87045 LIMOGES Cedex
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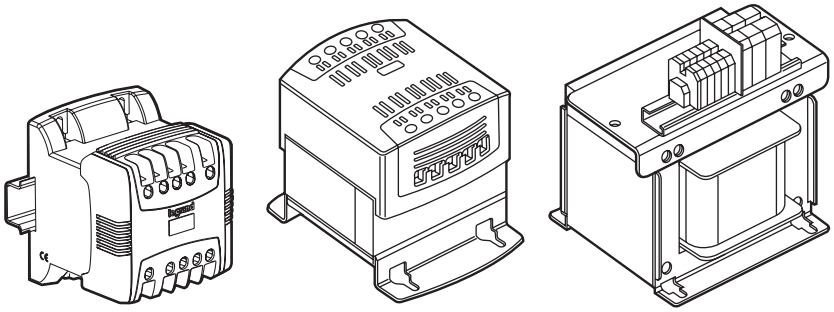
Single-phase control and signalling transformer

Cat. Nos. : 442 11/12/13/14/15/16/17/18/31/32/33/34/35/ 36/37/38/39/40/51/52/53/54/55/56/61/62/63/64/65/66/67/68/ 69/70/71/72/73/74



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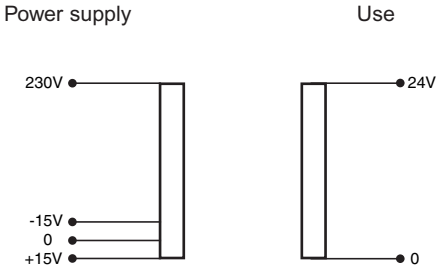
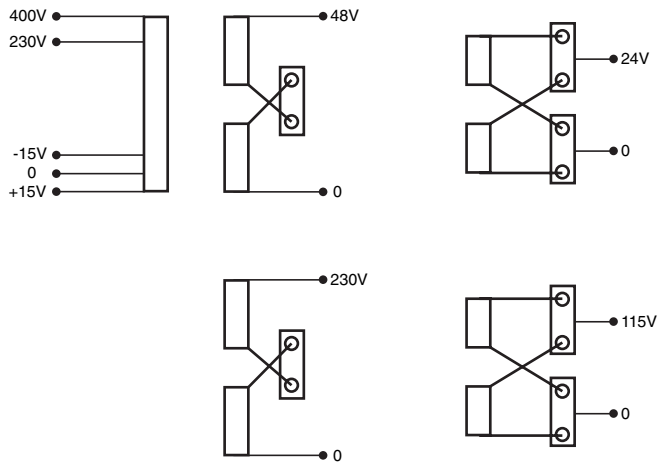
1. OPERATING PRINCIPLE

This transformer is intended to supply control and signalling equipment housed inside an enclosure (contactors, relays, automation systems, etc.)



Certain equipment needs to be supplied with a specific voltage.

Transformers are fitted with adjustment taps of + and - 15 V on the terminal strip of the primary circuit, to adjust the secondary voltage, which is influenced by the voltage of the power supply network and/or by a device under-load



(1) Up terminal: 245 V or 415 V or load lower than the rated power
(2) Up terminal: 215 V or 385 V

2.GENERAL CHARACTERISTICS

Single-phase 50-60 Hz class I
IP2x up to 400 VA - IK 04
Insulation voltage between windings : 4510 V
Maximum ambient operating temperature : 50° C
Protected against involuntary or accidental contacts with live parts up to 1000 VA

2.1 Conformities

- Conform to IEC EN 61558-2-2 and 2-4 or 2-6 UL 506 and CSA C22 - 2 - No. 66
- Products suitable for the construction of equipment compliant with EN 61131-2, EN 60204-1 and EN 60439-1
- Marking CE

2.2 Transformer protection

Transformers can be protected by a gG type fuse or by a C type circuit-breaker
Supplied with a connecting strip 0 V / Ground up to 1000 VA

2.3 Casing

Covered up to 1000 VA
Bare as from 1600 VA

2.3.1 Cover
Polyamide 6/6
• RAL 7035
• Information : Laser-engraved on the front face cover guaranteeing indelibility :
  - product Cat. No.
  - voltages
  - rated power / instantaneous power
  - protection device rating (fuses or circuit-breakers)
  - compliances
  - terminal strip marking
• Front face : flat surface 25 x 10 mm allowing marking by:
  - labels or adhesive label holders
  - inscription : manual
  - .....

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2. GENERAL CHARACTERISTICS *(continued)*

2.3 Casing *(continued)*

2.3.2 base
40 to 400 VA, polyamide 6/6, glass-filled, flame-retardant
fixing by screws or clips up to 250 VA on rail ⊔
400 VA fixing by screw only
- 630 to 1000 VA metal base with epoxy-polyester coating RAL 7000
- 1600 to 8000 VA :
  Metal base with anti-corrosion coating

2.3.3 Circuit
in silicon magnetic steel sheet
- Coating : matte black paint as from 630 VA

2.3.4 Connection terminal strip
- 40 VA to 400 VA :
  terminal fitted with a cable clamp plate with slotted cross-head type Z screw
- from 630 VA to 1000 VA :
  Cage terminals with slotted cross-head type Z screw
- 1600 to 8000 VA :
  connection to Viking terminal block

3. RANGE

Primary 230 V ±15 V, 230/400 V ±15 V
Secondary 24 V - 24/48 V - 115 - 230 V

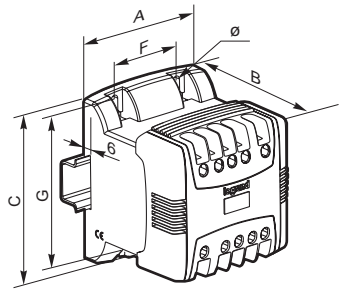
Power according to IEC and CSA	Prim : 230V ±15 V Sec : 24 V	Prim : 230 /400 V ±15 V	
		Sec : 24/48 V	Sec : 115/230 V
40 VA	442 11	442 31	442 61
63 VA	442 12	442 32	442 62
100 VA	442 13	442 33	442 63
160VA	442 14	442 34	442 64
250 VA	442 15	442 35	442 65
400 VA	442 16	442 36	442 66
630 VA	442 17	442 37	442 67
1000 VA	442 18	442 38	442 68
1600 VA		442 39	442 69
2500 VA		442 40	442 70
4000 VA			442 71
5000 VA			442 72
6300 VA			442 73
8000 VA			442 74

Interference filtering (except 44216/17/18)

4. MECHANICAL CHARACTERISTICS

4.1 Mechanical characteristics

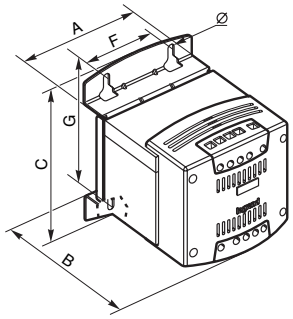
4.1.1 Transformers 40 - 63 - 100 - 160 - 250 - 400VA



Catalogue number	Power (VA)	Dimensions (mm)			Fixing (mm)			Weight (Kg)
		A	B	C	F	G	Diameter	
442 11/31/61	40	94	78	113	50	100	5.2	1.23
442 12/32/62	63	94	85	113	50	100	5.2	1.56
442 13/33/63	100	94	94	113	50	100	5.2	1.95
442 14/34/64	160	94	112	113	50	100	5.2	2.6
442 15/35/65	250	106	123	115	50	100	5.2	3.82
442 16/36/66	400	120	140	140	62,5	125	5.2	5.82

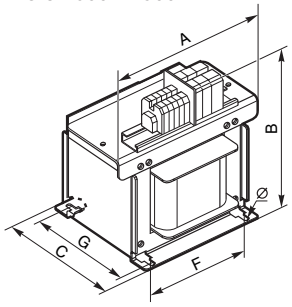
(1) Reminder: transformers 40 - 63 - 100 - 160 - 250 VA can also be fixed on rail ⊔

4.1.2 Transformers 630 - 1000 VA



Catalogue number	Power (VA)	Dimensions (mm)			Fixing (mm)			Weight (Kg)
		A	B	C	F	G	Diameter	
442 17/37/67	630	150	158	206	100	175	7	9.9
442 18/38/68	1000	150	199	206	100	175	7	14.9

4.1.3 Transformers 1600 - 2500 VA



Catalogue number	Power (VA)	Dimensions (mm)			Fixing (mm)			Weight (Kg)
		A	B	C	F	G	Diameter	
442 39/69	1600	220	245	191	150	153	9	25.6
442 40/70	2500	300	292	171	200	114	9	33.1

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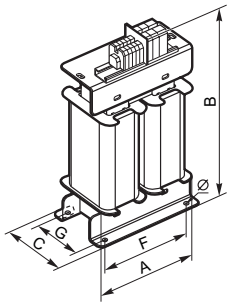
4. MECHANICAL CHARACTERISTICS *(continued)*

4.1 Dimensions *(continued)*

4.1.3 Transformers 4000 - 5000 - 6300 - 8000 VA



Catalogue number	Power (VA)	Dimensions (mm)			Fixing (mm)			Weight (Kg)
		A	B	C	F	G	Diameter	
442 71	4000	230	340	205	180	130	11	31
442 72	6000	240	390	205	180	130	11	40
442 73	6300	240	390	205	180	130	11	45
442 74	8000	240	390	280	180	140	11	64

4.2 Connection

Power VA	Secondary	Connection PRI Cable mm²		Connection SEC Cable mm²	
		Flexible	Rigid	Flexible	Rigid
40	24 V - 24/48 115/230V	1 to 4	1 to 4	1 to 4	1 to 4
63	"	1 to 4	1 to 4	1 to 4	1 to 4
100	"	1 to 4	1 to 4	1 to 4	1 to 4
160	"	1 to 4	1 to 4	1 to 4	1 to 4
250	"	1 to 4	1 to 4	1 to 4	1 to 4
400	"	1 to 4	1 to 4	1 to 4	1 to 4
630	"	1 to 16	1 to 16	1 to 16	1 to 16
1000	"	1 to 16	1 to 16	1 to 16	1 to 16
1600	115/230 V	2.5 to 10	1.5 to 16	2.5 to 10	1.5 to 16
	24/48 V	2.5 to 10	1.5 to 16	4 to 16	1.5 to 25
2500	115/230 V	4 to 16	1.5 to 25	4 to 16	1.5 to 25
	24/48 V	4 to 16	1.5 to 25	4 to 16	2.5 to 50
4000	115/230 V	4 to 16	1.5 to 25	4 to 16	1.5 to 25
5000	115/230 V	4 to 16	1.5 to 25	4 to 16	1.5 to 25
6300	115/230 V	4 to 16	1.5 to 25	4 to 16	1.5 to 25
8000	115/230 V	4 to 16	1.5 to 25	4 to 16	1.5 to 25

5. DETERMINATION OF TRANSFORMER POWER

5.1. Determination of transformer power

Start with the inrush power calculated previously and use the table below

Control and safety transformer
Primary 230 V +/- 15 V - Secondary 24 V

Catalogue number	Power (VA)	P.I.A to cos Ø =								
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
442 11	40	62	57	53	50	48	47	46	47	58
442 12	63	110	100	94	88	83	80	78	78	91
442 13	100	230	210	180	170	150	140	140	130	150
442 14	160	340	300	270	250	230	220	210	210	230
442 15	250	550	490	450	420	400	380	370	370	430
442 16	400	1600	1200	1000	850	740	650	590	540	510
442 17	630	2700	2200	1800	1500	1300	1200	1100	1000	1000
442 18	1000	8900	7000	5800	5000	4400	3900	3600	3300	3200

Control and safety transformer (24 V) or separation of circuits (48 V)
Primary 230/400 V +/- 15 V - Secondary 24/48 V

Catalogue number	Power (VA)	P.I.A to cos Ø =								
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
442 31	40	63	58	55	52	50	48	48	49	60
442 32	63	110	102	94	87	83	79	77	78	91
442 33	100	200	180	160	150	140	130	130	130	150
442 34	160	340	300	270	250	230	220	210	210	230
442 35	250	550	490	450	420	400	380	370	370	430
442 36	400	1800	1300	1100	900	800	700	600	600	500
442 37	630	2700	2200	1900	1700	1500	1300	1200	1200	1200
442 38	1000	8300	6700	5600	4800	4200	3800	3500	3200	3200
442 39	1600	12800	10900	9500	8500	7700	7100	6700	6400	6600
442 40	2500	4300	3900	3600	3300	3100	3000	2900	2900	3400

Control transformer and separation of circuits
Primary 230/400V +/- 15V - Secondary 115/230V

Catalogue number	Powere (VA)	P.I.A to cos Ø =								
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
442 61	40	62	57	53	50	48	47	46	47	57
442 62	63	110	100	93	86	82	78	76	76	90
442 63	100	200	180	160	150	140	140	130	130	150
442 64	160	330	300	270	250	240	230	220	220	250
442 65	250	560	510	460	430	410	390	380	370	430
442 66	400	2200	1700	1400	1200	1000	910	830	760	730
442 67	630	2700	2200	1800	1600	1400	1200	1100	1000	1000
442 68	1000	7300	5800	4900	4200	3700	3400	3100	2900	2800
442 69	1600	8700	7500	6600	6100	5400	5000	4700	4500	4700
442 70	2500	9200	8300	7600	7100	6700	6300	6200	6100	7100
442 71	4000	16500	14300	12700	11400	10500	9800	9200	8900	9500
442 72	5000	28500	23400	19900	17500	15600	14200	13100	12300	12300
442 73	6300	19900	18300	17000	16000	15300	14800	14600	14800	17900
442 74	8000	44600	39200	35200	32100	29800	28000	26700	26100	28500

5.2 Checking

Check that the transformer's power is at least equal to the sum of the contactors' and indicator lights' holding powers when powered up simultaneously.

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6. ELECTRICAL CHARACTERISTICS

Catalogue number	Power (VA)	No-load loss (W)	Total loss in rated load Wiron + Wcopper (W)	Voltage drop			Efficiency			Ucc %
				cos fr = 0.3 %	cos fr = 0.6 %	cos fr = 1 %	cos fr = 0.3 %	cos fr = 0.6 %	cos fr = 1 %	
442 11	40	3.9	7.5	8.9	10.8	8.9	62%	76%	84%	10.3
442 12	63	6.0	14.3	7.6	9.5	8.6	57%	73%	81%	9.1
442 13	100	8.2	17.9	6.3	8.6	9.2	63%	77%	85%	8.5
442 14	160	11.2	25.0	5.9	7.8	7.9	66%	79%	86%	7.4
442 15	250	14.9	31.6	5.2	6.5	6.2	70%	83%	89%	6.1
442 16	400	18.3	48.3	2.2	3.8	5.6	72%	84%	90%	4.2
442 17	630	24.1	53.7	2.0	3.3	4.6	78%	88%	92%	3.7
442 18	1000	44.2	73.9	1.3	2.1	2.8	80%	89%	93%	2.3

Catalogue number	Power (VA)	No-load loss (W)	Total loss in rated load Wiron + Wcopper (W)	Voltage drop			Efficiency			Ucc %
				cos fr = 0.3 %	cos fr = 0.6 %	cos fr = 1 %	cos fr = 0.3 %	cos fr = 0.6 %	cos fr = 1 %	
442 31	40	3.9	7.3	8.7	10.5	8.5	62%	77%	84%	10.0
442 32	63	6.0	14.2	7.5	9.4	8.5	57%	73%	82%	9.0
442 33	100	8.2	15.1	7.3	9.3	8.9	66%	80%	87%	8.9
442 34	160	11.2	24.6	5.8	7.6	7.7	66%	80%	87%	7.2
442 35	250	14.9	31.4	5.2	6.6	6.2	70%	83%	89%	6.1
442 36	400	18.3	46.3	2.1	3.7	5.6	72%	84%	90%	4.2
442 37	630	24.1	49.4	2.0	3.0	3.9	79%	88%	93%	3.3
442 38	1000	44.2	74.4	1.3	1.9	2.9	80%	89%	93%	2.4
442 39	1600	65.5	94.7	1.1	1.6	1.9	84%	91%	94%	1.7
442 40	2500	86.5	143.4	1.8	2.2	2.0	84%	91%	95%	1.9

Catalogue number	Power (VA)	No-load loss (W)	Total loss in rated load Wiron + Wcopper (W)	Voltage drop			Efficiency			Ucc %
				cos fr = 0.3 %	cos fr = 0.6 %	cos fr = 1 %	cos fr = 0.3 %	cos fr = 0.6 %	cos fr = 1 %	
442 61	40	3.9	7.4	8.7	10.5	8.8	62%	76%	84%	10.1
442 62	63	6.0	11.8	7.6	9.6	8.9	62%	76%	84%	9.2
442 63	100	8.2	17.3	7.2	9.2	8.6	63%	78%	85%	8.7
442 64	160	11.2	23.4	5.8	7.4	7.1	67%	80%	87%	6.9
442 65	250	14.9	31.7	5.2	6.6	6.2	70%	83%	89%	6.1
442 66	400	18.3	43.9	2.1	3.6	5.2	73%	85%	90%	4.1
442 67	630	24.1	53.2	2.1	3.3	4.5	78%	88%	92%	3.6
442 68	1000	44.2	73.6	1.3	2.0	2.7	80%	89%	93%	2.2
442 69	1600	65.5	95.3	1.1	1.5	1.8	83%	91%	94%	1.5
442 70	2500	86.5	150.1	1.8	2.3	2.2	83%	91%	94%	2.0
442 71	4000	87.4	234.8	2.1	2.9	3.3	84%	91%	94%	2.7
442 72	5000	87.4	279.0	1.5	2.3	2.9	84%	91%	95%	2.3
442 73	6300	117.9	272.9	2.2	2.6	2.3	87%	93%	96%	2.3
442 74	8000	195.0	336.5	1.3	1.7	1.8	88%	93%	96%	1.6

6. ELECTRICAL CHARACTERISTICS *(continued)*

Duration of the admissible installed power : 50 ms

Secondary	Cat. No. :	Max. on-load dissipated power (Watts)	Admissible instantaneous power at cos ø 05	Power in VA according to UL
24V	442 11	7.5	50	40
	442 12	14.3	88	63
	442 13	17.9	170	100
	442 14	25	250	140
	442 15	31.6	420	210
	442 16	46.3	850	300
	442 17	53.7	1500	500
	442 18	73.9	5000	500
24/48V	442 31	7.3	52	40
	442 32	14.2	87	63
	442 33	15.1	150	100
	442 34	24.6	250	140
	442 35	31.4	420	210
	442 36	46.3	900	300
	442 37	49.4	1700	500
	442 38	74.4	4800	500
	442 39	94.7	8500	700
	442 40	143.4	3300	1400
115/230V	442 61	7.4	50	40
	442 62	11.8	86	63
	442 63	17.3	150	100
	442 64	23.4	250	140
	442 65	31.7	430	210
	442 66	43.9	1200	300
	442 67	53.2	1600	500
	442 68	73.6	4200	500
	442 69	95.3	6100	700
	442 70	150.1	7100	1300
	442 71	234.8	11400	2400
	442 72	279	17500	3300
	442 73	272	16000	3700
	442 74	336.5	32100	4500

LINE PROTECTION

Min. rating of protections for the power line supplying the transformer's primary circuit (1)

Power	230V Single		400V Mono	
	aM type cart fuse	D circuit-breaker	aM type cart fuse	D circuit-breaker
40 VA				
63 VA	1A 13001		1A 13001	
100 VA	1A 13001	1A 06625	1A 13001	1A 06625
160VA	2A 13002	2A 06626	1A 13001	1A 06625
250 VA	2A 13002	3A 06627	1A 13001	2A 06626
400 VA	4A 13004	6A 06629	2A 13002	2A 06626
630 VA	6A 13006	6A 06629	4A 13004	3A 06627
1000 VA	10A 13010	10A 06631	6A 13006	6A 06629
1600 VA	10A 13010	16A 06633	10A 13010	10A 06631
2500 VA	16A 13016	20A 06634	10A 13010	16A 06633
4 kVA	20A 13020	32A 06636	16A 13016	20A 06634
5 kVA	25A 13025	40A 06637	16A 13016	25A 06635
6.3 kVA	25A 13025	50A 06638	20A 13020	32A 06636
8 kVA	40A 13040	63A 06639	25A 13025	40A 06637

(1) These values are given for information only for transformers with inrush currents of about 25 IN.

Single-phase control and signalling transformer

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6. ELECTRICAL CHARACTERISTICS *(continued)*

- Technical characteristics of transformers at secondaries

Rating power	24V		48V		115V		230V	
	Rating	C. B. Cat. No.	Rating	C. B. Cat. No.	Rating	C. B. Cat. No.	Rating	C. B. Cat. No.
IEC and CSA								
40 VA	2	T2AL(1)	1	T1AL(1)	04	T0.4AL(1)	02	T0.2AL(1)
63 VA	3.15	T3.15AL(1)	1,6	T1.6AL(1)	0,63	T0.63AL(1)	0.315	T0.315AL(1)
100 VA	4	06391	2	06389	1	06388	0.5	06386
160VA	8	06393	4	06391	2	06389	1	06388
250 VA	10	06394	6	06392	2	06389	1	06388
400 VA	16	06396	8	06393	4	06391	2	06389
630 VA	25	06398	13	06395	6	06392	3	06390
1000 VA	40	06400	20	06397	8	06393	4	06391
1600 VA	63	06474	32	06399	13	06395	8	06393
2500 VA	100	06476	50	06473	20	06397	10	06394
4 kVA					32	06399	16	06396
5 kVA					40	06400	20	06397
6.3 kVA					50	06473	25	06398
8 kVA					63	06474	32	06399

(1) Fuses IEC 127 (cartridges 5 x 20 type T)
T : time delay fuse
L : low breaking capacity

7. CHARACTERISTICS OF INSULATING MATERIALS

7.1 Cover and base

- Cover, polyamide 6/6 Ral 7035
- Base, polyamide 6/6 glass filled Ral 7000

- operating temperature ..... - 30 to +100° C
- flame resistance UL94 NFT 51-072 ..... VO
- resistance to glow wire test NFC 20-455 ..... 960° C
- tensile strength NFT 51-034 ..... 110 N/mm^2
- resistance to Charpy impact test NFT 51-035 ..... 33 KJ/m^2
- dielectric strength VDE 0303/2 ..... 20 KV/mm
- tracking current resistance CEI 112..... 300 V
- resistance to molds and tropical and fungi..... good.

Resistance to chemicals at a temperature of 23° C
+ : excellent resistance 0 : moderate resistance - : low resistance

Acids :

- mineral
- hydrochloric ″ 10% 0
- sulphuric ″ 10 % ..... -
- nitric - all concentrations ..... -
- organic
- acetic 10 % 0
- formic 10 % ..... -

Bases :

- mineral ..... +
- organic ..... +

Oils ..... +
Greases ..... +
Oil products ..... +
Chlorinated solvents ..... +
Phenols ..... -
Alcools ..... +
Hydrocarbons ..... +
Mineral salts ..... +