

Control and signalling transformers

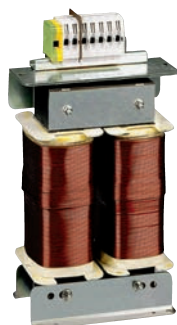
Single-phase - screw connection - AC



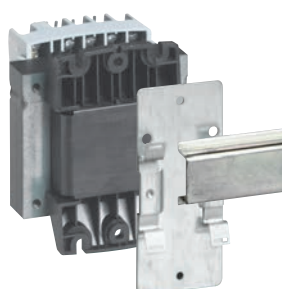
442 33



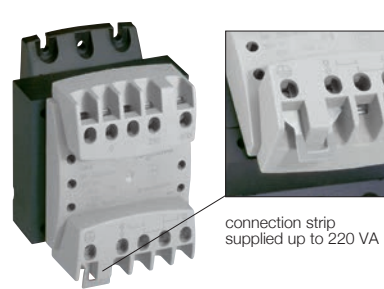
442 68



442 71



428 40 +
428 99



428 41
supplied with connection
strip

connection strip
supplied up to 220 VA

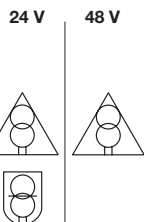


Technical characteristics (p. 152)

IP 2X or XXB up to 400 VA - IP XXA over 400 VA - IK 04
Conform to IEC EN 61558-2-2 and 2-4 or 2-6, UL506 and CSA C22-2-No 66
UL USA and Canada agreements
Products suitable for building equipment conforming to standards EN
61131-2, EN 60204-1 and EN 60439-1
Active parts protected by cover up to 1000 VA
Interference filtering
Direct fixing possibility on symmetrical rail up to 250 VA
Supplied with connection strip 0 V secondary / earth up to 1000 VA

IP 2X or XXB up to 220 VA - IK 04
Clip on fixing possibility up to 160 VA with accessories
Cat. No. 044 16 or 428 99
Transformers with 2 secondary voltage supplied with coupling strip
and with isolated strip for 0 V connection secondary / earth connection
Conform to IEC EN 61558-2-6 for 12 V and 24 V
Products suitable for building equipment conforming to standards EN
61131-2, EN 60204-1 and EN 60439-1

Pack	Cat. No.	Control and safety		
		24-48 V		
		230-400 V ± 15 V (primary) / 24-48 V (secondary)		
		Supplied with 2 coupling strips		
		Power in VA	Instantaneous	
		according to IEC and CSAUL	according to admissible power at $\cos \varphi = 0.5$	
1	442 31	40	40	52
1	442 32	63	63	87
1	442 33	100	100	150
1	442 34	160	140	250
1	442 35	250	210	420
1	442 36	400	300	700
1	442 37	630	500	1700
1	442 38	1000	700	2000
1	442 39	1600	700	8500
1	442 40	2500	1400	3300



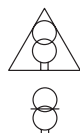
Pack	Cat. No.	Safety		
		12 - 24 V		
		230-400 V (primary) / 12 - 24 V (secondary)		
		Power (VA)	Primary terminal flexible cable (mm²)	Secondary terminal flexible cable (mm²)
1	428 40	40	1 to 4	1 to 4
1	428 41	63	1 to 4	1 to 4
1	428 42	100	1 to 4	1 to 4
1	428 43	160	1 to 4	1 to 4
1	428 44	220	1 to 4	1 to 4



Pack	Cat. No.	Accessories	
5	428 99	For clip on rail (90° mounting) of transformers up to 160 VA with 2 claws	
10	044 16	Plate	
		Claw width 10 mm	
		Threaded hole	
		For M4 screw	



Pack	Cat. No.	Control and circuit isolation		
		115-230 V		
		115-230 V (secondary)		
		Supplied with 2 coupling strips		
		Primary 230-400 V ± 15 V	Power in VA according to IEC and CSA	Instantaneous power according to admissible power at $\cos \varphi = 0.5$
1	442 61	40	40	50
1	442 62	63	63	86
1	442 63	100	100	150
1	442 64	160	140	250
1	442 65	250	210	360
1	442 66	400	300	1100
1	442 67	630	500	1300
1	442 68	1000	700	2000
1	442 69	1600	700	6100
1	442 70	2500	1300	7100
1	442 71	4000	2400	11400
1	442 72	5000	3300	17500
1	442 73	6300	3700	10900
1	442 74	8000	4500	12500



Some items sold separately

For pack quantity, please refer to numerical index pages

For trade price, please see your local HPM Legrand representative for the current price list

Control and signalling transformers

Single-phase

■ Dimensions

Fig. 1: 40 to 400 VA

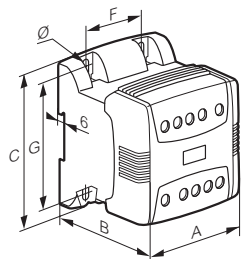


Fig. 2: 630 to 1000 VA

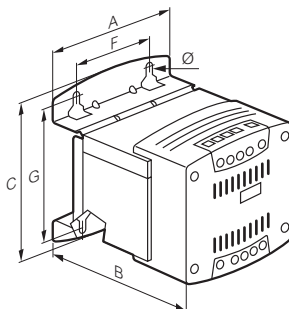


Fig. 3: 1600 to 2500 VA

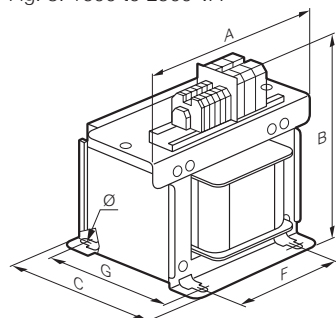
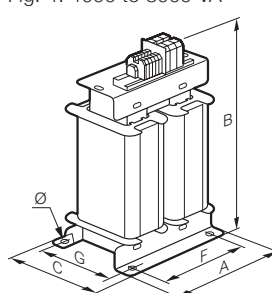
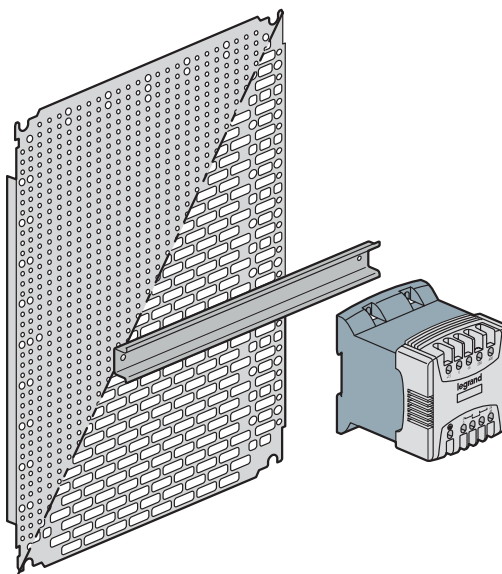


Fig. 4: 4000 to 8000 VA

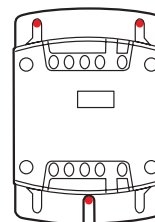


■ Fixing

On perforated plates Lina 25 and on Lina 12.5 plates
On symmetrical rail 4 up to 250 VA
fixing centres pitch 25 mm up to 1000 VA



Attachment at 3 points possible with through oblong on the secondary side



Cat. No.	Power (VA)	Fig.	Dimensions (mm)			Fixing ⁽¹⁾			Weight (Kg)
			A	B	C	F	G		
442 31/61	40	1	94	78	113	50	100	5.2	1.23
442 32/62	63	1	94	85	113	50	100	5.2	1.56
442 33/63	100	1	94	94	113	50	100	5.2	1.95
442 34/64	160	1	94	112	113	50	100	5.2	2.6
442 35/65	250	1	106	123	115	50	100	5.2	3.82
442 36/66	400	1	120	140	140	62.5	125	5.2	5.62
442 37/67	630	2	132	155	175	75	150	5.5	8
442 38/68	1000	2	150	199	206	100	175	7	14.9
442 39/69	1600	3	220	245	191	150	153	9	25.6
442 40/70	2500	3	300	292	171	200	114	9	33.1
442 71	4000	4	230	340	205	180	130	11	31
442 72	5000	4	240	390	205	180	130	11	40
442 73	6300	4	240	390	205	180	130	11	45
442 74	8000	4	240	390	280	180	140	11	64

(1) Direct fixing possibility on symmetrical rail 4 up to 250 VA

Control and signalling transformers

Single-phase

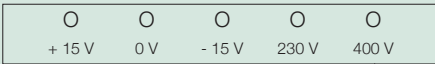
■ Characteristics

Single - phase 50-60 Hz - class I

Insulation voltage between windings: 4 510 V

Max. ambient operating temperature without derating: 50 ° C

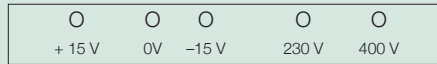
Use of adjustment taps



Connected to mains supply (U1) between terminals + 15 V and 230 or 400 V

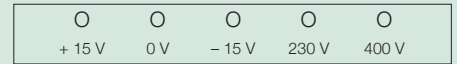
1) If $U_1 > 230$ or 400 V

2) If $I_2 < I_{2n}$ (if load is lower than rated load, the secondary voltage must be reduced)



Connected to mains supply (U1) between terminals 0 V and 230 or 400 V

If $U_1 < 230$ or 400 V with a load $I_2 = I_{2n}$



Connected to mains supply (U1) between terminals - 15 V and 230 or 400 V

If $U_1 < 230$ or 400 V with a load $I_2 = I_{2n}$

Transformer sizing

$P_{inrush} = 0.8 (\sum P_m + \sum P_r + P_a)$

$\sum P_m$ = Sum of all contactors holding powers

$\sum P_r$ = Sum of all indicators light powers

P_a = Inrush power of the largest contactor

Cat. No.	Power (VA)	Admissible instantaneous power (VA) at cos φ of:									No-load loss (W)	Loss at rated voltage ⁽¹⁾ (W)	Voltage drop (%) with cos φ of:			Efficiency (%) with cos φ of:			Ucc (%)	Connection			
																				Primary cable (mm²)		Secondary cable (mm²)	
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1			0.3	0.6	1	0.3	0.6	1		flexible	rigid	flexible	rigid
Primary 230-400 V ~ 15 V - Secondary 24-48 V																							
442 31	40	63	58	55	52	50	48	48	49	60	3.9	7.3	8.7	10.5	8.5	62.0	77.0	84.0	10.0	1 to 4	1 to 4	1 to 4	1 to 4
442 32	63	110	102	94	87	83	79	77	78	91	6.0	14.2	7.5	9.4	8.5	57.0	73.0	82.0	9.0	1 to 4	1 to 4	1 to 4	1 to 4
442 33	100	200	180	160	150	140	130	130	130	150	8.2	15.1	7.3	9.3	8.9	66.0	80.0	87.0	8.9	1 to 4	1 to 4	1 to 4	1 to 4
442 34	160	340	300	270	250	230	220	210	210	230	11.2	24.6	5.8	7.6	7.7	66.0	80.0	87.0	7.2	1 to 4	1 to 4	1 to 4	1 to 4
442 35	250	550	490	450	420	400	380	370	370	430	14.9	31.4	5.2	6.6	6.2	70.0	83.0	89.0	6.1	1 to 4	1 to 4	1 to 4	1 to 4
442 36	400	1400	1000	800	700	600	500	500	400	400	18.3	46.3	2.1	3.7	5.6	72.0	84.0	90.0	4.2	1 to 4	1 to 4	1 to 4	1 to 4
442 37	630	2200	1700	1400	1000	960	910	820	760	720	255	58	2.3	4	4.7	7.0	82	89	3.8	1 to 4	1 to 4	1 to 10	1 to 10
442 38	1000	3400	2800	2300	2000	1800	1600	1500	1400	1300	44.2	74.4	1.3	1.9	2.9	80.0	89.0	93.0	2.4	1 to 16	1 to 16	1 to 16	1 to 16
442 39	1600	12800	10900	9500	8500	7700	7100	6700	6400	6600	65.5	94.7	1.1	1.6	1.9	84.0	91.0	94.0	1.7	2.5 to 10	1.5 to 16	4 to 16	1.5 to 25
442 40	2500	4300	3900	3600	3300	3100	3000	2900	2900	3400	86.5	143.4	1.8	2.2	2.0	84.0	91.0	95.0	1.9	4 to 16	1.5 to 25	4 to 35	2.5 to 50
Primary 230-400 V ~ 15 V - Secondary 230 V and Primary 230-400 V + 15 V - Secondary 115-230 V																							
442 61	40	62	57	53	50	48	47	46	47	57	3.9	7.4	8.7	10.5	8.8	62.0	76.0	84.0	10.1	1 to 4	1 to 4	1 to 4	1 to 4
442 62	63	110	100	93	86	82	78	76	76	90	6.0	11.8	7.6	9.6	8.9	62.0	76.0	84.0	9.2	1 to 4	1 to 4	1 to 4	1 to 4
442 63	100	200	180	160	150	140	140	130	130	150	8.2	17.3	7.2	9.2	8.6	63.0	78.0	85.0	8.7	1 to 4	1 to 4	1 to 4	1 to 4
442 64	160	330	300	270	250	240	230	220	220	250	11.2	23.4	5.8	7.4	7.1	67.0	80.0	87.0	6.9	1 to 4	1 to 4	1 to 4	1 to 4
442 65	250	560	510	460	430	410	390	380	370	430	14.9	31.7	5.2	6.6	6.2	70.0	83.0	89.0	6.1	1 to 4	1 to 4	1 to 4	1 to 4
442 66	400	200	1600	1300	1100	900	840	760	700	660	18.3	43.9	2.1	3.6	5.2	73.0	85.0	90.0	4.1	1 to 4	1 to 4	1 to 4	1 to 4
442 67	630	2300	1800	1500	1300	1100	1000	910	840	810	25.5	75.7	2.1	3.5	4.8	71	83	89	3.4	1 to 4	1 to 4	1 to 10	1 to 10
442 68	1000	3400	2800	2300	2000	1800	1600	1500	1400	1300	44.2	73.6	1.3	2.0	2.7	80.0	89.0	93.0	2.2	1 to 16	1 to 16	1 to 16	1 to 16
442 69	1600	8700	7500	6600	6100	5400	5000	4700	4500	4700	65.5	95.3	1.1	1.5	1.8	83.0	91.0	94.0	1.5	2.5 to 10	1.5 to 16	2.5 to 10	1.5 to 16
442 70	2500	9200	8300	7600	7100	6700	6300	6200	6100	7100	86.5	150.1	1.8	2.3	2.2	83.0	91.0	94.0	2.0	4 to 16	1.5 to 25	4 to 16	1.5 to 25
442 71	4000	16500	14300	12700	11400	10500	9800	9200	8900	9500	87.4	234.8	2.1	2.9	3.3	84.0	91.0	94.0	2.7	4 to 16	1.5 to 25	4 to 16	1.5 to 25
442 72	5000	28500	23400	19900	17500	15600	14200	13100	12300	12300	87.4	279.0	1.5	2.3	2.9	84.0	91.0	95.0	2.3	4 to 16	1.5 to 25	4 to 16	1.5 to 25
442 73	6300	17200	14500	12500	10900	10000	9200	8600	8100	8300	120	530	2.8	4.1	4.8	78	88	92	3.9	4 to 16	1.5 to 25	4 to 16	1.5 to 25
442 74	8000	19800	18600	14400	12500	11500	10600	9800	9300	9600	195	350	1.7	2.7	3.7	87	93.0	96.0	2.9	4 to 16	1.5 to 25	4 to 16	1.5 to 25

(1) Total losses at nominal voltage

Some items sold separately

For pack quantity, please refer to numerical index pages

For trade price, please see your local HPM Legrand representative for the current price list

Equipment

Single-phase

■ Characteristics

Insulation voltage:

- between windings: 4 470 V
- between primary and earth: 2 240 V
- between secondary and earth: 250 V for 12 and 24 V

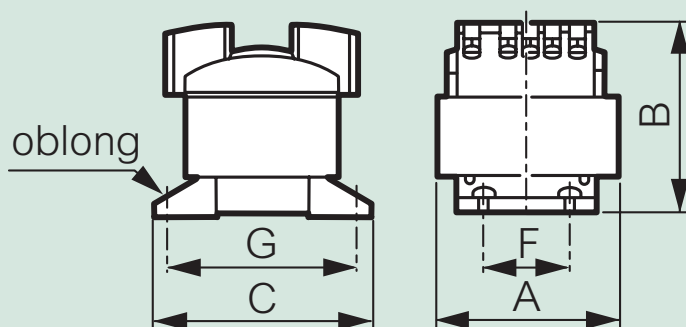


Fig. 1

Cat. No.	Power (VA)	AIO (VA) cos 0.5	Fig.	Dimensions (mm)			Fixing (mm)			Weight (kg)	No load loss (W)	Total losses at 100% load (W)	Voltage drop (%)		Efficiency (%)		Ucc (%)	Connection PRI cable (mm²) lug ∅			Connection SEC cable (mm²) lug		
				A	B	C	F	G	Ø				cos Ø 1	cos Ø 0.45	cos Ø 1	cos Ø 0.45		flexible	rigid	(mm)	flexible	rigid	(mm)
Single-phase safety transformers: Primary 230-400 V - Sec 12-24 V																							
428 40	40	55	1	84	70	98	40	86	4.5	0.9	3.7	13.1	18.3	12.7	0.75	0.58	15.6	1 to 4	1 to 4	4.5	1 to 4	1 to 4	4.5
428 41	63	91	1	84	77	98	40	86	4.5	1.3	4.9	16.3	13.5	10.2	0.79	0.64	11.8	1 to 4	1 to 4	4.5	1 to 4	1 to 4	4.5
428 42	100	140	1	84	86	98	40	86	4.5	1.6	6.2	21.0	10.5	8.7	0.83	0.68	9.5	1 to 4	1 to 4	4.5	1 to 4	1 to 4	4.5
428 43	160	205	1	84	104	98	40	86	4.5	2.4	9.1	31.8	8.8	7.4	0.83	0.69	7.9	1 to 4	1 to 4	4.5	1 to 4	1 to 4	4.5
428 44	220	290	1	96	115	110	40	98	4.5	3.4	12.6	40.0	6.9	6.3	0.85	0.71	6.5	1 to 4	1 to 4	4.5	1 to 4	1 to 4	4.5

Protection of transformers and their lines

Protection of lines

General

Lines must be protected against overloads and short-circuits. Protection against overloads is only compulsory if the line is likely to be affected by an overload current. This protection can be installed at the head or end of the line. Protection against short-circuits is compulsory in all installations ; this protection has to be installed at the head of the line

Supply line (transformer primary)

The transformer is a device that cannot generate overloads. Its supply line requires protection against short-circuits only. When a transformer is energised, a very high inrush current is produced (in the region of 25 In) for approximately 10 ms. The line protection must take these 2 factors into consideration. Legrand offers 3 possibilities: aM fuse cartridges, type D MCBs (average value of the magnetic 12 In, with a standard adjustment range between 10 and 14 In), type C MCBs (average value of the magnetic 7 In, with a standard adjustment range between 5 and 10 In)

Minimal protection rating for primary supply line on transformer⁽¹⁾

Power	230 V single - phase				400 V single - phase		
	aM Cartridge	MCBs C curve or MCCBs	MCBs D curve or MCCBs	type B MCB with inrush current limiter	aM Cartridge	MCBs C curve or MCCBs	MCBs D curve or MCCBs
40 VA	0.5 A 130 95	1 A 064 60		1 A 067 52	0.25 A 130 92	1 A 064 60	
63 VA	1 A 130 01	2 A 064 61		1 A 067 52	0.5 A 130 95	1 A 064 60	
100 VA	1 A 130 01	3 A 064 62	1 A 066 25	1 A 067 52	1 A 130 01	2 A 064 61	1 A 066 25
160 VA	2 A 130 02	6 A 064 64	2 A 066 26	1 A 067 52	1 A 130 01	2 A 064 61	1 A 066 25
220 VA	2 A 130 02	6 A 064 64	2 A 066 26	2 A 067 53	1 A 130 01	3 A 064 62	2 A 066 26
250 VA	2 A 130 02	6 A 064 64	3 A 066 27	2 A 067 53	2 A 130 02	3 A 064 62	2 A 066 26
310 VA	4 A 130 04	10 A 064 66	3 A 066 27	2 A 067 53	2 A 130 02	6 A 064 64	2 A 066 26
400 VA	4 A 130 04	10 A 064 66	6 A 066 29	2 A 067 53	2 A 130 02	6 A 064 64	2 A 066 26
450 VA	4 A 130 04	10 A 064 66	6 A 066 29	3 A 067 54	2 A 130 02	6 A 064 64	3 A 066 27
630 VA	6 A 130 06	16 A 064 68	6 A 066 29	3 A 067 54	4 A 130 04	10 A 064 66	6 A 066 29
800 VA	6 A 130 06	16 A 064 68	10 A 066 31	6 A 067 56	4 A 130 04	10 A 064 66	6 A 066 29
1000 VA	10 A 130 10	20 A 064 69	10 A 066 31	6 A 067 56	4 A 130 04	16 A 064 68	6 A 066 29
1250 VA	10 A 130 10	25 A 064 70	16 A 066 33	10 A 067 56	6 A 130 06	16 A 064 68	10 A 066 31
1600 VA	10 A 130 10	32 A 064 71	16 A 066 33	10 A 067 58	10 A 130 06	20 A 064 69	10 A 066 31
2000 VA	12 A 130 12	40 A 064 72	20 A 066 34	10 A 067 58	8 A 130 08	25 A 064 70	16 A 066 33
2500 VA	16 A 130 16	50 A 064 73	25 A 066 35	16 A 067 60	10 A 130 10	32 A 064 71	16 A 066 33

Protection of transformers

According to IEC/EN 61558 standards, transformers must be protected against overloads and short-circuits which may occur during normal operations

The standards do not specify the location or type of protective device: it is the manufacturer's responsibility to select the most suitable position, either on the primary or secondary side
Legrand has selected secondary protection. The rating, type and location of the protective device are indicated on the front of its devices

Single-phase: Control, safety isolating, isolating, equipment and installation transformers

Nominal power IEC and CSA	12 V				24 V				48 V				115 V				230 V			
	Rating	Cartridge Cat.Nos	Rating	MCBS Cat.Nos	Rating	Cartridge Cat.Nos	Rating	MCBS Cat.Nos	Rating	Cartridge Cat.Nos	Rating	MCBS Cat.Nos	Rating	Cartridge Cat.Nos	Rating	MCBS Cat.Nos	Rating	Cartridge Cat.Nos	Rating	MCBS Cat.Nos
40 VA	4	T4 AL ⁽¹⁾	4	T4 AL ⁽¹⁾	2	T2 AL ⁽¹⁾	2	T2 AL ⁽¹⁾	1	T1 AL ⁽¹⁾	1	T1 AL ⁽¹⁾	0.4	T0.4 AL ⁽¹⁾	0.4	T0.4 AL ⁽¹⁾	0.2	T0.2 AL ⁽¹⁾	0.2	T0.2 AL ⁽¹⁾
63 VA	5	T5 AL ⁽¹⁾	5	T5 AL ⁽¹⁾	2.5	T2.5 AL ⁽¹⁾	2.5	T2.5 AL ⁽¹⁾	1.25	T1.25 AL ⁽¹⁾	1.25	T1.25 AL ⁽¹⁾	0.5	T0.5 AL ⁽¹⁾	0.5	T0.5 AL ⁽¹⁾	0.25	T0.25 AL ⁽¹⁾	0.25	T0.25 AL ⁽¹⁾
100 VA	8	T8 AE ⁽¹⁾	8	063 93	4	T4 AE ⁽¹⁾	4	063 91	2	T2 AL ⁽¹⁾	2	063 89	0.8	T0.8 AL ⁽¹⁾	1	063 88	0.4	T0.4 AL ⁽¹⁾	0.5	063 86
160 VA	16	133 16	13	063 95	8	133 08	6	063 92	3.15	T3.15 AE ⁽¹⁾	4	063 91	1.6	T1.6 AL ⁽¹⁾	2	063 89	0.63	T0.63 AL ⁽¹⁾	1	063 88
220 VA	20	133 20	20	063 97	10	133 10	10	063 94	5	T5 AE ⁽¹⁾	6	063 92	2	T2 AL ⁽¹⁾	2	063 89	1	T1 AL ⁽¹⁾	1	063 88
250 VA	20	133 20	20	063 97	10	133 10	10	063 94	6	133 06	6	063 92	2	T2 AL ⁽¹⁾	2	063 89	1	T1 AL ⁽¹⁾	1	063 88
310 VA	25	133 25	25	063 98	12	133 12	13	063 95	6	133 06	6	063 92	2.5	T2.5 AE ⁽¹⁾	3	063 90	1.25	T1.25 AL ⁽¹⁾	2	063 89
400 VA	32	143 32	32	063 99	16	133 16	16	063 96	8	133 08	8	063 93	4	133 04	4	063 91	2	133 02	2	063 89
450 VA	40	143 40	40	064 00	20	133 20	20	063 97	10	133 10	10	063 94	4	133 04	4	064 91	2	133 02	2	063 89
630 VA	50	143 50	50	063 81	25	133 25	25	063 98	12	133 12	13	063 95	6	133 06	6	063 92	4	133 04	3	063 90
800 VA	63	153 63	63	063 82	32	143 32	32	063 99	16	133 16	16	063 96	8	133 08	8	063 93	4	133 04	4	063 91
1000 VA	80	153 80	80	063 83	40	143 40	40	064 00	20	133 20	20	063 97	8	133 08	8	063 93	4	133 04	4	063 91
1250 VA	100	153 96	100	064 76	50	143 50	50	063 81	25	133 25	25	063 98	10	133 10	10	064 94	6	133 06	6	063 92
1600 VA	125	153 97	125	064 77	63	153 63	63	063 82	32	143 32	32	063 99	16	133 16	13	064 95	8	133 08	8	063 93
2000 VA			160		80	153 80	80	063 83	40	143 40	40	064 00	16	133 16	16	063 96	8	133 08	8	063 93
2500 VA			200		100	153 96	100	064 76	50	143 50	50	063 81	20	133 20	20	063 97	10	133 10	10	063 94

(1) Fuses IEC 127 (cartridge 5 x 20 T type)

Main transformer functions:

Changing voltage:



Isolation transformer
(basic insulation between primary and secondary)



Auto-transformer
(no insulation between primary and secondary)

Control circuit power supply



Control transformer
(basic insulation between primary and secondary)

Protection against electric shock

- Protection against direct and indirect contact by:



Safety isolating transformers
(reinforced insulation between primary and secondary, no-load voltage < 50 V)

- Protection against indirect contact by:



Isolating transformers
(reinforced insulation between primary and secondary)



Isolating transformers
For the supply of medical location (group II)

The transformer function(s) can either be defined by the equipment designer or can be imposed by installation guidelines or the equipment standard

Definitions:

- Electric shocks: physiological effect resulting from an electrical current through a human or animal body (IEV 195-01-04)
- Direct contact: electric contact of persons or animals with live parts (195-06-03)
- Indirect contact: electric contact of persons or animals with exposed-conductive-parts which have become live under fault conditions (195-06-04)

Some items sold separately

For pack quantity, please refer to numerical index pages

For trade price, please see your local HPM Legrand representative for the current price list