

SINGLE-PHASE TRANSFORMERS

SAFETY OR ISOLATING

new

TR 28 1.1

TR 28 1.1. SAFETY OR ISOLATING TRANSFORMER

Safety or isolating single-phase transformers. IP20 protection index (finger safe). For mounting on DIN/EN rail up to 320 VA. Fast and easy connection due to the high capacity clamp type terminal blocks.

TECHNICAL DATA

PRI voltage: 230 or 400V
 SEC voltage: 12-24-48-115 or 230V
 Rated power range: 40 VA to 1000 VA
 Class I against electric shock
 Thermal class: B (130 °C)
 Max. ambient temperature: 40°C
 Frequency: 50/60 Hz
 Protection index: IP20
 Dielectric strength PRI-SEC: ≥ 4,5 kV
 Dielectric strength between windings and metallic parts: ≥ 2,5 kV

PRIMARY VOLTAGE 230V

POWER (VA)	230 // 12V		230 // 24V		REFERENCE		230 // 115V		230 // 230V	
					230 // 48V					
t_a 40°C										
40	680040025	680040026*	680040027	680040028	680040029					
63	680063025	680063026*	680063027	680063028	680063029					
100	680100025	680100026*	680100027	680100028	680100029					
160	680160025	680160026*	680160027	680160028	680160029					
200	680200025	680200026*	680200027	680200028	680200029					
250	680250025	680250026*	680250027	680250028	680250029					
320	680320025	680320026*	680320027	680320028	680320029					
400	680400025	680400026*	680400027	680400028	680400029					
500	680500025	680500026*	680500027	680500028	680500029					
630	-	680630026*	680630027	680630028	680630029					
800	-	680800026*	680800027	680800028	680800029					
1000	-	681000026*	681000027	681000028	681000029					



680320028

PRIMARY VOLTAGE 400V

POWER (VA)	400 // 12V		400 // 24V		REFERENCE		400 // 115V		400 // 230V	
					400 // 48V					
t_a 40°C										
40	680040030	680040031*	680040032	680040033	680040034					
63	680063030	680063031*	680063032	680063033	680063034					
100	680100030	680100031*	680100032	680100033	680100034					
160	680160030	680160031*	680160032	680160033	680160034					
200	680200030	680200031*	680200032	680200033	680200034					
250	680250030	680250031*	680250032	680250033	680250034					
320	680320030	680320031*	680320032	680320033	680320034					
400	680400030	680400031*	680400032	680400033	680400034					
500	680500030	680500031*	680500032	680500033	680500034					
630	-	680630031*	680630032	680630033	680630034					
800	-	680800031*	680800032	680800033	680800034					
1000	-	681000031*	681000032	681000033	681000034					

t_a maximum ambient temperature
 * stock references, the rest on request



SINGLE-PHASE TRANSFORMERS

CONTROL & SAFETY OR ISOLATING

TR 28 2.2

TR 28 5.2

TR 28 CONTROL & SAFETY OR ISOLATING TRANSFORMER

Control and safety or isolating single-phase transformers. They can supply high instantaneous power necessary for the correct operation of contactors and other switch and control gear. IP20 protection index (finger safe). For mounting on DIN/EN rail up to 320 VA. Great flexibility due to the several primary rated voltages with regulation taps $\pm 15V$ (TR28 5.2) and the serial-parallel secondary connection. Fast and easy connection due to the high capacity clamp type terminal blocks.

TR28 2.2

TECHNICAL DATA

PRI voltage: 0-230-400 V
SEC voltage: 12-24, 24-48 or 115-230 V
Rated power range: 25 VA to 1000 VA
Class I against electric shock
Thermal class: B (130 °C)
Max. ambient temperature: 40°C
Frequency: 50/60 Hz
Protection index: IP20
Dielectric strength PRI-SEC: $\geq 4,5$ kV
Dielectric strength between windings and metallic parts: $\geq 2,5$ kV

TR28 5.2

TECHNICAL DATA

PRI voltage: 0-230-400-460 ± 15 V
SEC voltage: 12-24, 24-48 or 115-230 V
Rated power range: 25 VA to 1000 VA
Class I against electric shock
Thermal class: B (130 °C)
Max. ambient temperature: 40°C
Frequency: 50/60 Hz
Protection index: IP20
Dielectric strength PRI-SEC: $\geq 4,5$ kV
Dielectric strength between windings and metallic parts: $\geq 2,5$ kV

TR 28 2.2 CONTROL & SAFETY OR ISOLATING TRANSFORMER

POWER (VA)		INSTANT. POWER (VA)	REFERENCE		
t_a 40°C	t_a 25°C		12 - 24V	24 - 48V	115 - 230V
25	40	75	680025043	680025044	680025045
40	63	120	680040043	680040044	680040045
63	100	150	680063043	680063044	680063045
100	130	230	680100043	680100044	680100045
160	200	350	680160043	680160044	680160045
200	250	450	680200043	680200044	680200045
250	320	600	680250043	680250044	680250045
320	400	800	680320043	680320044	680320045
400	500	950	680400043	680400044	680400045
500	630	1275	680500043	680500044	680500045
630	800	1700	680630043	680630044	680630045
800	1000	2100	680800043	680800044	680800045
1000	1250	3300	681000043	681000044	681000045



680320044

TR 28 5.2 CONTROL & SAFETY OR ISOLATING TRANSFORMER

POWER (VA)		INSTANT. POWER (VA)	REFERENCE		
t_a 40°C	t_a 25°C		12 - 24V	24 - 48V	115 - 230V
25	40	75	680025010	680025011	680025012
40	63	120	680040010	680040011	680040012
63	100	150	680063010	680063011	680063012
100	130	230	680100010	680100011	680100012
160	200	350	680160010	680160011	680160012
200	250	450	680200010	680200011	680200012
250	320	600	680250010	680250011	680250012
320	400	800	680320010	680320011	680320012
400	500	950	680400010	680400011	680400012
500	630	1275	680500010	680500011	680500012
630	800	1700	680630010	680630011	680630012
800	1000	2100	680800010	680800011	680800012
1000	1250	3300	681000010	681000011	681000012



680320011

t_a maximum ambient temperature

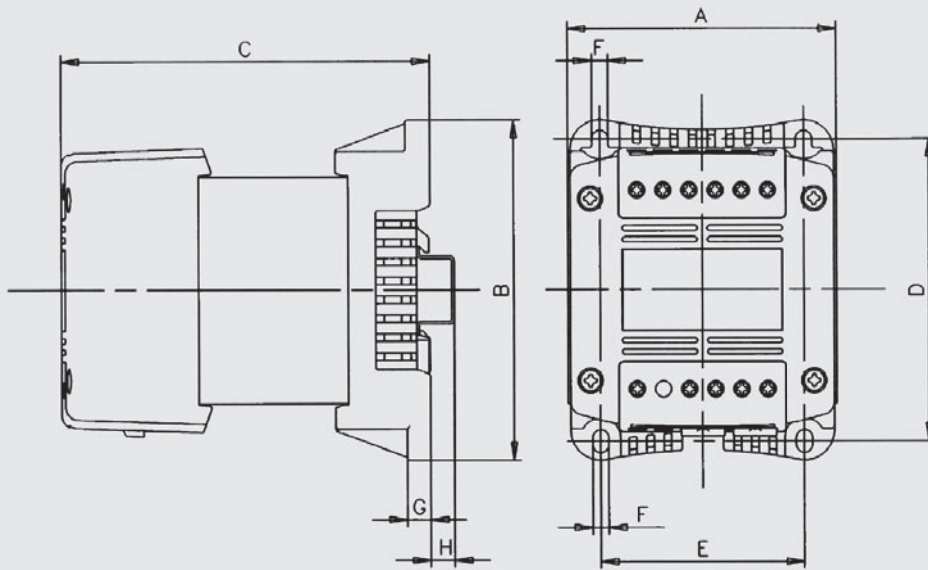
SINGLE-PHASE TRANSFORMERS

DIMENSIONS

new

TR 28 1.1

DIMENSIONS



POWER (VA)	DIMENSIONS (mm)								WEIGHT (kg)
	A	B	C	D	E	F	G	H	
40	84	113	96	101	66	5	7,5	2	1,17
63	84	113	105	101	66	5	7,5	2	1,48
100	84	113	112	101	66	5	7,5	2	1,83
160	84	113	126	101	66	5	7,5	2	2,40
200	108	135	124	120	82	6,5	9,5	9,5	3,95
250	108	135	133	120	82	6,5	9,5	9,5	4,20
320	108	135	138	120	82	6,5	9,5	9,5	4,40
400	120	152	136	135	94	7	9,5	-	5,50
500	120	152	146	135	94	7	9,5	-	6,75
630	150	177	130	160	115	7	2	-	7,60
800	150	177	150	160	115	7	2	-	10,0
1000	150	177	170	160	115	7	2	-	13,0

technical data

TRANSFORMERS



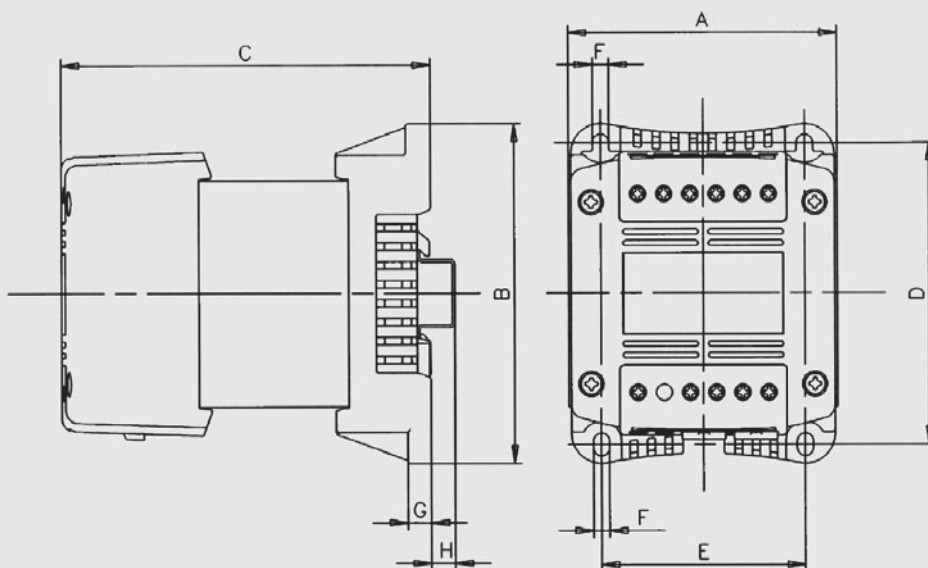
SINGLE-PHASE TRANSFORMERS

DIMENSIONS
CONNECTION POSSIBILITIES



TR 28 2.2

DIMENSIONS

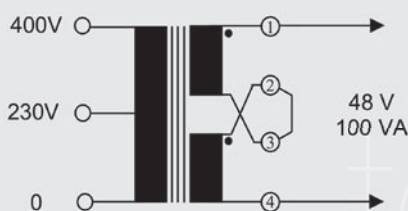


POWER (VA)	DIMENSIONS (mm)								WEIGHT (kg)
	A	B	C	D	E	F	G	H	
25	84	113	96	101	66	5	7,5	2	1,15
40	84	113	105	101	66	5	7,5	2	1,45
63	84	113	112	101	66	5	7,5	2	1,80
100	84	113	116	101	66	5	7,5	2	1,95
160	84	113	131	101	66	5	7,5	2	2,55
200	108	135	133	120	82	6,5	9,5	9,5	4,15
250	108	135	138	120	82	6,5	9,5	9,5	4,40
320	108	135	148	120	82	6,5	9,5	9,5	4,95
400	120	152	141	135	94	7	9,5	-	5,80
500	120	152	156	135	94	7	9,5	-	7,00
630	150	177	140	160	115	7	2	-	8,60
800	150	177	160	160	115	7	2	-	11,4
1000	150	177	182,60	160	115	7	2	-	14,3

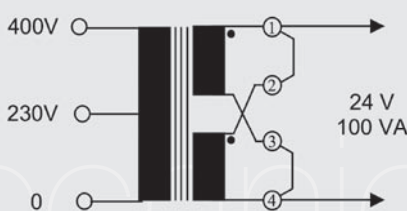
CONNECTION POSSIBILITIES

EXAMPLE - TRANSFORMER 0-230-400 // 24-48V 100VA (610100044)

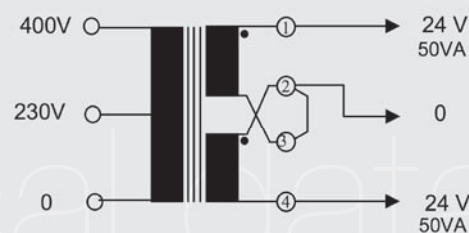
SERIAL CONNECTION



PARALLEL CONNECTION



WITH MIDDLE TAP



STANDARDS

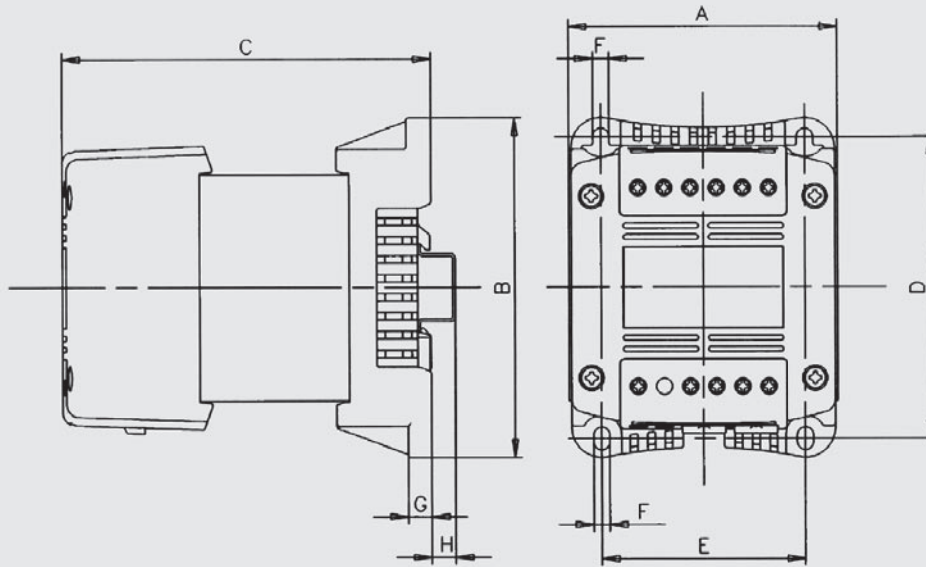
IEC 61558-1 EN 61558-2-4
IEC 61558-2-2 EN 61558-2-6
EN 61558-1
EN 61558-2-2

SINGLE-PHASE TRANSFORMERS

DIMENSIONS
CONNECTION POSSIBILITIES

TR 28 5.2

DIMENSIONS

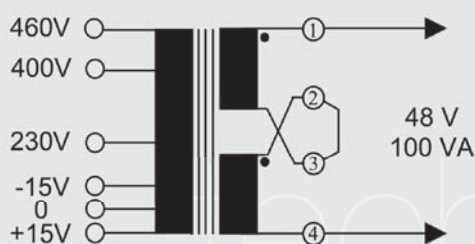


POWER (VA)	DIMENSIONS (mm)								WEIGHT (kg)
	A	B	C	D	E	F	G	H	
25	84	113	96	101	66	5	7,5	2	1,17
40	84	113	105	101	66	5	7,5	2	1,48
63	84	113	112	101	66	5	7,5	2	1,83
100	84	113	116	101	66	5	7,5	2	2,00
160	84	113	131	101	66	5	7,5	2	2,65
200	108	135	133	120	82	6,5	9,5	9,5	4,20
250	108	135	138	120	82	6,5	9,5	9,5	4,45
320	108	135	148	120	82	6,5	9,5	9,5	5,00
400	120	152	136	135	94	7	9,5	-	5,30
500	120	152	156	135	94	7	9,5	-	7,08
630	150	177	140	160	115	7	2	-	8,68
800	150	177	160	160	115	7	2	-	11,5
1000	150	177	182,60	160	115	7	2	-	14,4

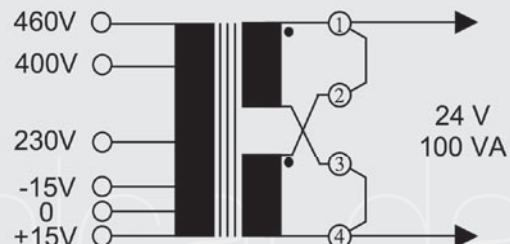
CONNECTION POSSIBILITIES

EXAMPLE - TRANSFORMER 0-230-400 // 24-48V 100VA (610100001)

SERIAL CONNECTION



PARALLEL CONNECTION



SINGLE-PHASE TRANSFORMERS

TR 21 & TR 28 SELECTION GUIDE

TR 21 - TR 28

TR 21 & TR 28 SELECTION GUIDE

DETERMINATION OF RATED POWER OF THE TRANSFORMER IN CONTROL APPLICATIONS

For the correct sizing of a control transformer we must consider the continuous power as well as the inrush power due to the high momentary inrush current caused when electromechanical devices such as contactors or relays are energized. During the normal operation of control circuit the transformer must supply a high instantaneous power for a short time. From the thermal point of view this is not a problem due to the very short time, however, this situation could be problematic due to the reduction of output voltage in the transformer. If the secondary voltage decreases in excess, some devices might not operate and the control circuit won't work properly.

Thus, in every control circuit we will take into account several facts:

- The maximum power in a given moment (inrush power).
- Continuous power requirement.
- Power factor.
- Minimum admissible voltage.

An exhaustive study in each situation could be very complex due to the particularities on every application, however there are simple rules to determine the correct size of a transformer.

We can suppose that the power factor is $\cos \varphi = 0,5$ during the operation of contactors.

The instantaneous power will be:

$$P_{inst} = \Sigma P_m + \Sigma P_s + P_a$$

ΣP_m : sum of the sealed power of the contactors.

ΣP_s : sum of the power of the signalling lamps.

P_a : Inrush power of the biggest contactor.

technical data



TRANSFORMERS & AUTOTRANSFORMERS

PROTECTION

PROTECTION OF TRANSFORMERS & AUTOTRANSFORMERS

The transformers and autotransformers (and their lines) must be protected against overloads and/or short-circuits that they can be submitted in use, and could cause dangerous situations for persons, animals or installations. This protection is also a requirement of the standards and the national regulations about electrical installations.

Due to the high inrush current (about $25 \cdot I_n$) it is very difficult to get an optimal protection in the primary side. If we select the rated current of fuses according to the primary rated current, the inrush current will melt the fuses. On the other hand, if the fuses are overrating for withstand the inrush, the transformer won't have a good protection against overloads.

For this reason we recommend to protect transformers and autotransformers on the secondary side (output). The most adequate way to protect these devices (and their lines) is to include on the output side a device protection capable to interrupt overloads as well as short circuits. For the other hand the input line must be protected against short circuit.

As a general rule the criteria to select the ratings of protection devices are the following:

PROTECTION ON THE OUTPUT SIDE (LOAD)

In this part can appear overloads (if the user try to obtain a power higher than the rated power) as well as short circuits.

In order to achieve a good protection, the device (fuse link, circuit breaker or similar) must be capable to interrupt all range of currents (overloads and short circuits) and must have a rated current equal or lower than the output rated current of the autotransformer.

PROTECTION ON THE INPUT SIDE (SUPPLY LINE)

In this part there is no risk of overload because if the output protection has been correctly selected, it will operate if appear an overload at the output side and the load will be disconnected of the autotransformer.

For this reason we only must protect the input line of autotransformer against short circuits in the line, in the autotransformer connections or inside the windings in a hypothetical failure of the insulations.

When the transformer is energized, it can demand a high momentary current (can be about 25 times the rated current) with a duration of a few milliseconds, that decrease very quickly until reach the rated value.

This factors should be take into account to choose the protection in order to avoid the fusing of the fuses or the not desired operation of the circuit breakers:

- Miniature fuses 5x20 ó 6x32 time-lag (slow) according to IEC/EN60127:
In fuse link $\geq 3 \cdot I_n$ transformer
- Fuse links aM type according to IEC/EN60269:
In fuse link $\geq 1,8 \cdot I_n$ transformer
- Fuse links gG type according to IEC/EN60269:
In fuse link $\geq 3 \cdot I_n$ transformer

technical data

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