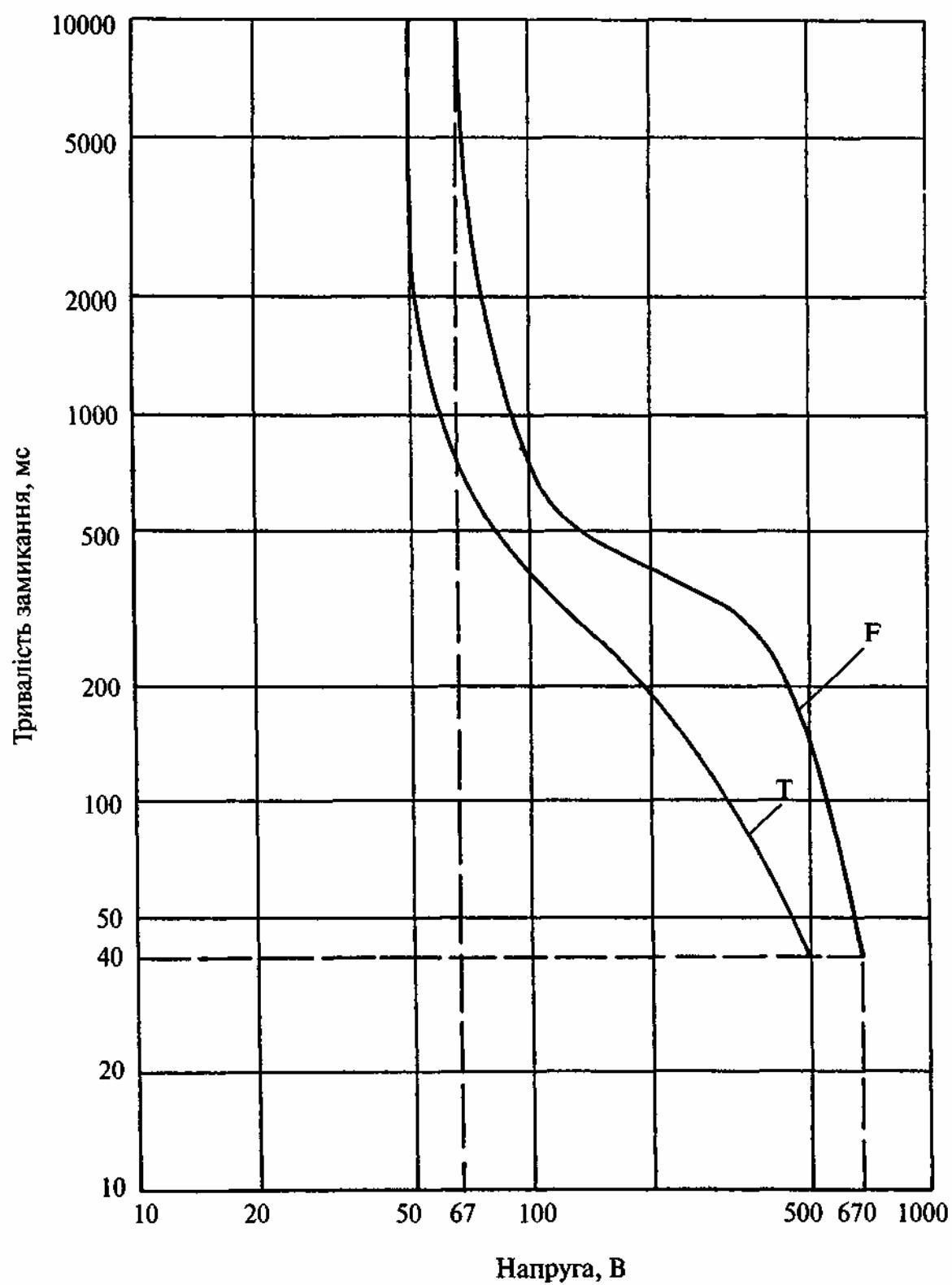
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- 60364-3:1993, Electrical installations of buildings – Part 3: Assessment of general characteristics (. 3.)
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, 410-413 , ,
, (2004 .) , , ;
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442, 442.3.2;
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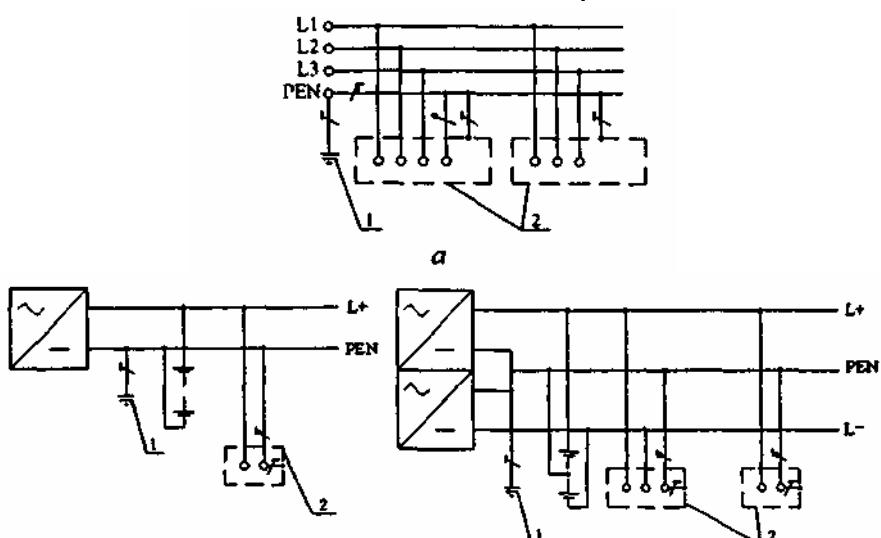
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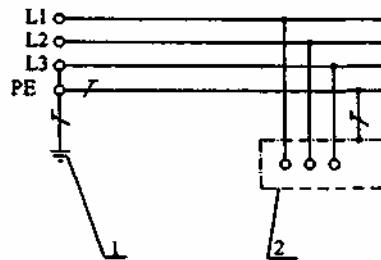
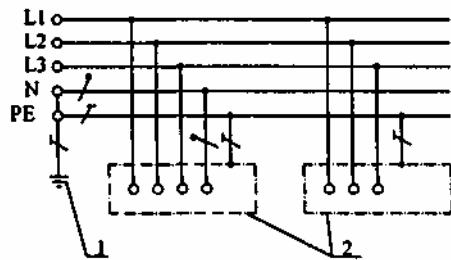
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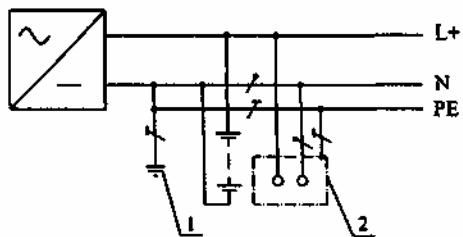
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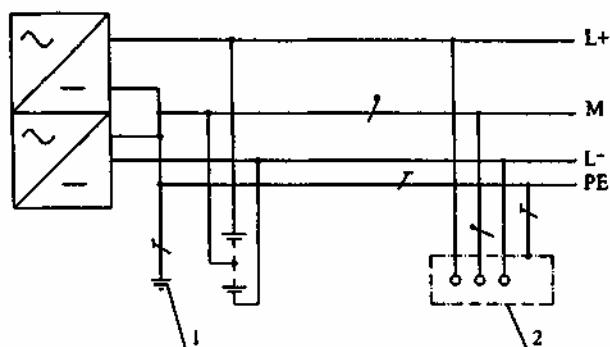
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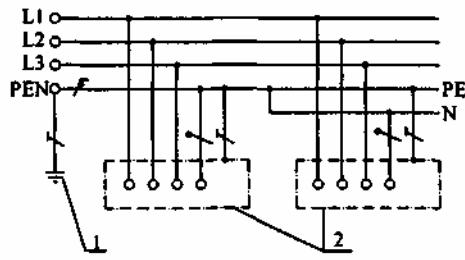
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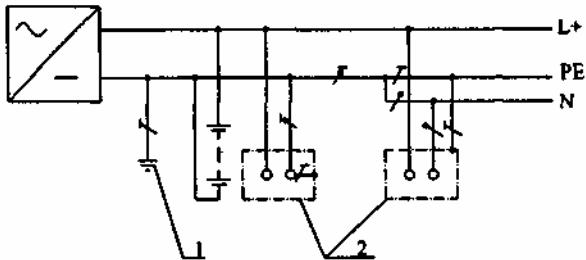
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TN-S: -

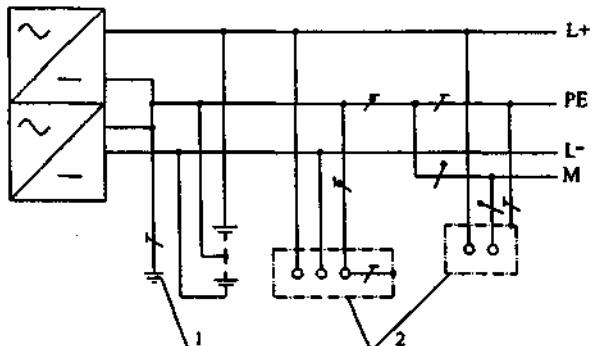
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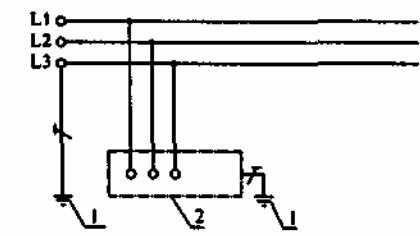
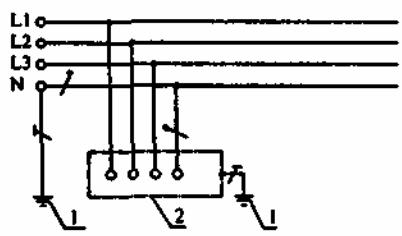
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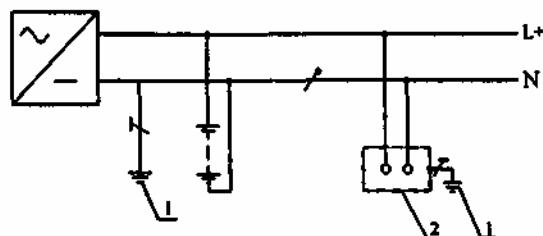
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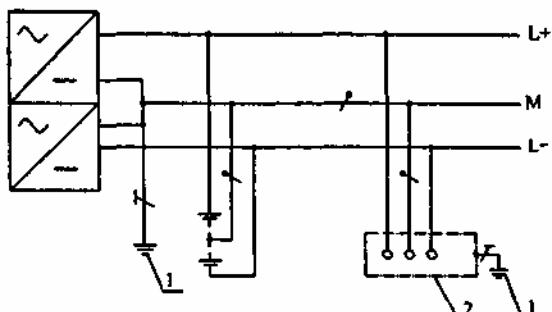
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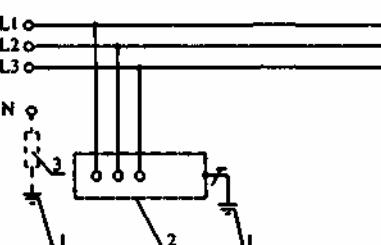


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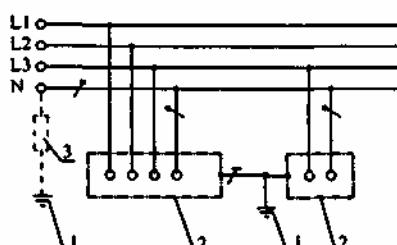
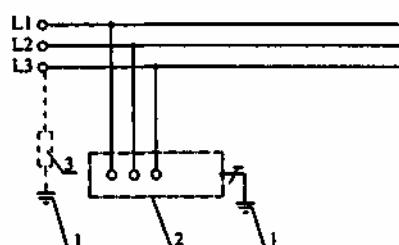
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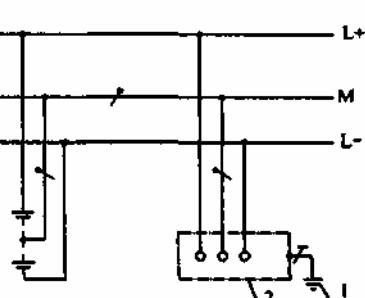
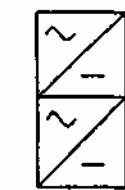
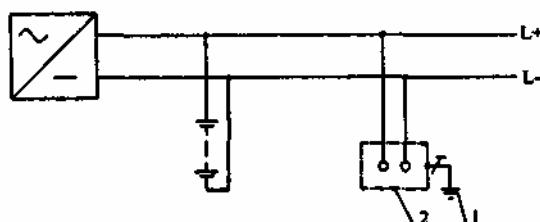
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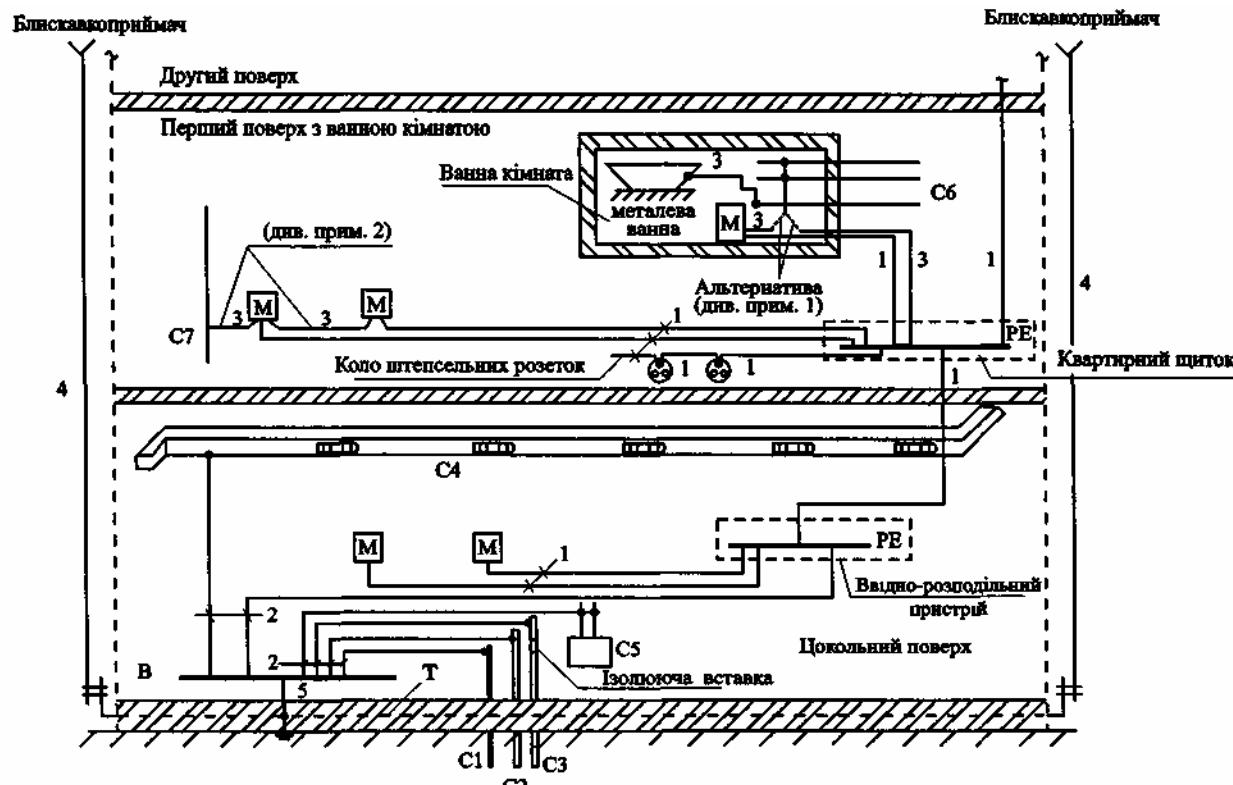
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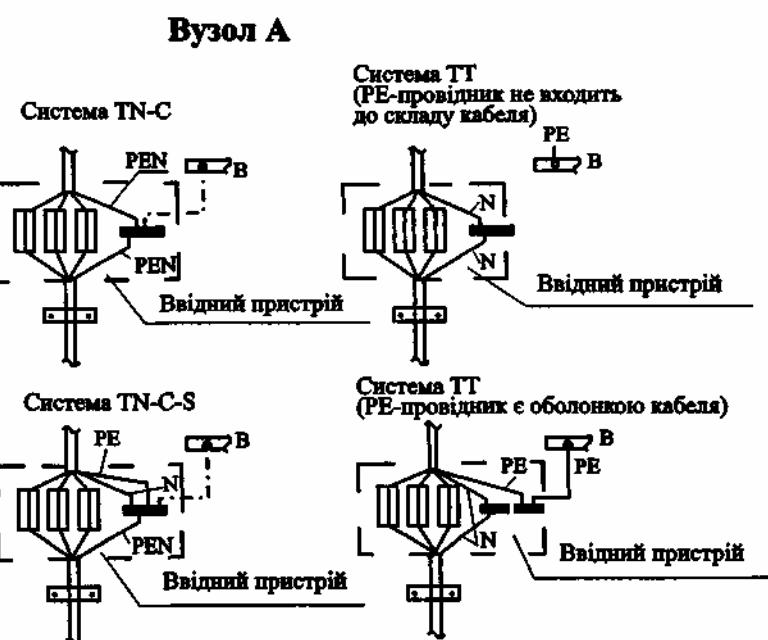
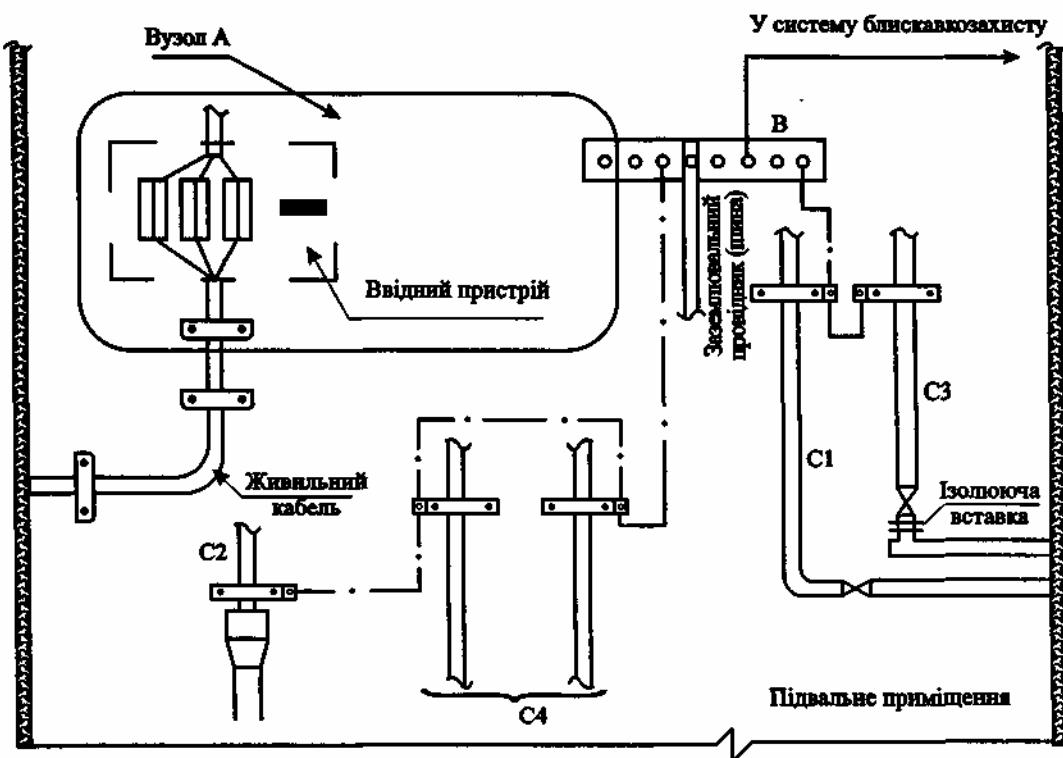
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$U_0,$,
$25 < U_0 \leq 127$	0,3
$127 < U_0 \leq 230$	0,2
$230 < U_0 \leq 400$	0,05
$U_0 > 400$	0,02*
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$$(U_2 = R + U_0)$$

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$$U_1 = R + U_0.$$

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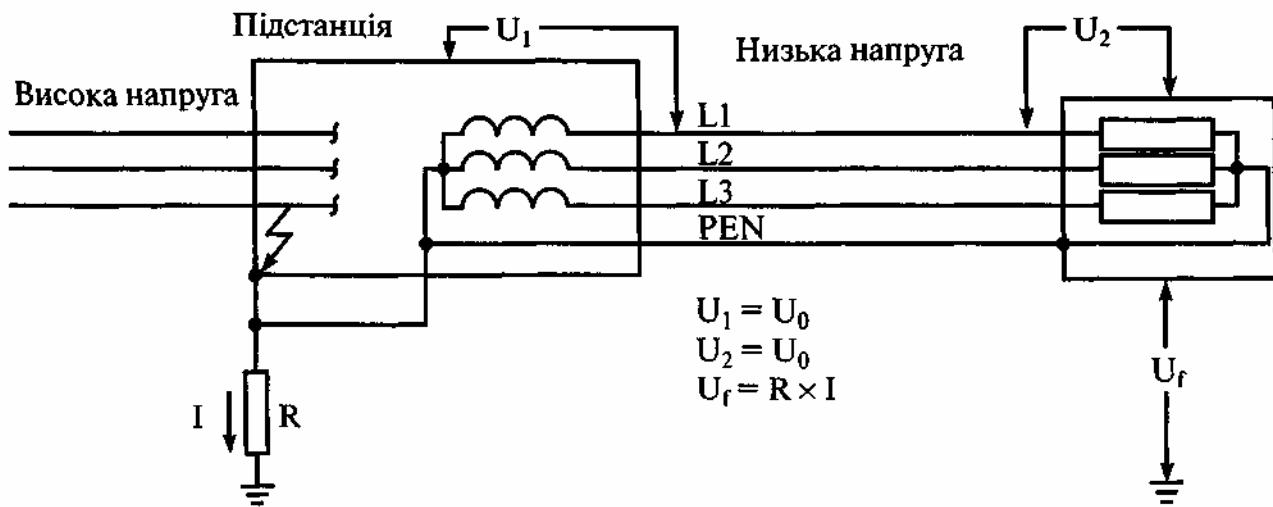
U₀,

$$U = U_0 \sqrt{3} .$$

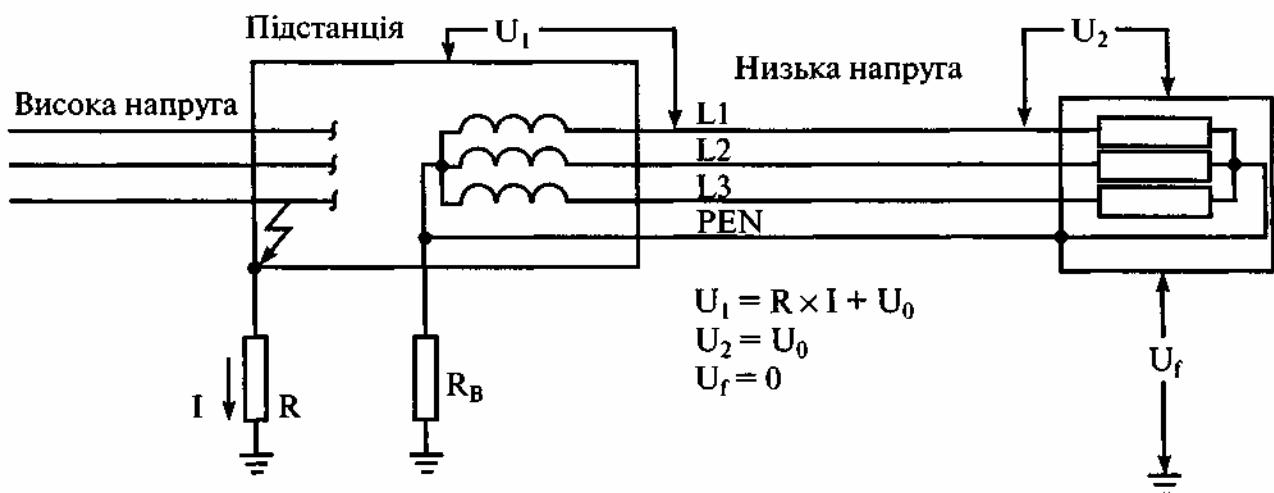
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$$U = U_0 \sqrt{3}).$$

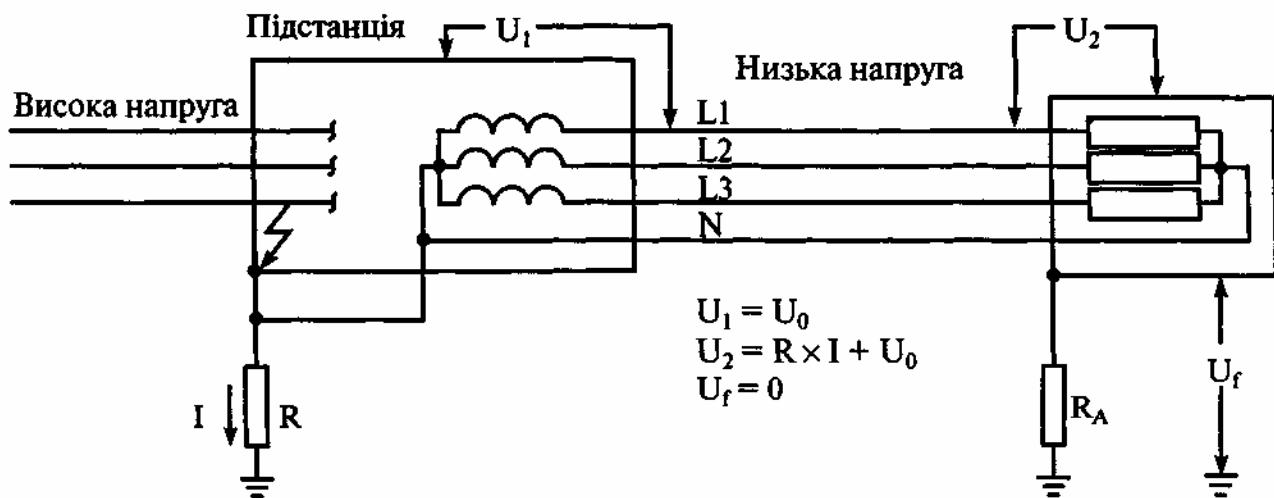


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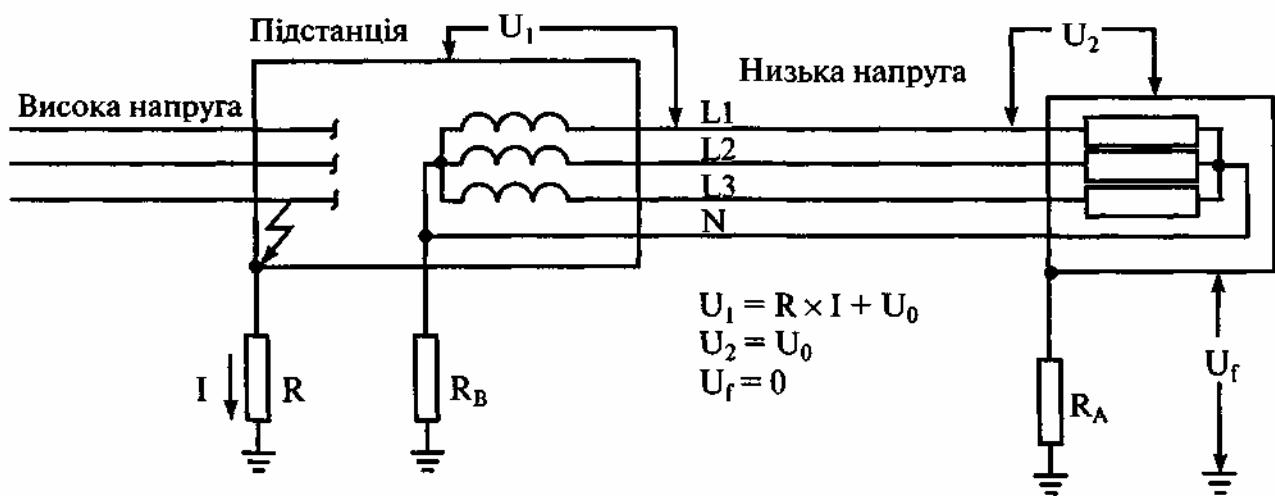


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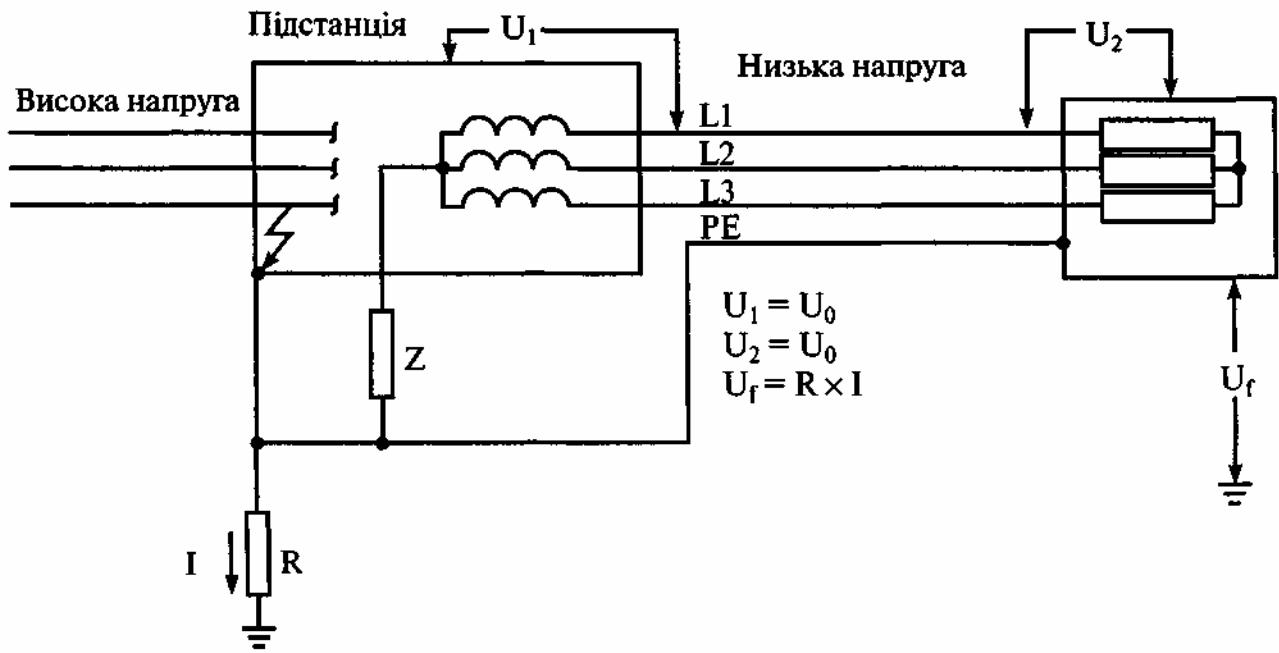
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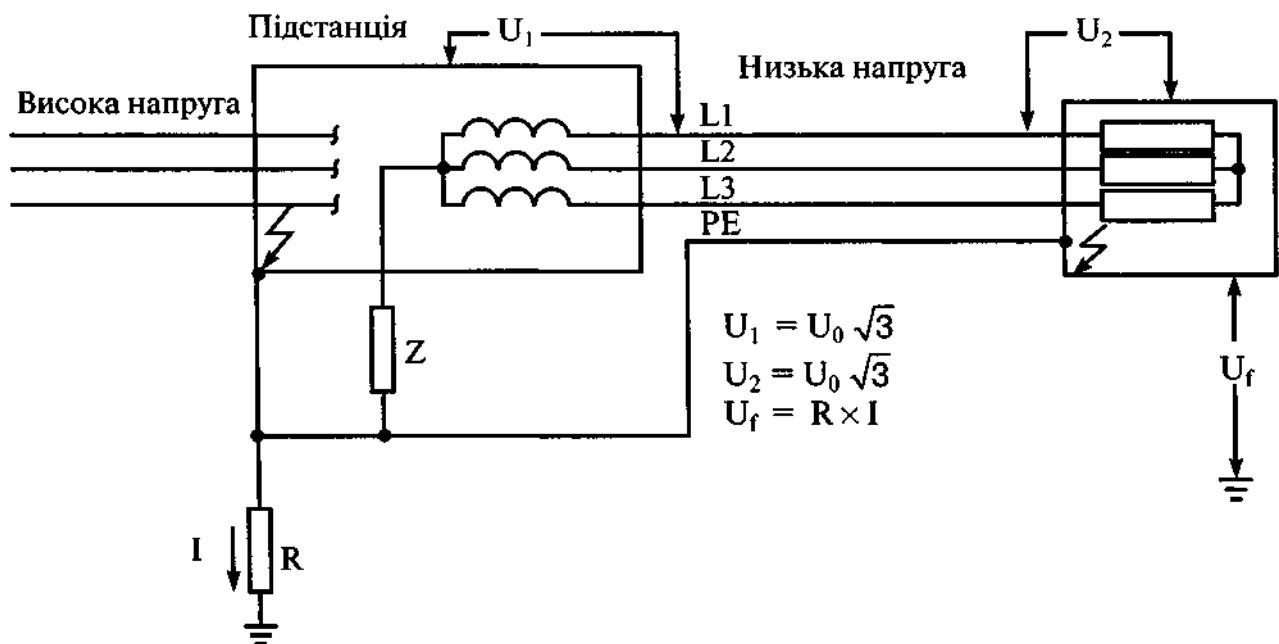
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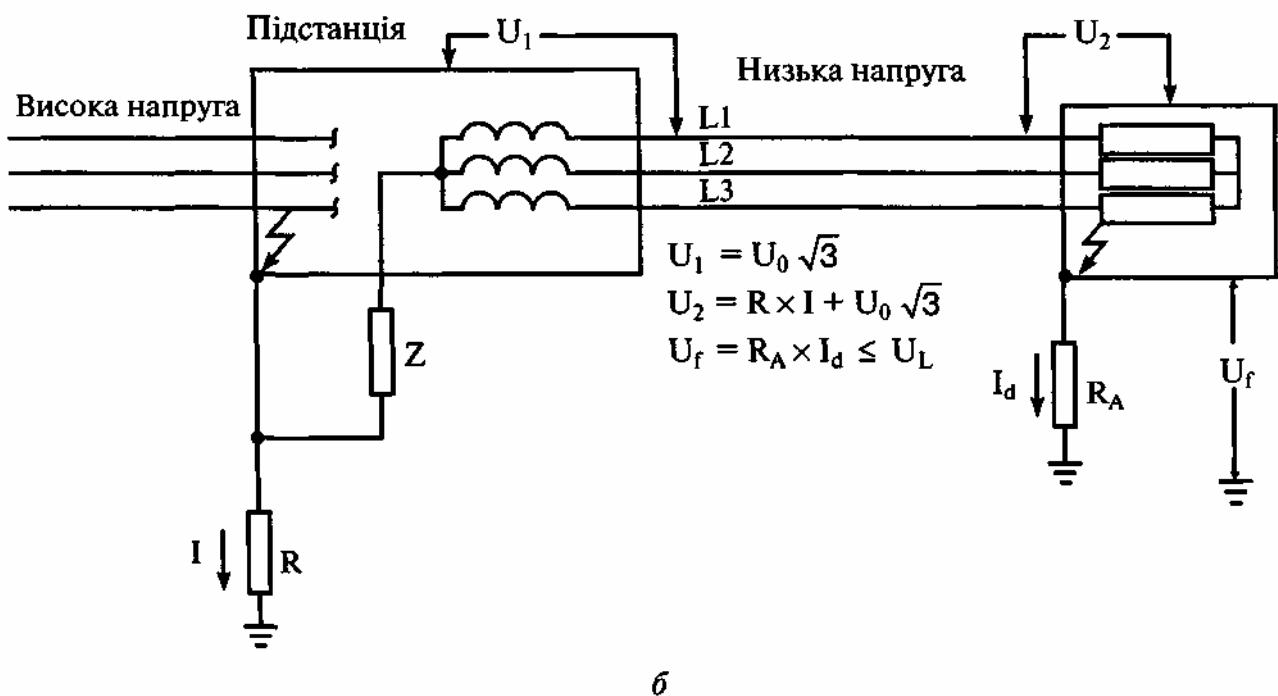
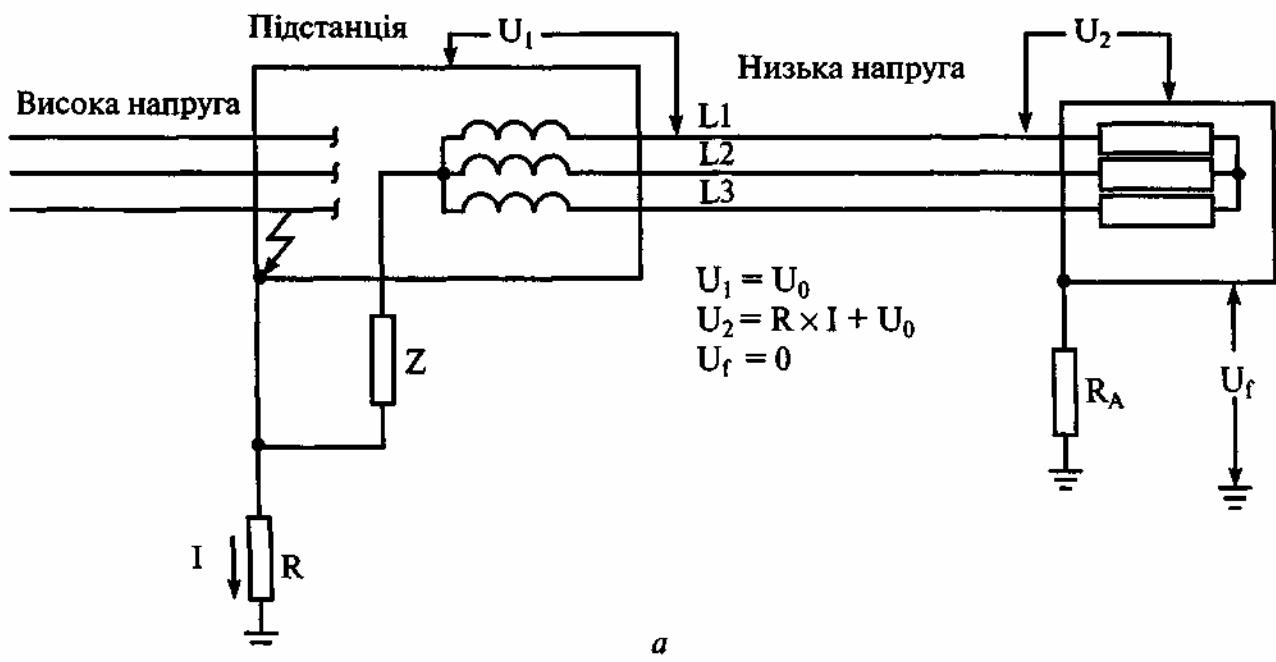
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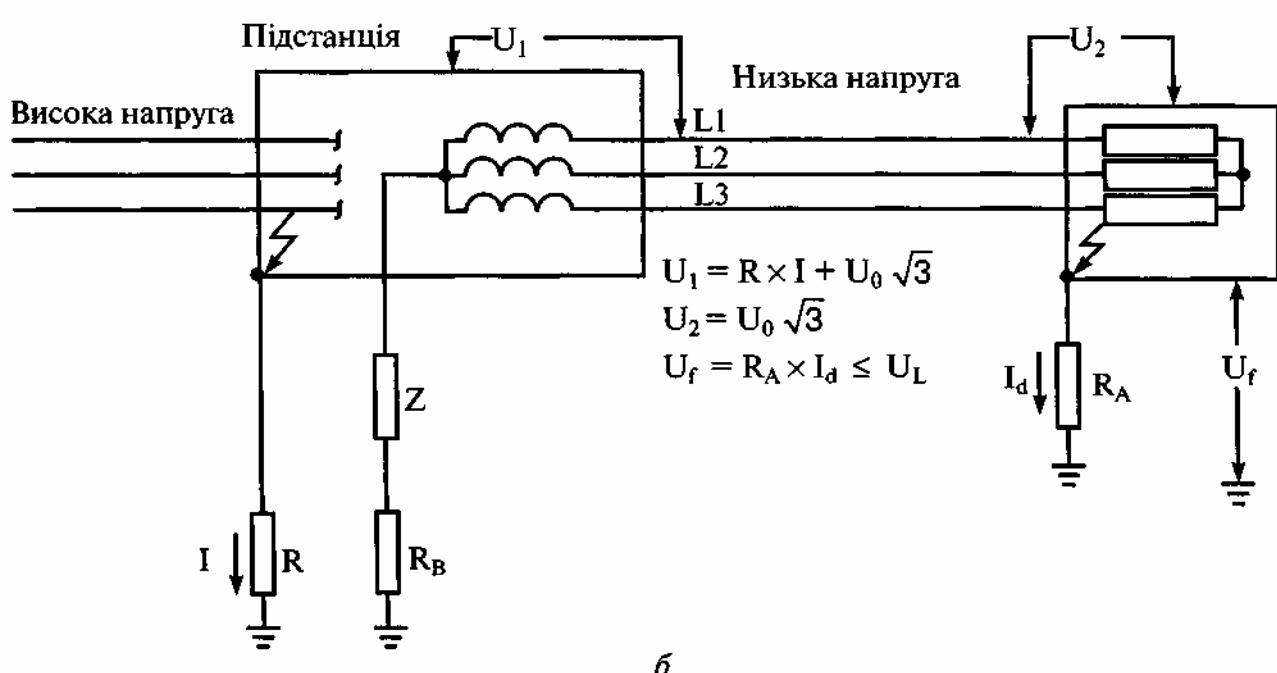
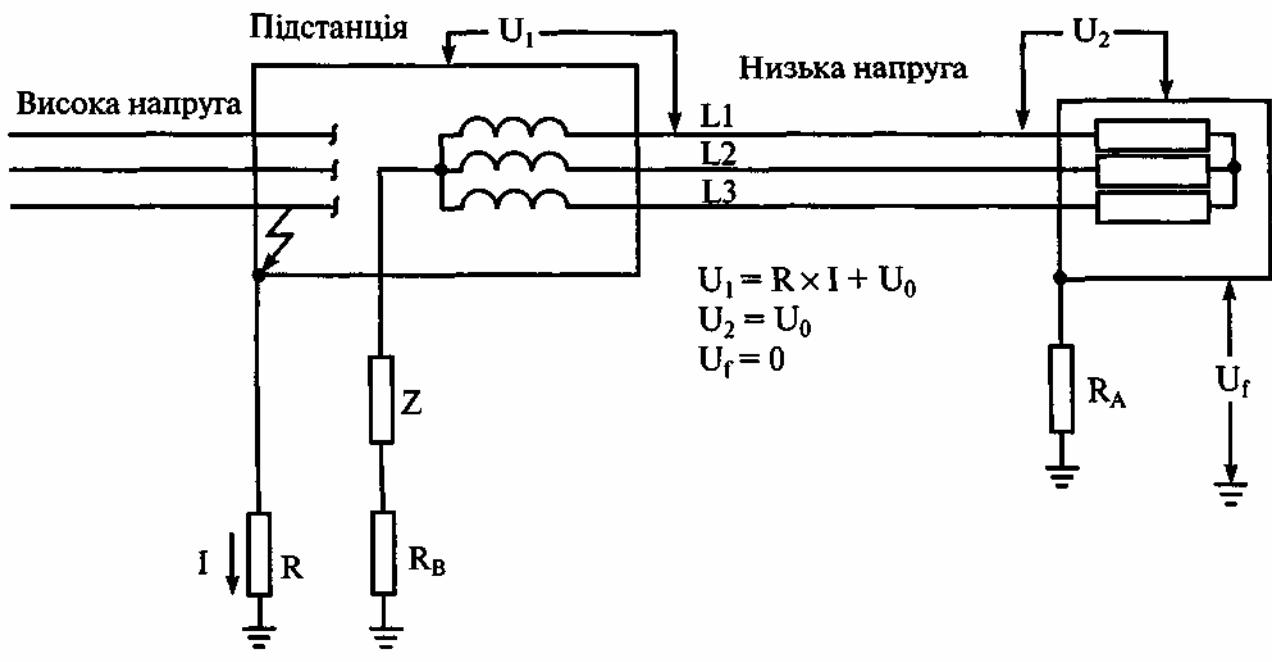
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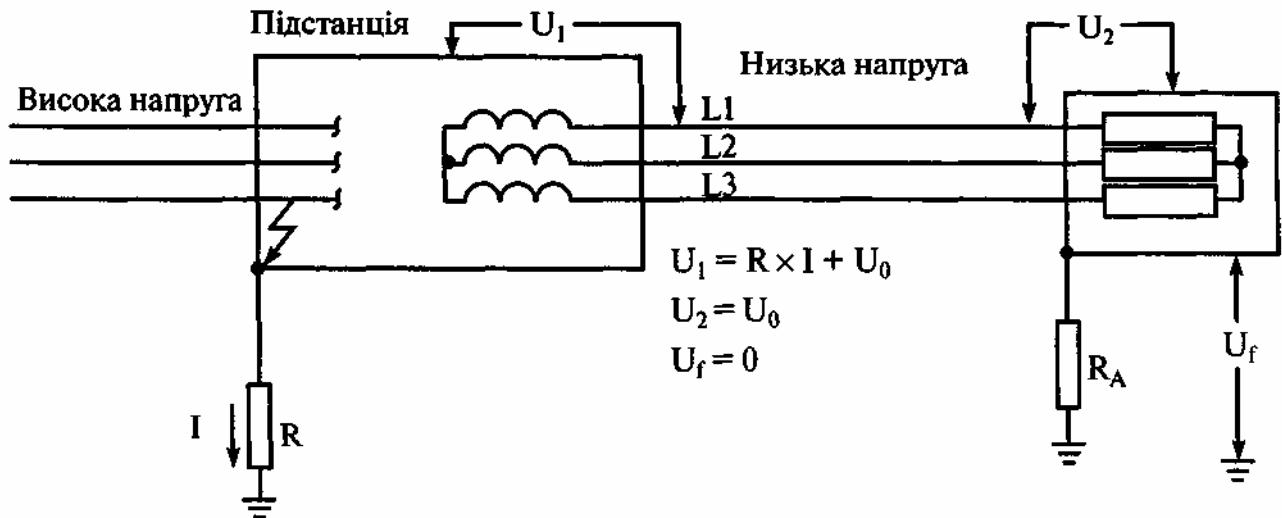
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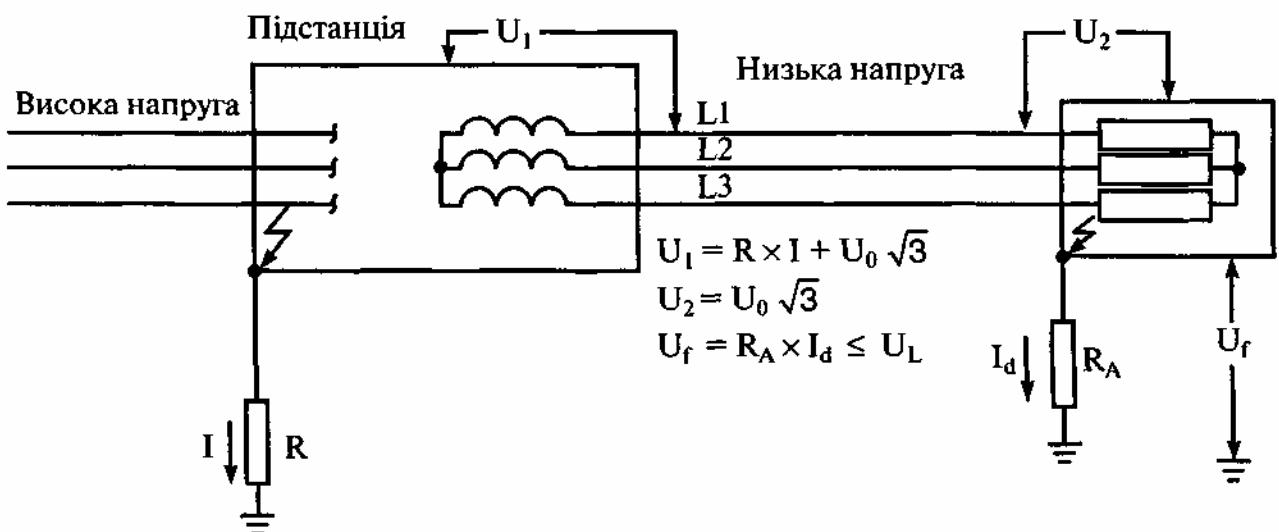
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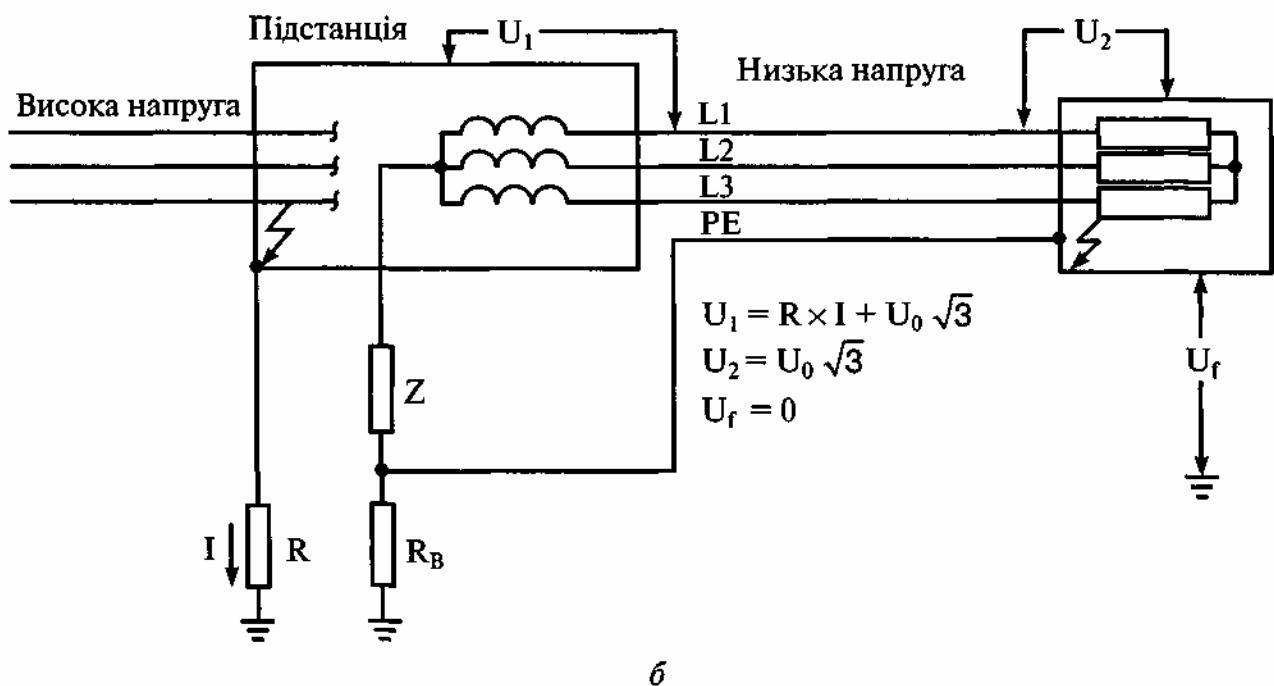
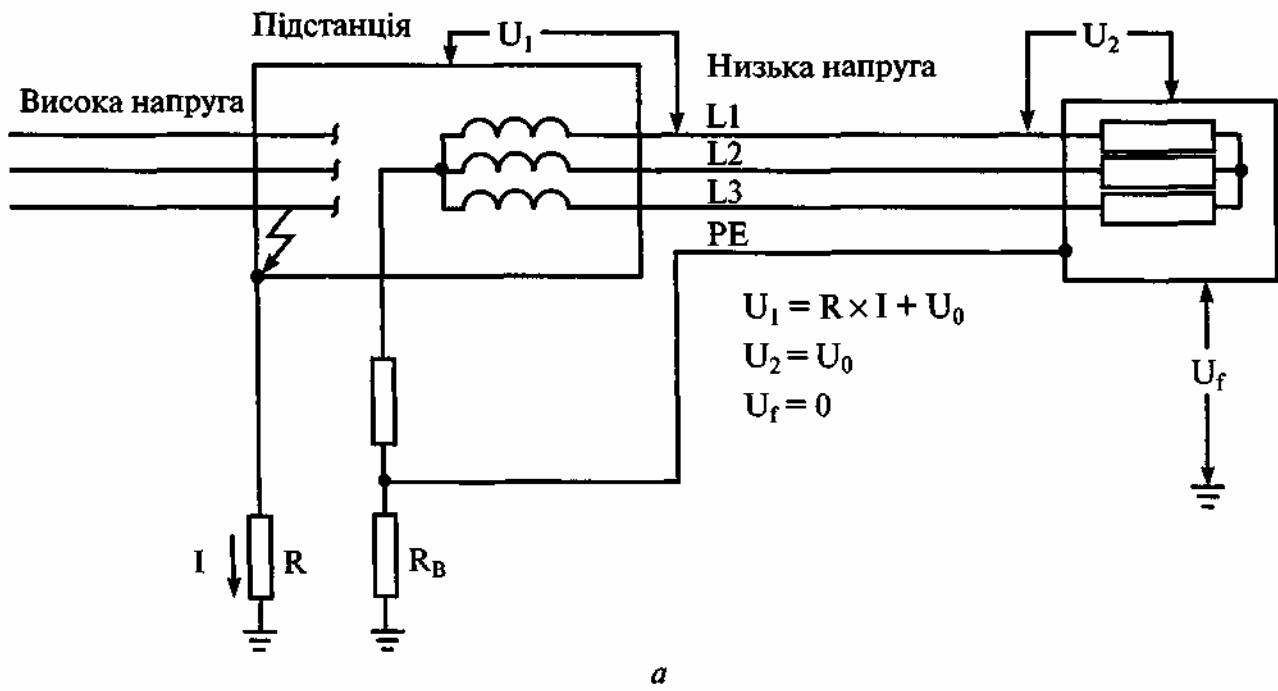


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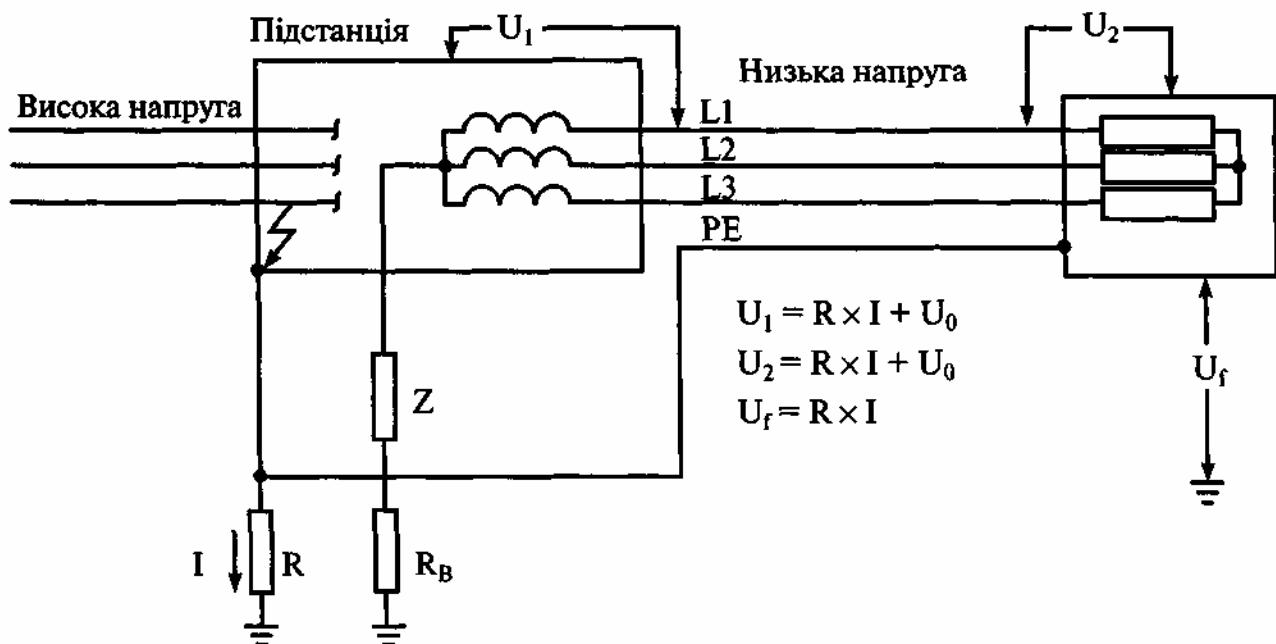


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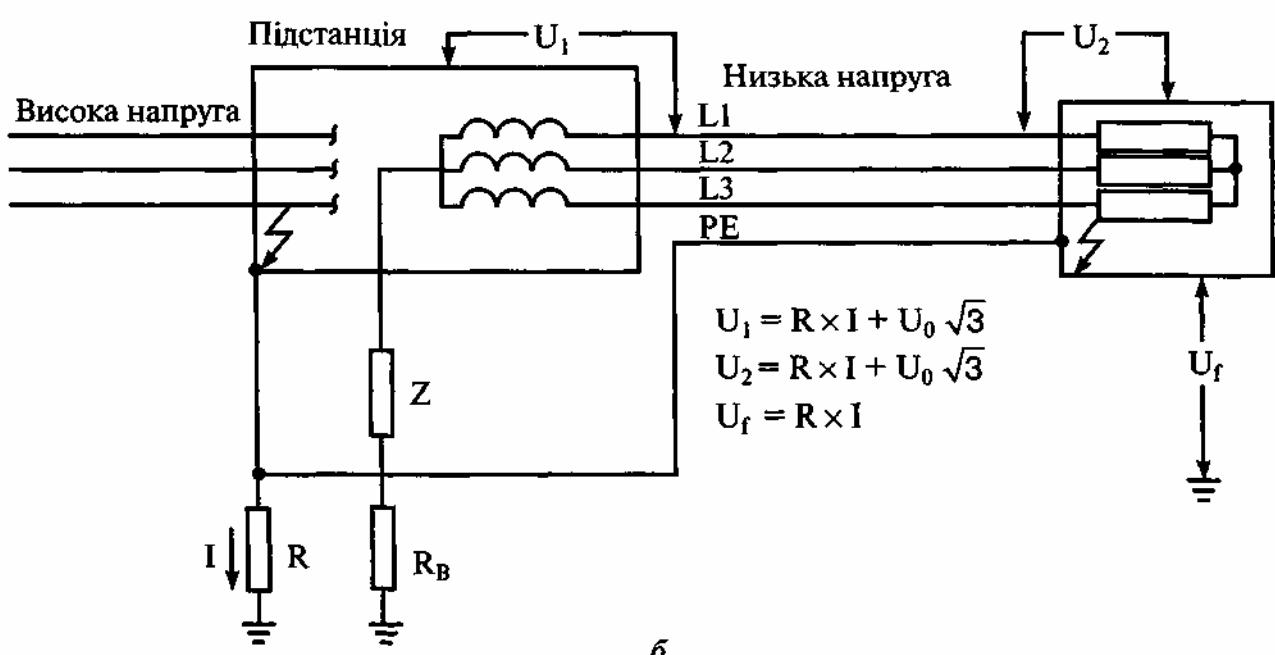
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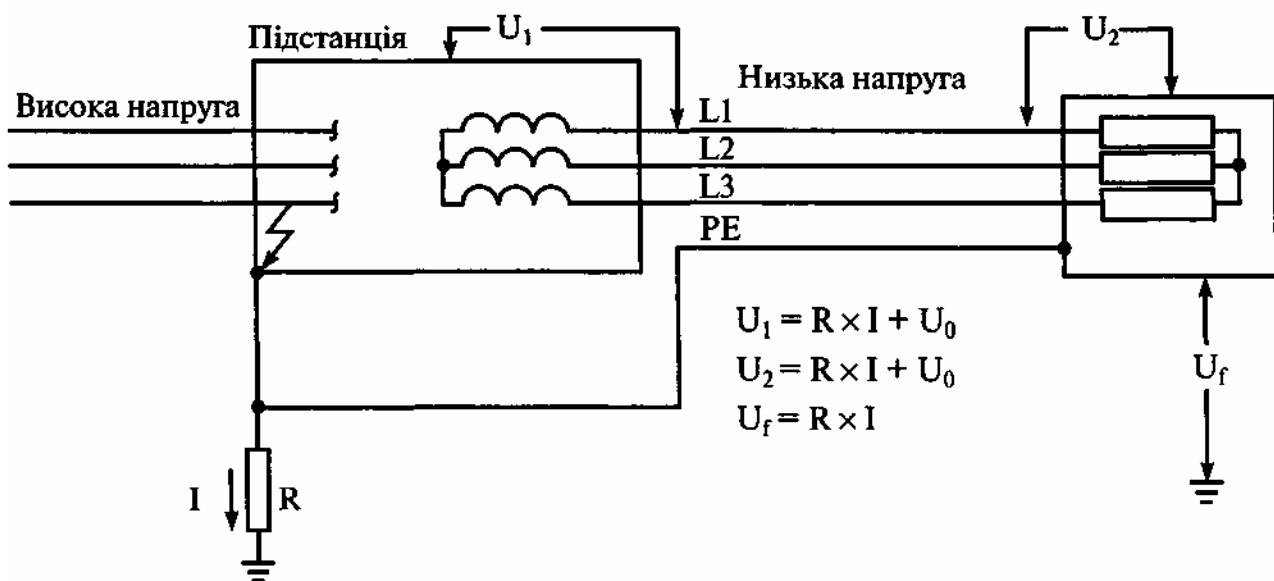


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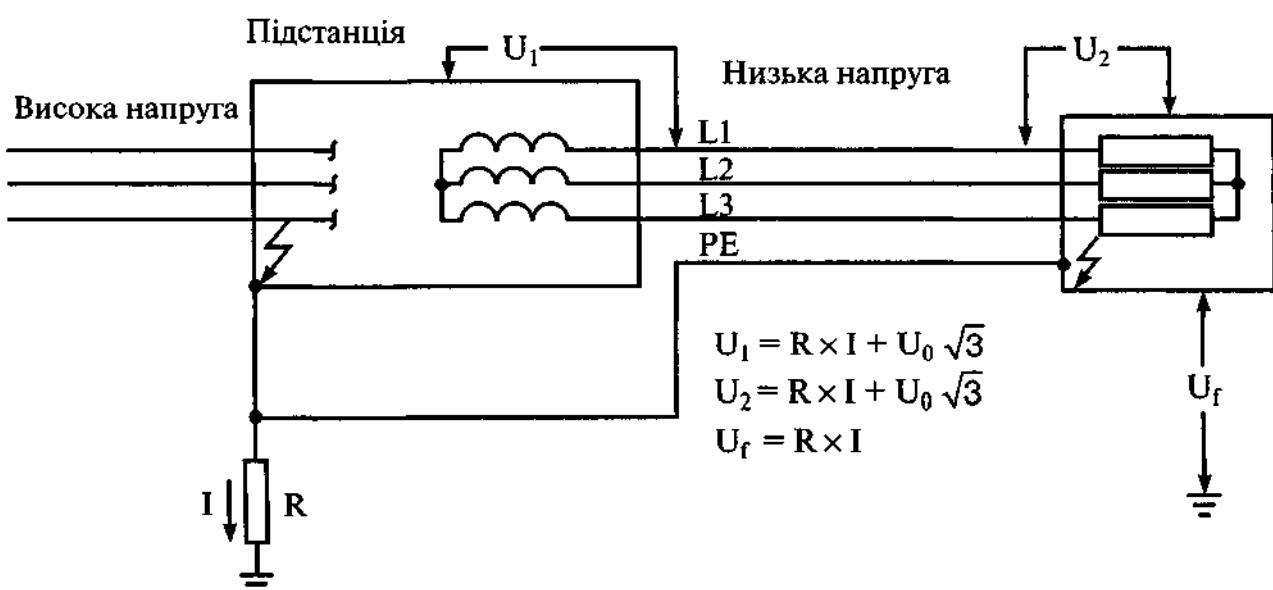
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(4.1) (. 4.2.1.3)

$$K = \sqrt{\frac{Q_c (+20)}{20}} \ln \left(1 + \frac{f - i}{+ i} \right) \quad (3.1)$$

Q_c — ' 20° , $/^\circ$ $^3;$ —

0° , $^\circ$; $_{20}$ — 20° , $,$;

i — (), $^\circ$; f — (), $^\circ$.
 $,$, .1, .1.

.1 —

	, $^\circ$	$Q_c, /^\circ$ 3	$_{20},$	$\sqrt{\frac{Q_c (+20)}{20}}$
	234,5	$3,45 \cdot 10^{-3}$	$17,241 \cdot 10^{-6}$	226
	228	$2,5 \cdot 10^{-3}$	$28,264 \cdot 10^{-6}$	148
	230	$1,45 \cdot 10^{-3}$	$214 \cdot 10^{-6}$	41
	202	$3,8 \cdot 10^{-3}$	$138 \cdot 10^{-6}$	78

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()	, $^\circ$				
(70°)	30	160 (140)	143 (133)	95 (88)	52 (49)
(90°)	30	160 (140)	143 (133)	95 (88)	52 (49)

()	, °				
,	(90°)	30	250	176	116
(60°)		30	200	159	105
(85°)		30	220	166	110
		30	350	201	133
					73
				300 , 2 .	

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		30	200	159	105
		30	150	138	91
		30	220	166	100
					60

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()	, °				
(70°)	70	160 (140)	115 (103)	76 (68)	42 (37)
(90°)	90	160 (140)	100 (86)	66 (57)	36 (31)
,	90	250	143	94	52
(90°)					
(60°)	60	200	141	93	51
(85°)	85	220	134	89	48
	180	350	132	87	47
				300 , 2 .	

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		()		()		
(70°)	60	200	141	93	26	
(90°)	80	200	128	85	23	
,	80	200	128	85	23	
(90°)	55	200	144	95	26	
(60°)	75	220	140	93	26	
(85°)						

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	228	500	125	300	82	500
	159	200	105	200	58	200
	138	150	91	150	50	150

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2.2.3	'	7
2.2.4		8
2.3	(,)	8
2.3.1	() ()	8
2.3.2	()	11
2.4	,	12
2.4.1		12
2.4.2) II (21
2.4.3	() , ,	23
2.4.4	()	24
2.4.5		25
2.5		26
3		28
4		31

4.1		31
4.1.1		31
4.1.2		32
4.1.3		34
4.1.4		35
4.2		36
4.2.1		36
4.2.2	PEN-	40
4.2.3		41
4.3	'	42
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2.1.4 , , , :

¹¹ See also the discussion of the relationship between the two in the section on the "Economic Crisis."

2.3.1.7.

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(. 3).

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2.2.2

2.2.2.1

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14254. IPXXD IP4X

2.2.2.3

2.2.2.4

IPXXB , IP2X , 14254

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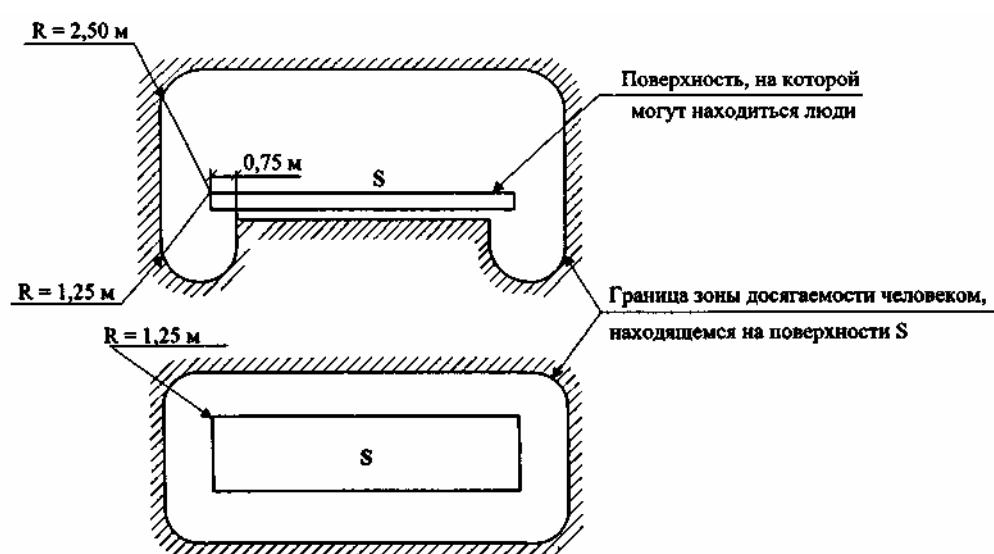
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IPXXB IP2X 14254.

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2.1.1).

2.4.1.2

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2.4.1.13; 2.4.14; 2.4.1.18 2.4.1.25.

(. 2.4.1.16; 2.4.1.19; 2.4.1.26),
2.5.4.

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2.4.1.4

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2.4.1.6 IT

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2.4.1.7

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2.4.1.11

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(PEN-), , 4.2.2.

2.4.1.13 (. . 2.4.1.16)

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$$Z_s x l_a \leq U_0, \quad (2.1)$$

$Z_s =$ () ,

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2.4.1.2), A; $U_0 =$ 5 (.

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(), $23 \cdot 10^{-6}$, $-37 \cdot 10^{-6}$

(80°).

(2.1)

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2.1 -

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2.4.1.14)

32

U_0 ,		
	,	,
$50 < U_0 \leq 120$	0,8	-
$120 < U_0 \leq 230$	0,4	5
$230 < U_0 \leq 400$	0,2	0,4
$U_0 > 400$	0,1	0,1

1.

127

0,8 .

2.

$c U_0 \leq 50 B u U_0 \leq 120$

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2.4.1.14

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2.4.1.15

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$R_B/R_E \leq 50/(U_0 - 50)$,

R_B - , ; R_E - ,

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2.4.1.18

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2.4.1.2.

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U_0 ,		
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$50 < U_0 \leq 120$	0,3	-
$120 < U_0 \leq 230$	0,2	0,4
$230 < U_0 \leq 400$	0,07	0,2
$U_0 > 400$	0,04	0,1

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$TN(\dots)$.

3.

$U_0 \leq 50 \quad U_0 \leq 120$

2.4.1.19

$Z_s(\dots)$ 2.4.1.21).

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2. , 2.2,

2.4.1.20

$$, \quad 2.4.1.18, \quad R_A \times I_n \leq 50, \quad (2.2)$$

$R_A -$

, ; $I_n -$

1. $50 \quad (2.2)$

2. (2.2)

3. $Z_s (\dots 2.4.1.21) \quad R_A, \quad (2.2) \quad R_A, \quad ,$

2.4.1.21

$$, \quad Z_s \times I_a \leq U_0, \quad (2.3)$$

$Z_s - (\dots) ,$

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2.4.1.18, .

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2.4.1.22 $IT (\dots)$

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2.4.1.23,

2.4.1.25.

2.4.1.23

$$R_A \times I_d \leq 50; \quad (2.4)$$

$$R_A \times I_d \leq 120, \quad (2.5)$$

$R_A -$

, , ; $I_d -$

1.

$$50 \quad 120 \quad (2.4) \quad (2.5)$$

2.

I_d

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$$R_A, \quad 10 \quad (\dots \quad 230/400 \quad 2.4.1.25).$$

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$$(2.5)$$

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$$2 I_a \times Z_s \leq U_0; \quad (2.6)$$

$$2 I_a \times Z'_s \leq U_0, \quad (2.7)$$

$$\begin{aligned} U - & , ; U_0 - \\ & , ; Z_s - \\ & , ; Z'_s - \\ & , ; I - , \end{aligned} \quad (2.1) \quad 2.4.1.14$$

$$TN \left(\dots \right) \quad 2.4.1.2),$$

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$$(\dots)$$

$$(\dots) - , \quad (\dots)$$

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$$2 \quad (2.6) \quad (2.7)$$

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$$IT \quad ,$$

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$$R_A \times I_a \leq 50, \quad (2.8)$$

$$R_A -$$

$$, \quad , ; I -$$

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$$50 \quad (2.8)$$

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$$R \leq 50/l ; \quad (2.9)$$

$$R \leq 120/l , \quad (2.10)$$

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$$50 \quad 120 \quad (2.9) \quad (2.10)$$

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2.4.2.7-2.4.2.10,



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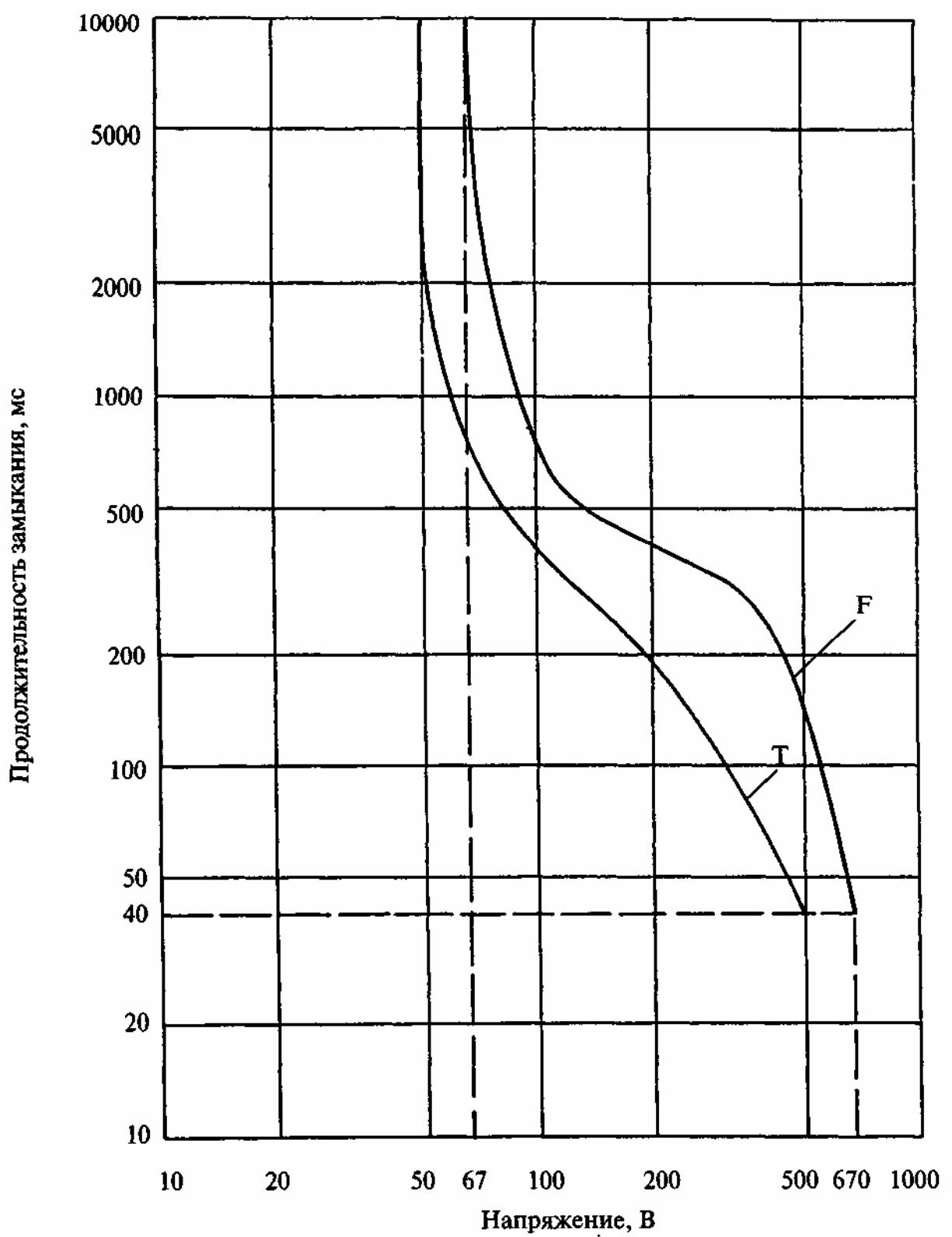
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$16 < S \leq 35$	16
$S > 35$	$S/2$

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(IEC 60742:1983)**

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542.2.1, 542.3.1, 543.1.1, 543.1.2.
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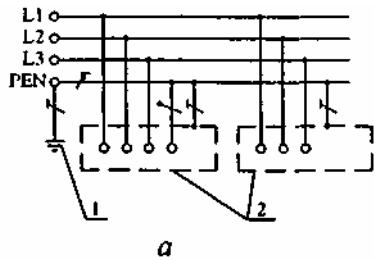
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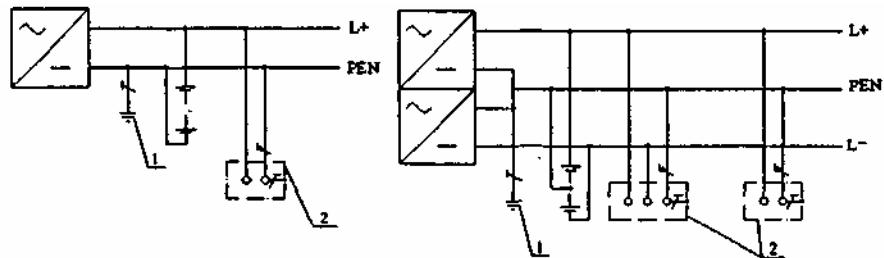
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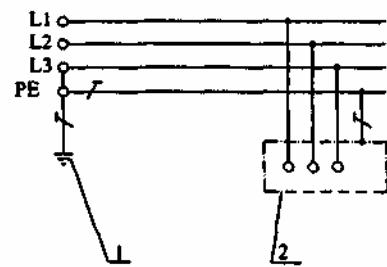
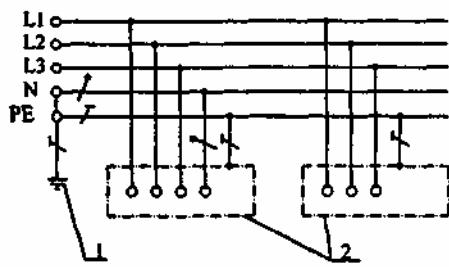
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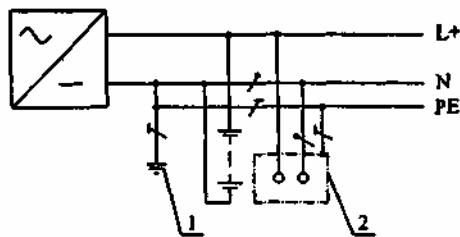
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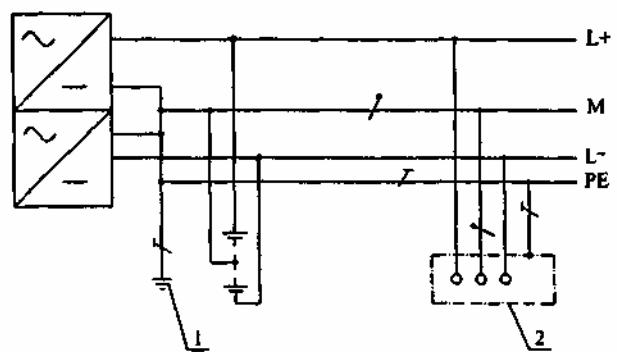
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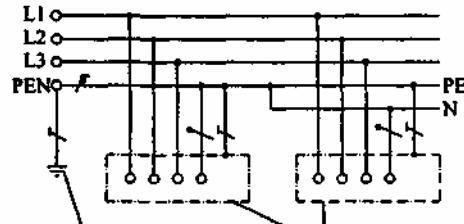
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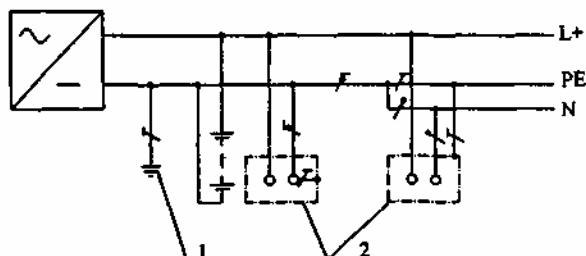
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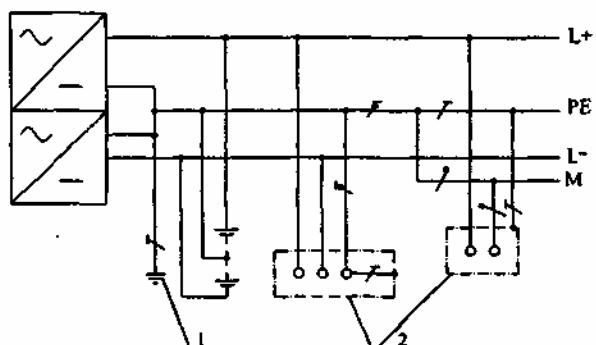
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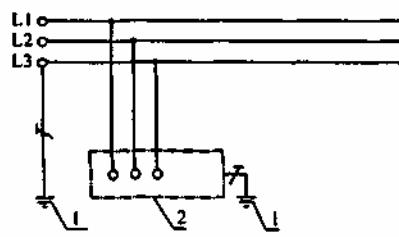
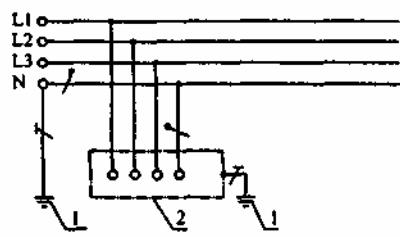
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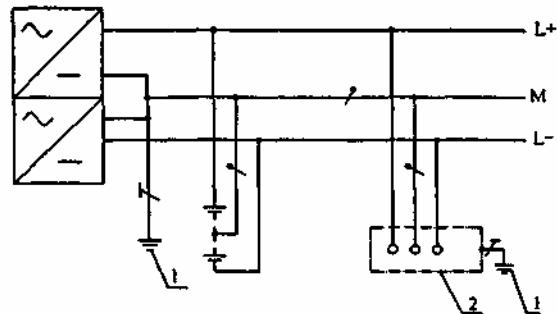
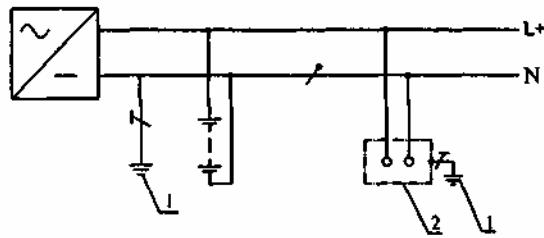
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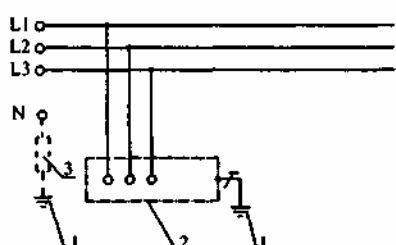
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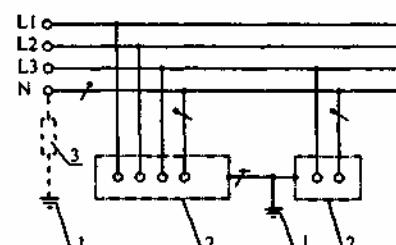
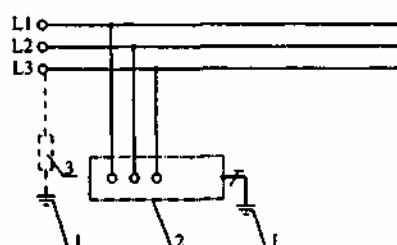
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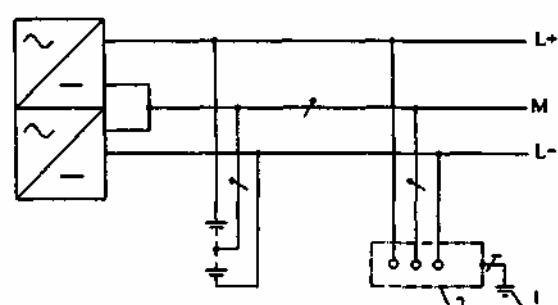
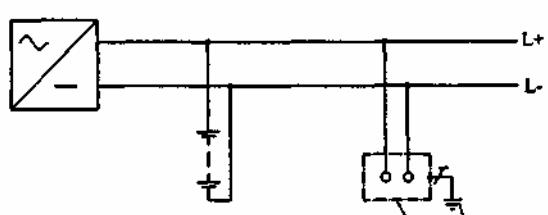
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a



b



b

1 -

; 2 -

; 3 -

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IT:

a -

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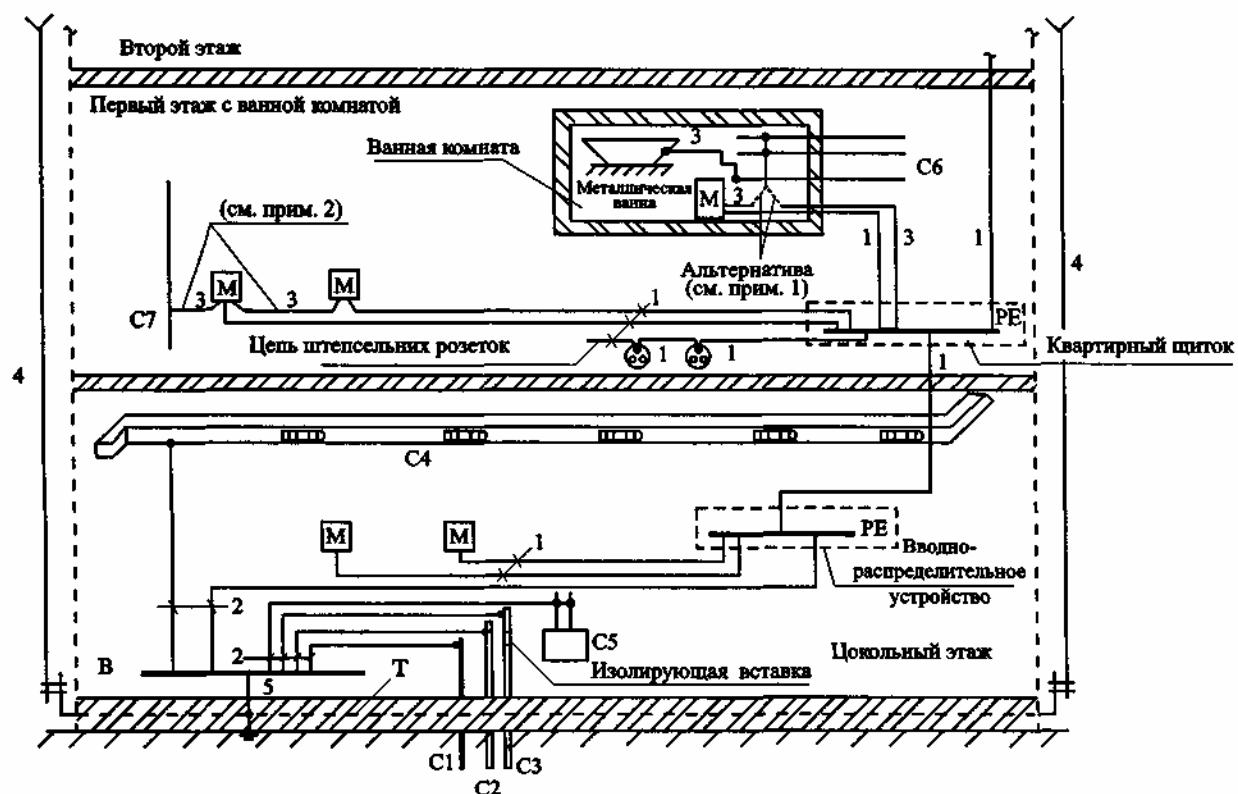
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; 5 — ; 6 —
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; — (); 1 —
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; 5 — 1.
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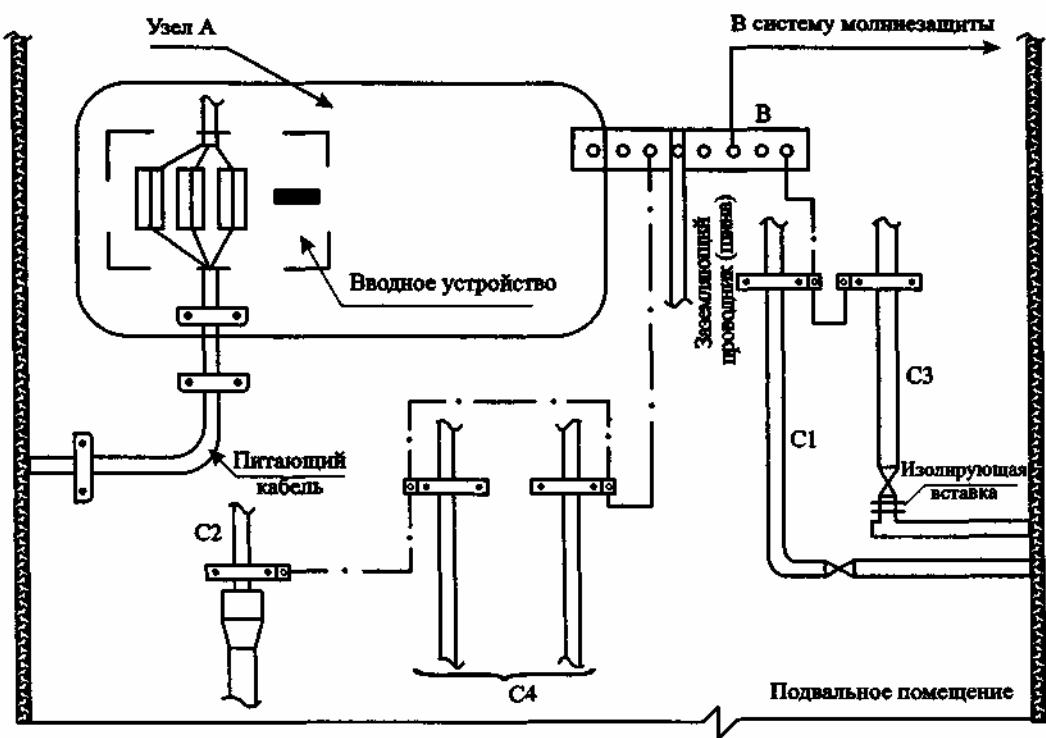
.2.5-23-

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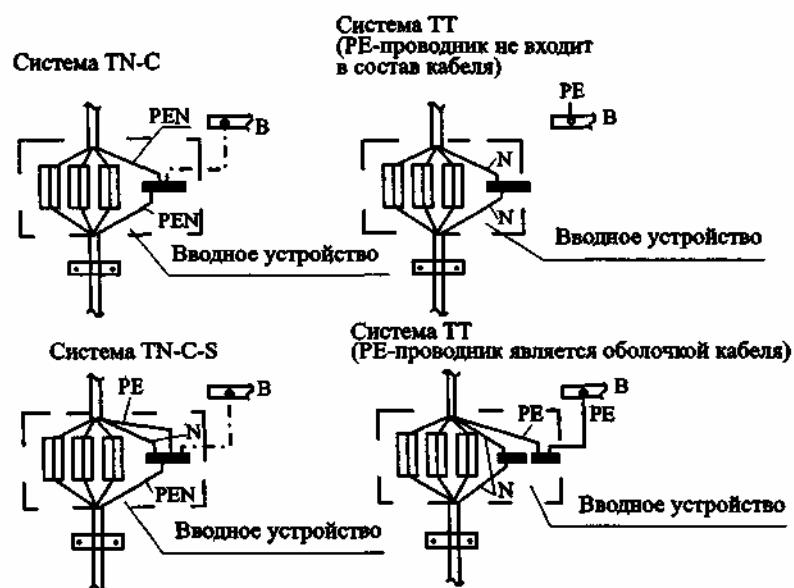
6

2.

(. 2.4.1.10).



Узел А



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 3 — , 4 — ; — ;
 N — ; PEN — , ;

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$U_0,$,
$25 < U_0 \leq 120$	0,35
$120 < U_0 \leq 230$	0,2
$230 < U_0 \leq 400$	0,05
$U_0 > 400$	0,02*

*

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(2.9),

50

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3 .
3 ,

. 1 :
I - , ;
I_d - IT, A;
U_0 - , ;
U - , ;
U_1 - , ;
U_2 - , ;
, (- U_1, - U_2)
U_f - ,
, ;
U_L - , ;
R - , ;
R_A - ,
, ;
R_B - ,

Z - , ;
()

(IT), .
U₁, U₂ U_f

.1-.9.

.1-.9

.2
U₂

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,	,
U ₀ + 250 U ₀ + 1200	5 5
1. () () ,)
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, (U₂ = R I + U₀)

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$R \times I \leq 250$.
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IT

$(U_2 = R - I + U)$

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$U_1 = R \times I + U$.

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U_0 ,

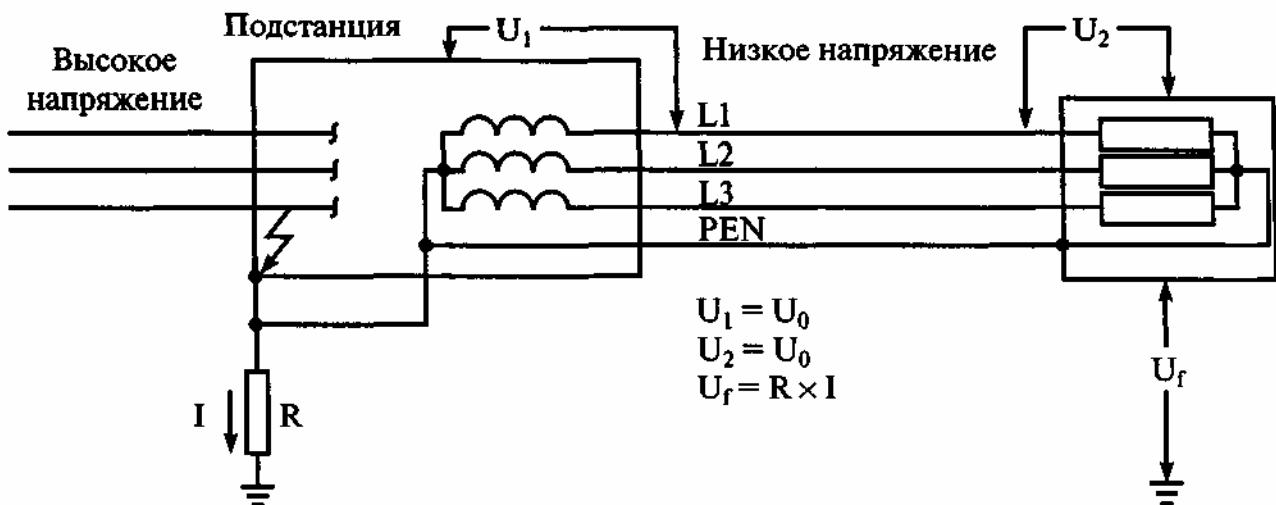
IT

,

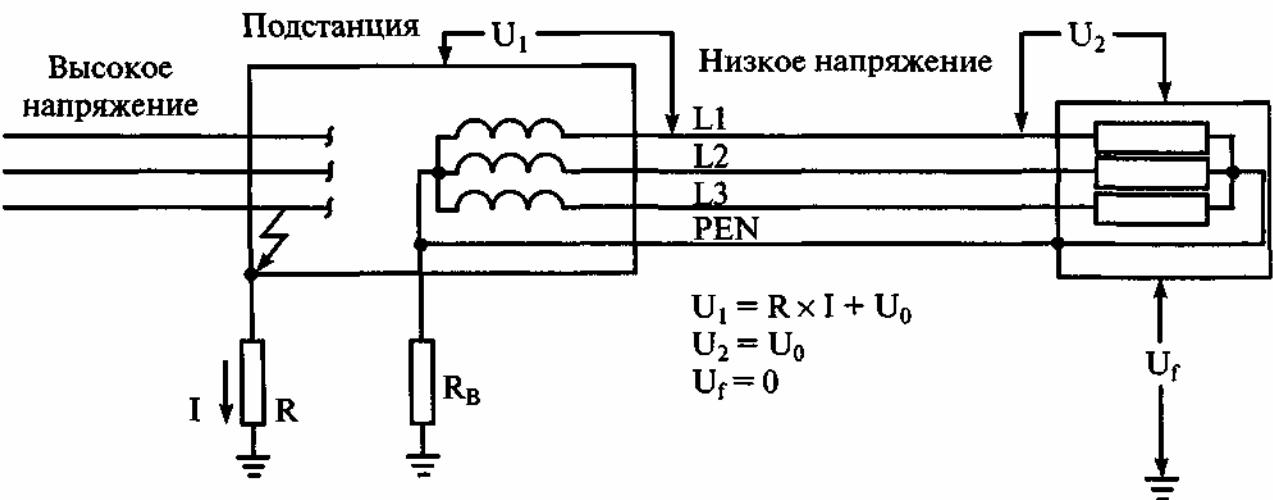
$U = U_0 \sqrt{3}$.

$$U = U_0 \sqrt{3}.$$

TN



a



b

. 1 -

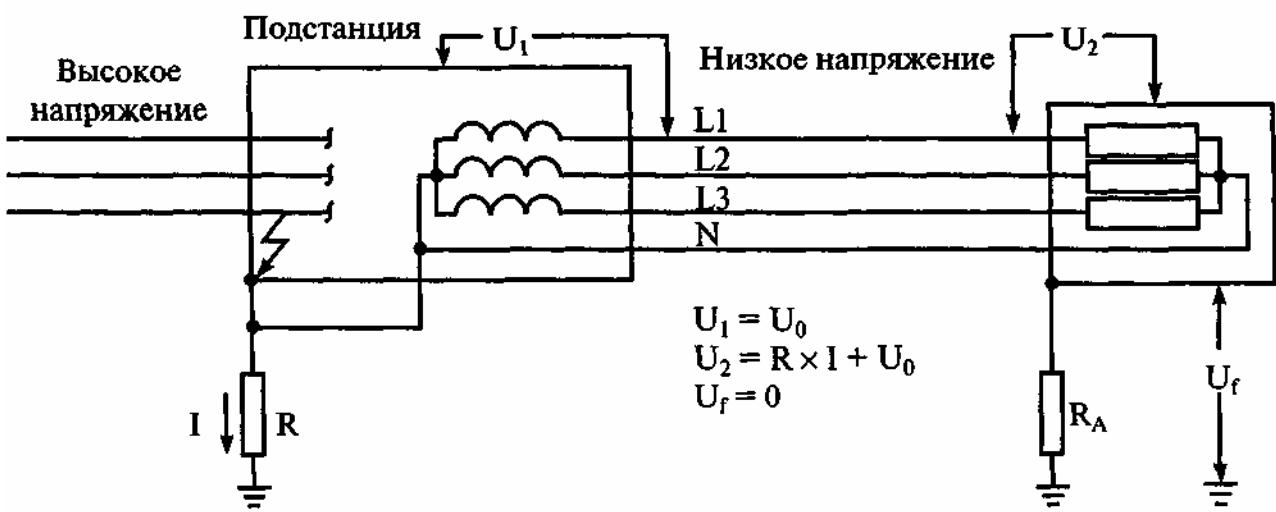
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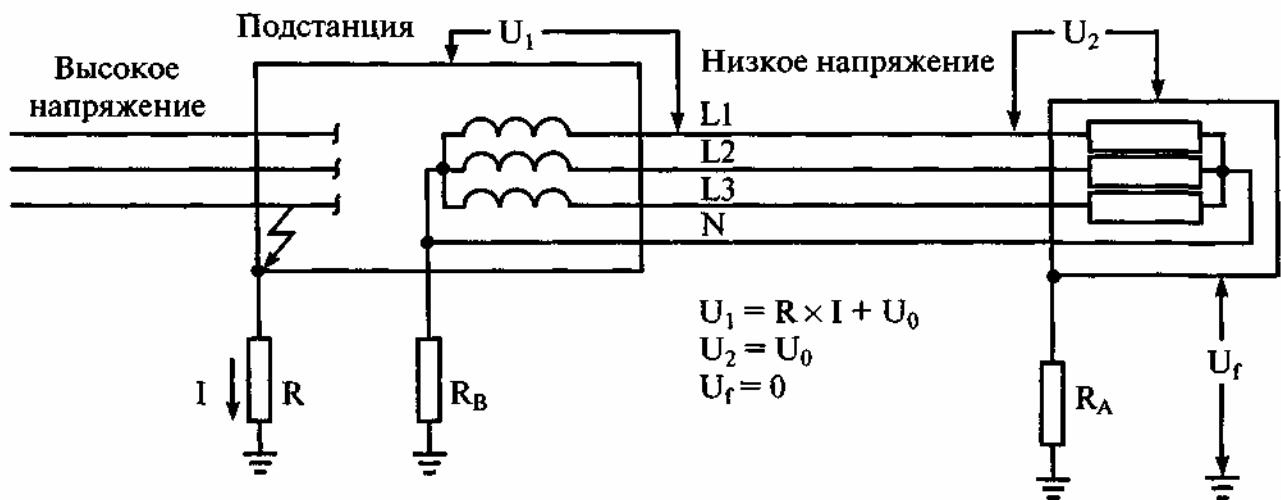
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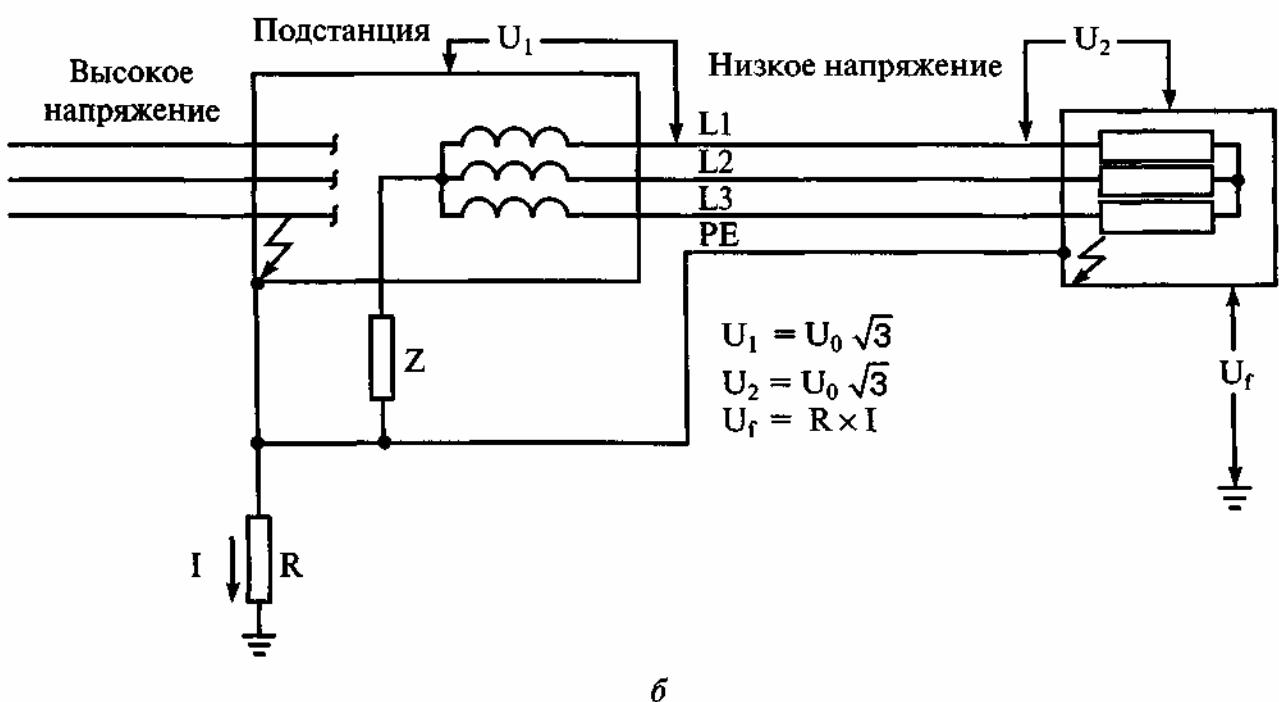
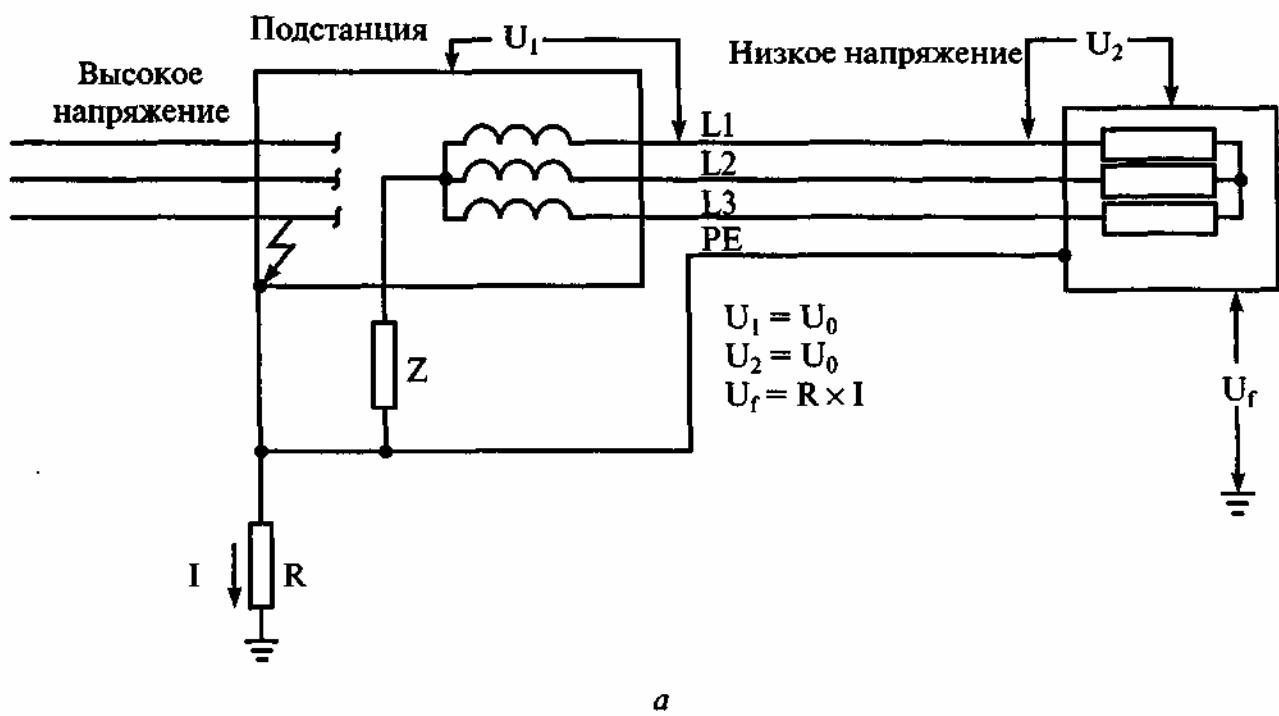


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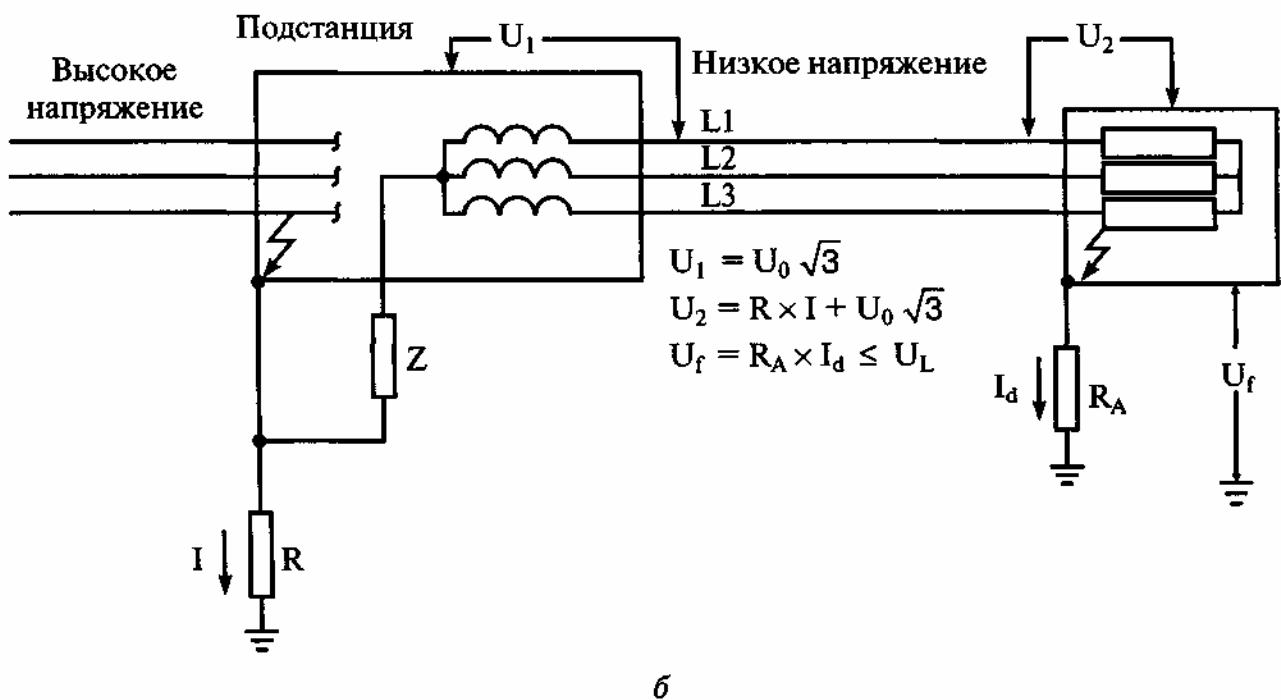
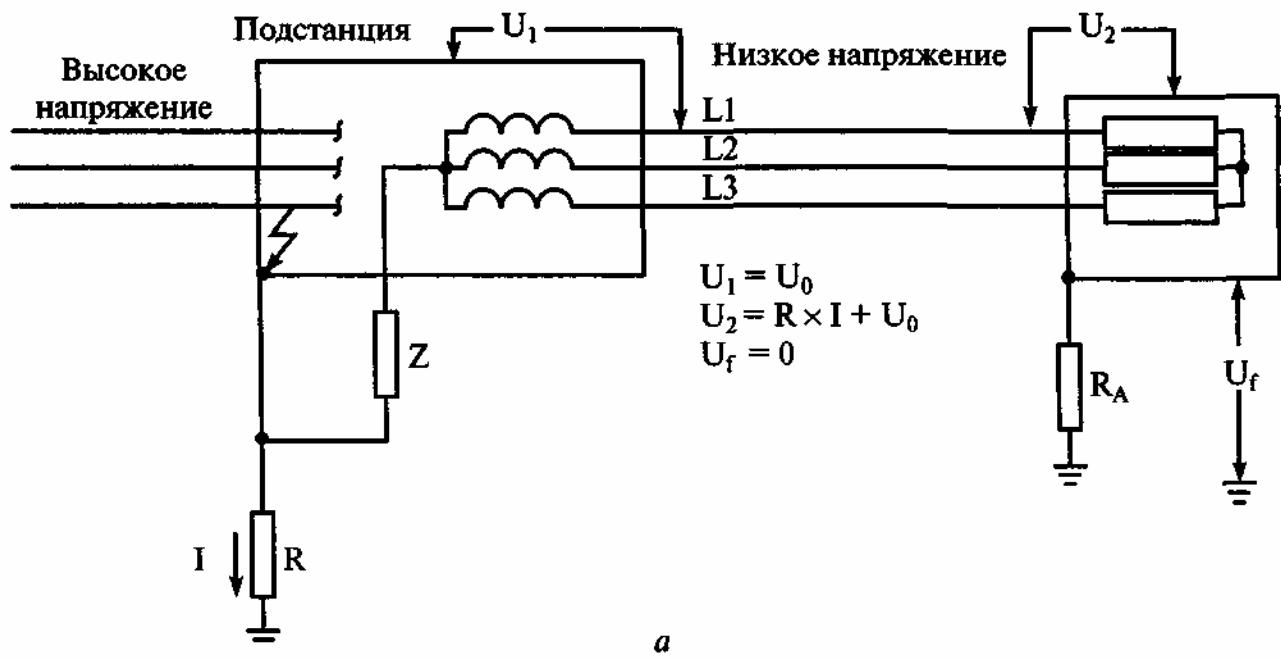


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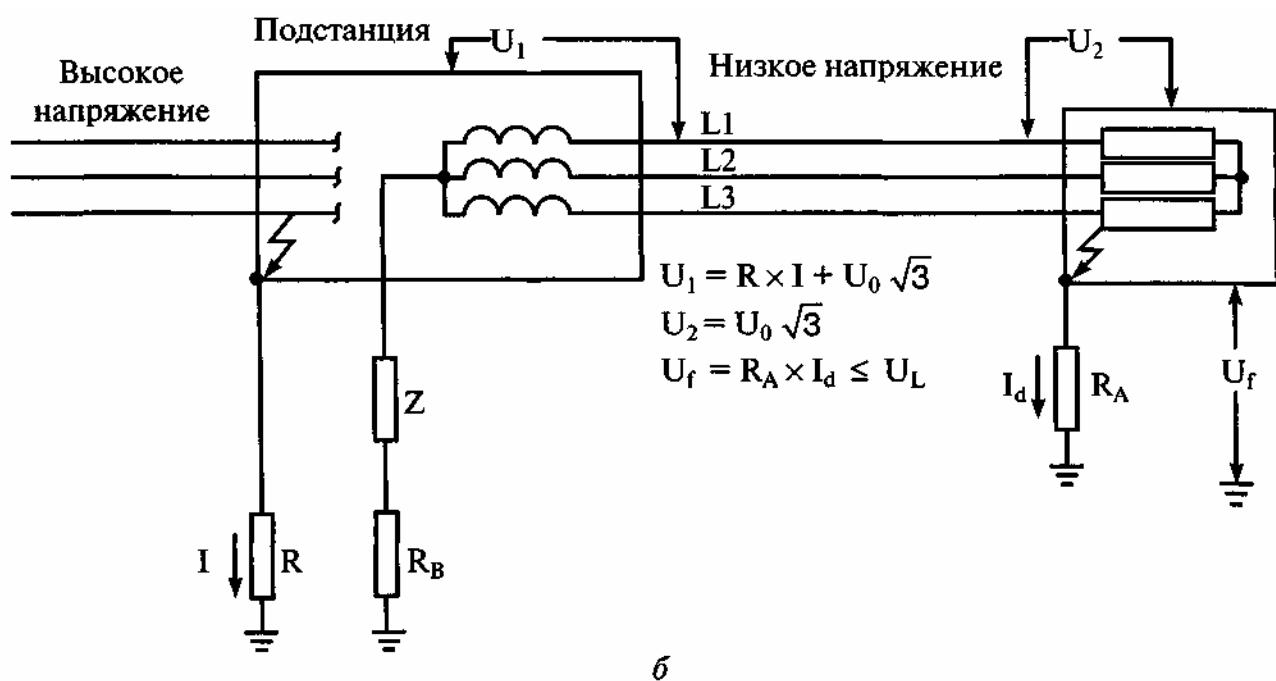
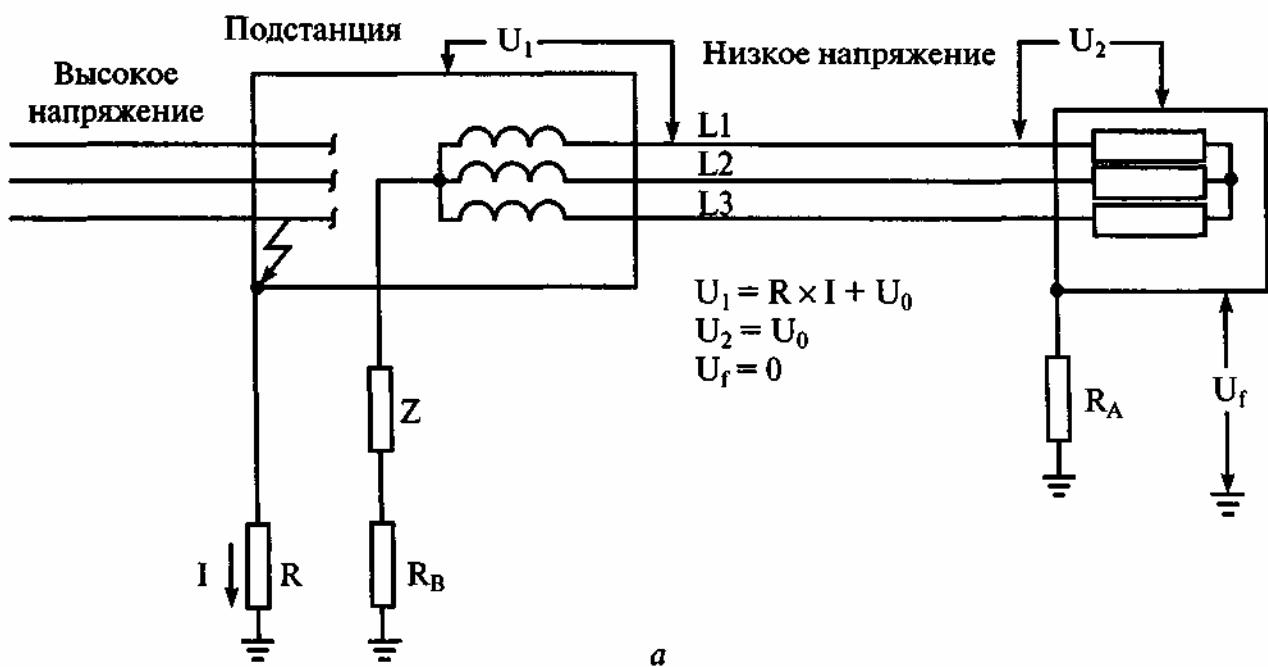
. 2 – :
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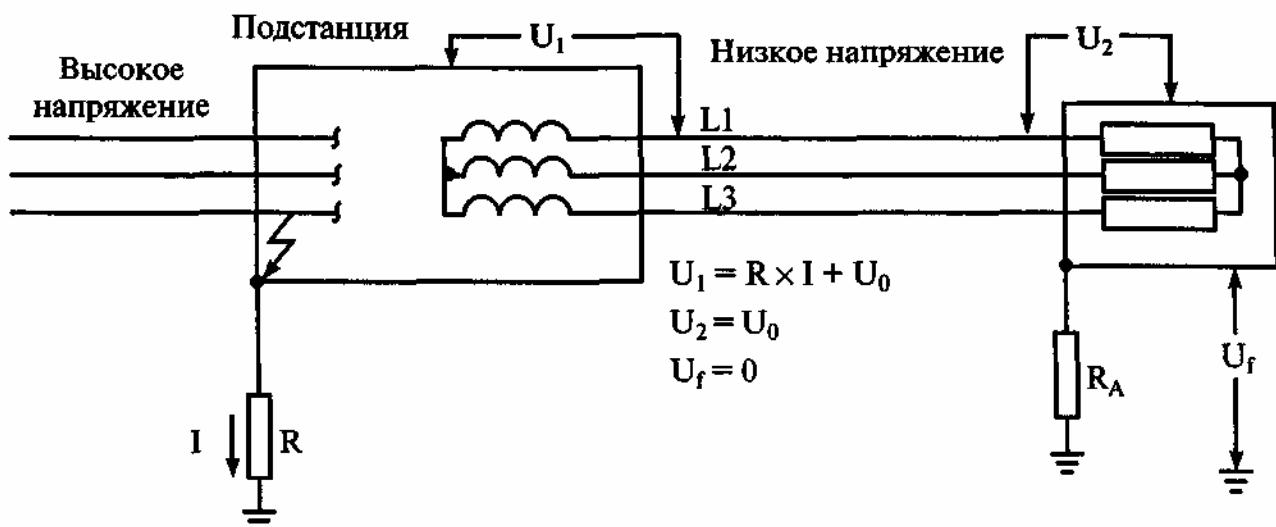
. 3 – IT,
 $Z)$



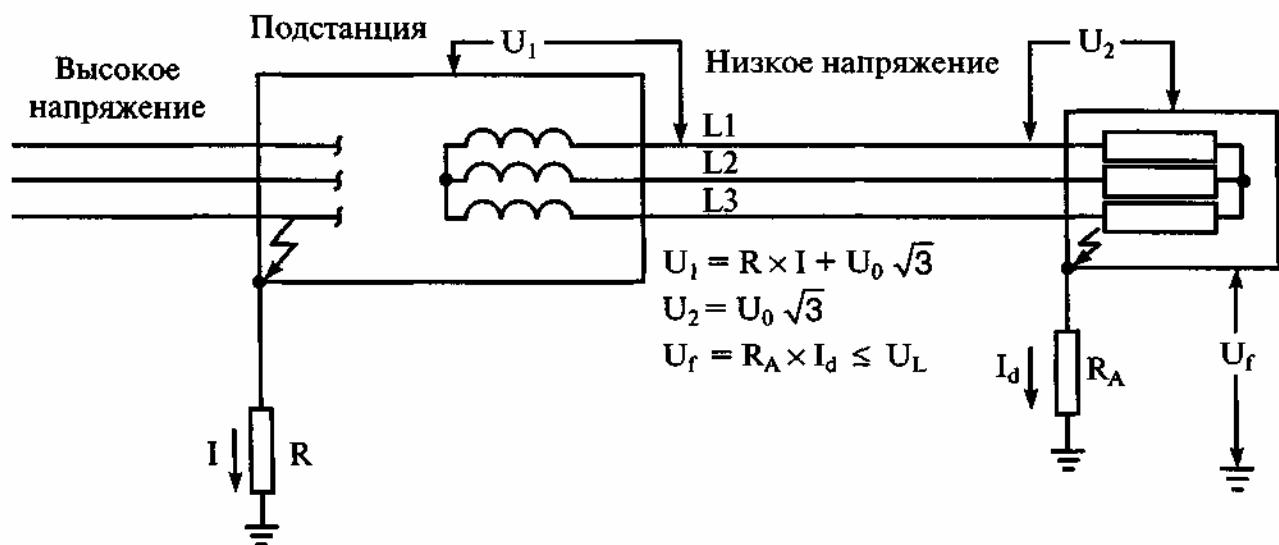
$$.4 - \frac{IT}{Z}$$



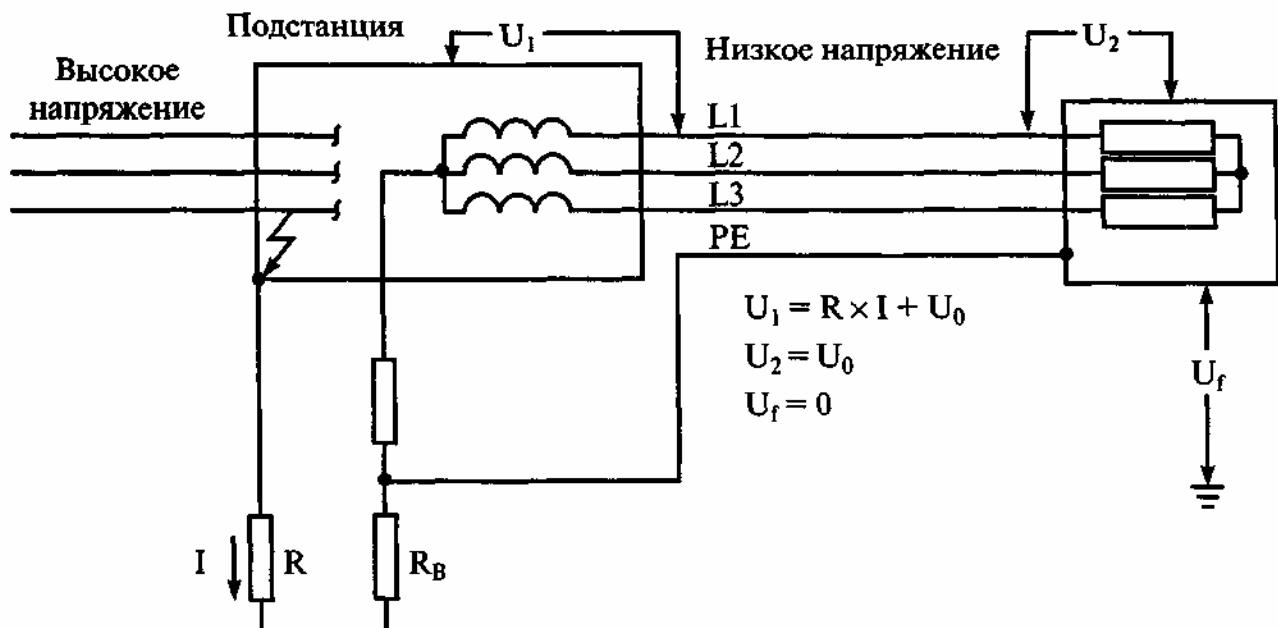
.5-
Z
IT,



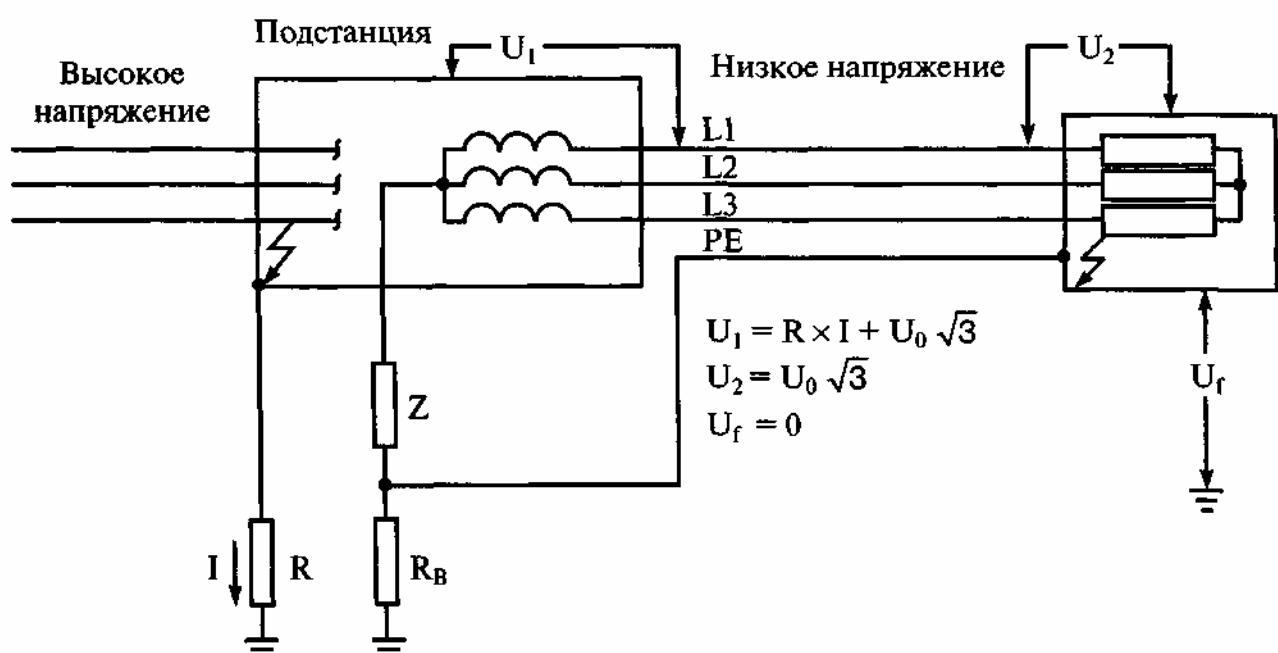
a



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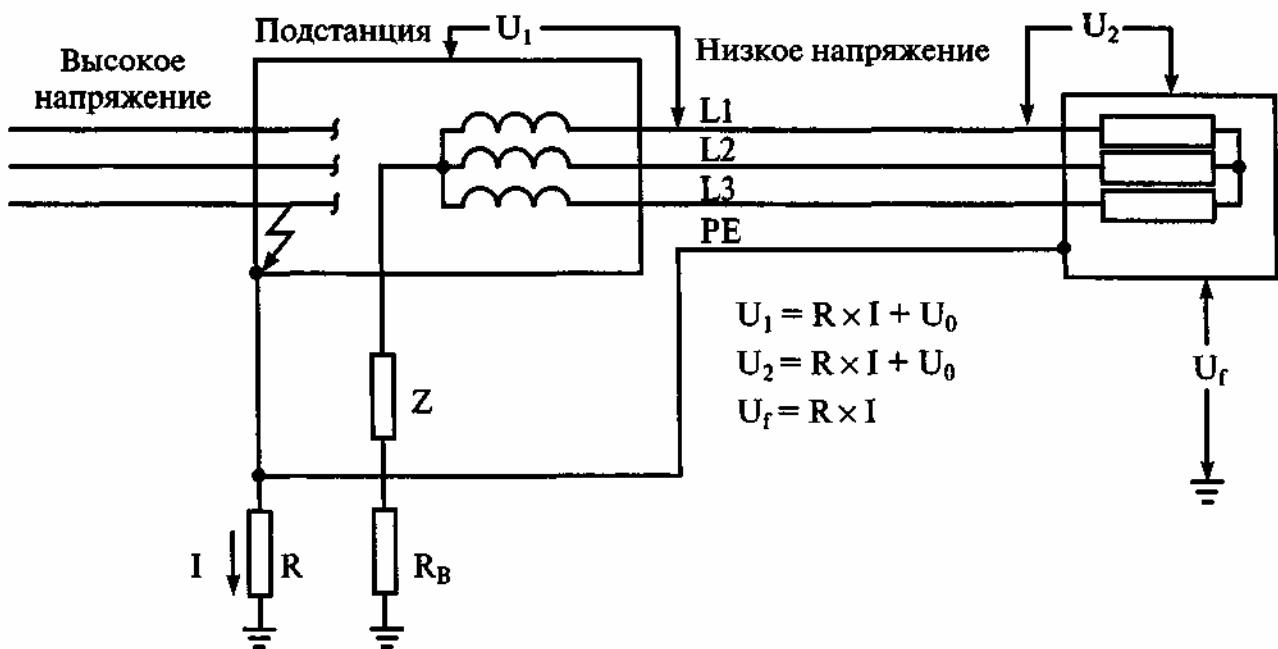


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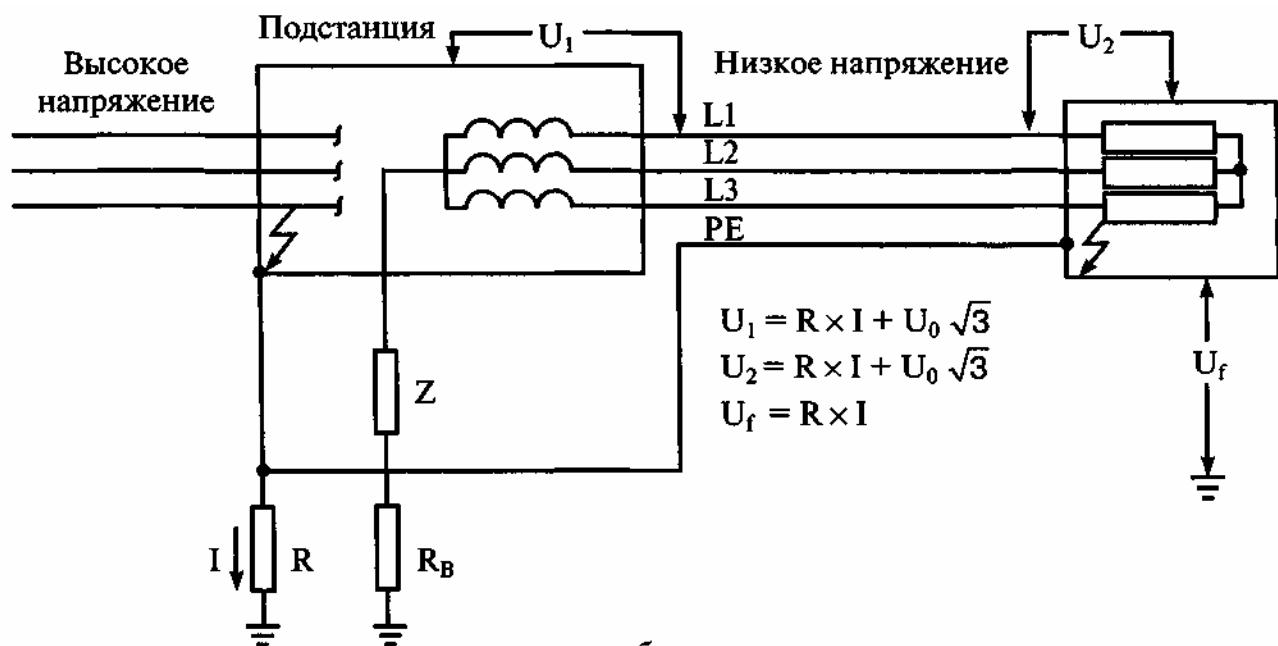


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$$0.7 - \frac{1}{Z},$$

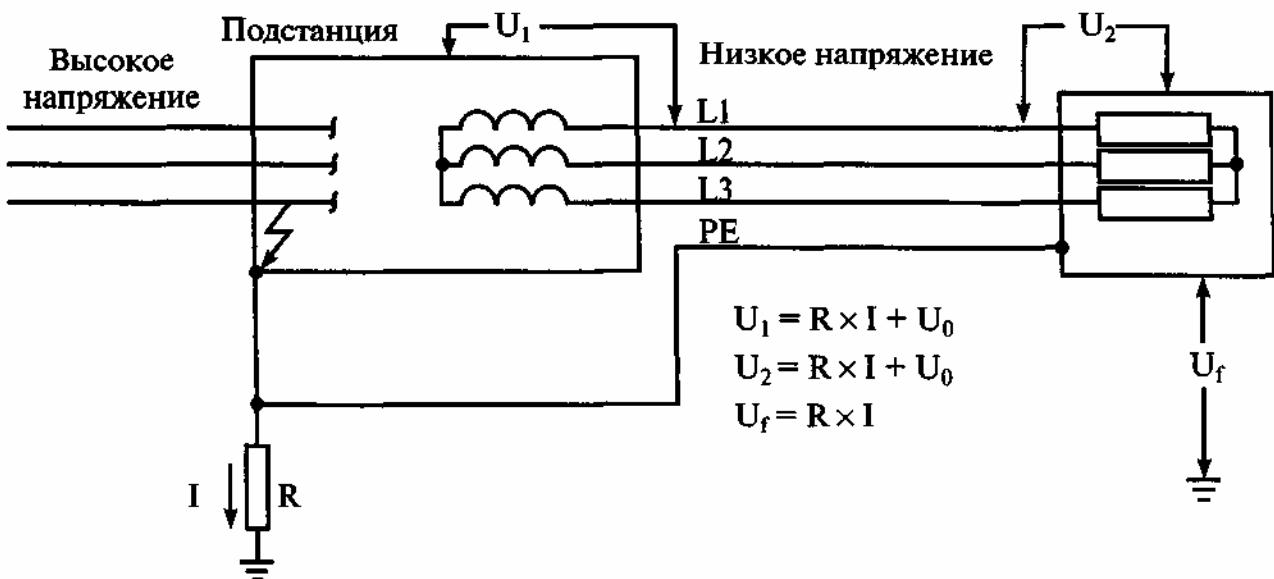


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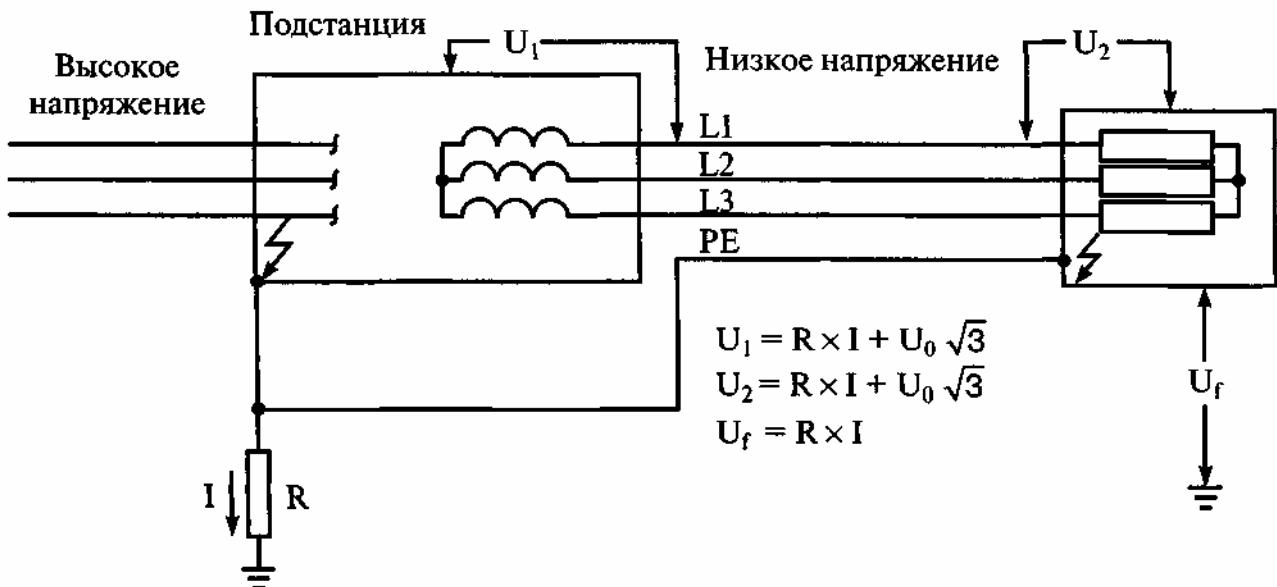


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$$.8 - \frac{IT}{Z},$$



a



б

.9 -

IT,

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(4.1)

(. 4.2.1.3)

:

$$K = \sqrt{\frac{Q_c (+20)}{20}} \ln \left(1 + \frac{f - i}{+ i} \right) \quad (3.1)$$

$Q_c =$

$20^\circ, /^\circ, ^3;$

$- ,$

$0^\circ, ^\circ; _{20} -$

$20^\circ, ; _i -$

$($
), $^\circ; f -$

(

$), ^\circ.$

,

(3.1),

.1.

.1 -

	, $^\circ$	$Q_c, /^\circ, ^3$	$_{20},$	$\sqrt{\frac{Q_c (+20)}{20}}$
	234,5	$3,45 \cdot 10^{-3}$	$17,241 \cdot 10^{-6}$	226
	228	$2,5 \cdot 10^{-3}$	$28,264 \cdot 10^{-6}$	148
	230	$1,45 \cdot 10^{-3}$	$214 \cdot 10^{-6}$	41
	202	$3,8 \cdot 10^{-3}$	$138 \cdot 10^{-6}$	78

.1,

,

.1

.2- .6.

.2 -

(90°)	(70°)	30	160 (140)	143 (133)	95 (88)	52 (49)
	(90°)	30	160 (140)	143 (133)	95 (88)	52 (49)
	,	30	250	176	116	64
	(60°)	30	200	159	105	58
	(85°)	30	220	166	110	60
		30	350	201	133	73
		,		300	2.	,

.3 -

(90°)	30	200	159	105	58	
	30	150	138	91	50	
	30	220	166	100	60	

.4 -

(90°)	(70°)	70	160 (140)	115 (103)	76 (68)	42 (37)
	(90°)	90	160 (140)	100 (86)	66 (57)	36 (31)

()	, °					
(90°)	90	250	143	94	52	,
(60°)	60	200	141	93	51	,
(85°)	85	220	134	89	48	,
	180	350	132	87	47	,
			300	2.		,

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(

)

()	, ,					
(70°)	60	200	141	93	26	,
(90°)	80	200	128	85	23	,
(90°)	80	200	128	85	23	,
(60°)	55	200	144	95	26	,
(85°)	75	220	140	93	26	,

		° ,		° ,		° ,
	228	500	125	300	82	500
	159	200	105	200	58	200
	138	150	91	150	50	150

30 ° .

1.		78
2		
		79
2.1		79
2.2	2.2.1	
		81
2.2.3		83
2.2.4		83
2.3	(,)	84
2.3.1	()	
	()	84
2.3.2	()	
	()	86
2.4	,	
	,	87
2.4.1		87
2.4.2	()	98
2.4.3	(, ,)	100
2.4.4	()	101
2.4.5		101
2.5		103
3	-	

		105
4	4.1	108
	4.1.1	108
4.1.2	3	109
4.1.3		112
4.1.4		112
4.2		113
4.2.1		113
4.2.2	PEN-	117
4.2.3		119
4.3		119
		121
		122
	()	129
		130
		135

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(TN)

137

138

150

156