# Catalog

EREA
TRANSFORMERS

erea · energy · engineering

## Content – Transformers for industrial applications

EN

DE

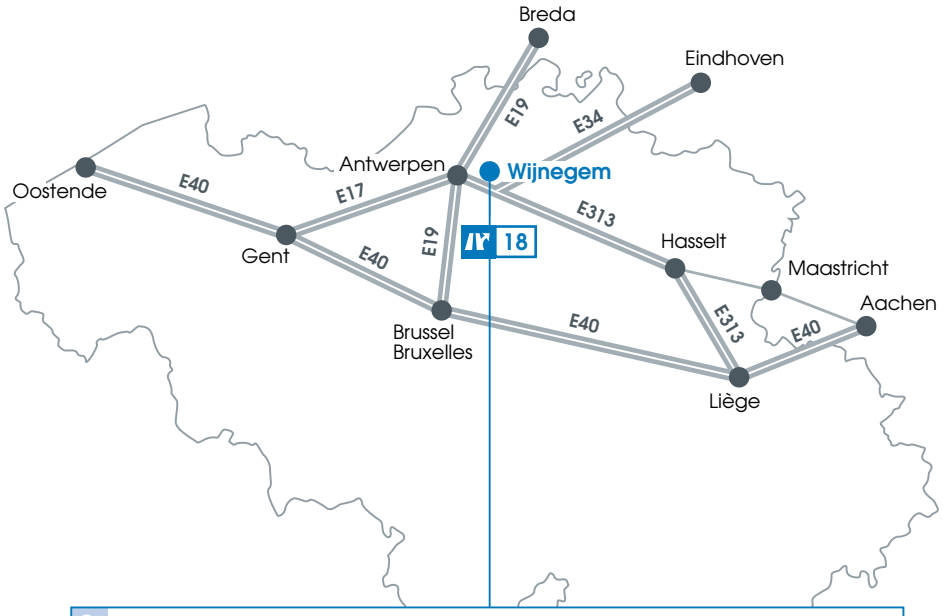
Please see our catalog
also on our website!

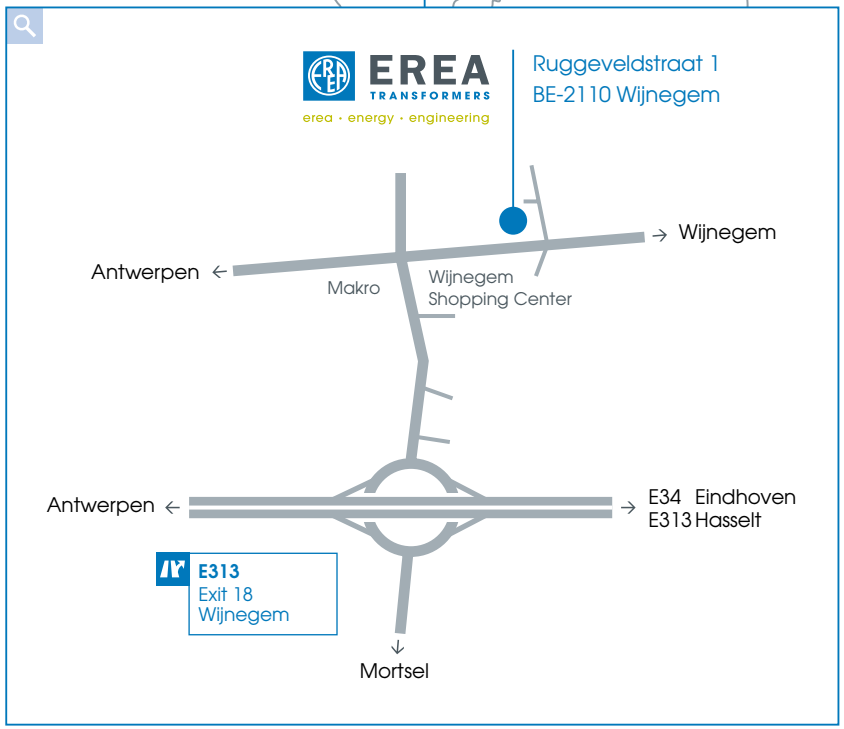
**www.shop.erea.be**


**EREA Energy Engineering bv**
Ruggeveldstraat 1
BE 2110 Wijnegem
tel. BE +32 (0)3 355 16 00
tel. FR +33 (0)4 81 68 08 12
tel. NL +31 (0)183 788 108
fax +32 (0)3 355 16 01
sales@erea.be
**www.erea.be**



Edition 2020




# Technical information

EN

DE

EN

DE

# Technical information

## Auto transformers – Classic Range – EN60076-11 – Chapter 6.4

| Ps VA | Type | Upri = 3 x 230V Y+N or 3 x 400V Y+N | Upri 230V Y+N Ipri A | Type C A | Type D A | Upri 400V Y+N Ipri A | Type C A | Type D A | Usec 230V Y+N Isec A | Type C A | Usec 400V Y+N Isec A | Type C A | IP20 cover Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2750 | ATT 2750 | | 6,97 | 20 | 10 | 4,01 | 16 | 8 | 6,90 | 8 | 3,97 | 4 | K20EI190 |
| 4400 | ATT 4400 | | 11,2 | 32 | 20 | 6,46 | 20 | 13 | 11,0 | 12 | 6,35 | 8 | K20EI190 |
| 6800 | ATT 6800 | | 17,2 | 50 | 25 | 9,87 | 32 | 16 | 17,1 | 20 | 9,81 | 10 | K20EI220 |
| 11000 | ATT 11000 | | 27,8 | – | 40 | 16,0 | 50 | 25 | 27,6 | 32 | 15,9 | 16 | U 222 752 |
| 17500 | ATT 17500 | | 44,1 | – | 63 | 25,4 | 63 | 32 | 43,9 | 50 | 25,3 | 25 | U 222 752 |
| 25000 | ATT 25000 | | 63,0 | – | 80 | 36,2 | – | 40 | 62,8 | 63 | 36,1 | 40 | U 2222 720 |
| 40000 | ATT 40000 | | 101 | – | 125 | 58,2 | – | 63 | 100 | 100 | 57,7 | 63 | U 2222 721 |
| 50000 | ATT 50000 | | 126 | 160 (*) | | 72,5 | – | 80 | 125 | 125 | 72,2 | 80 | U 2222 721 |
| 63000 | ATT 63000 | | 158 | 200 (*) | | 90,9 | – | 100 | 158 | 160 (*) | 90,9 | 100 | U 2222 721 |
| 95000 | ATT 95000 | | 241 | 250 (*) | | 139 | 160 (*) | | 238 | 250 (*) | 137 | 160 (*) | U 2222 722 |
| 120000 | ATT 120000 | | 304 | 400 (*) | | 175 | 200 (*) | | 301 | 320 (*) | 173 | 200 (*) | U 2222 723 |
| 145000 | ATT 145000 | | 368 | 500 (*) | | 212 | 250 (*) | | 364 | 400 (*) | 209 | 250 (*) | U 2222 723 |

## Separating-transformers – Classic Range – EN60076-11 – Chapter 6.1 – 6.2

| Ps VA | Type | Upri = 3 x 230V Δ or 3 x 400V Y+N | Upri = 3 x 400V Δ | Upri 230V Δ Ipri A | Type C A | Type D A | Upri 400V Y+N Ipri A | Type C A | Type D A | Usec 230V Δ Isec A | Type C A | Usec 400V Y+N Isec A | Type C A | IP20 cover Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | – | | | | Upri 400V Δ | | | Usec 230V Δ | | Usec 400V Y+N | | IP20 cover |
| 1000 | SPT 1000 | | SPT 1000/D | 2,68 | 10 | 6 | 1,52 | 6 | 3 | 2,51 | 3 | 1,44 | 2 | K20EI150 |
| 1600 | SPT 1600 | | SPT 1600/D | 4,26 | 16 | 8 | 2,43 | 10 | 6 | 4,02 | 4 | 2,31 | 3 | K20EI190 |
| 2500 | SPT 2500 | | SPT 2500/D | 6,57 | 25 | 13 | 3,80 | 16 | 8 | 6,28 | 8 | 3,61 | 4 | K20EI220 |
| 4000 | SPT 4000 | | SPT 4000/D | 10,6 | 32 | 16 | 6,10 | 20 | 10 | 10,0 | 10 | 5,77 | 6 | U 222 752 |
| 6300 | SPT 6300 | | SPT 6300/D | 16,5 | 63 | 32 | 9,50 | 40 | 20 | 15,8 | 16 | 9,09 | 10 | U 222 752 |
| 10000 | SPT 10000 | | SPT 10000/D | 26,1 | – | 50 | 15,0 | 63 | 32 | 25,1 | 25 | 14,4 | 16 | U 2222 720 |
| 16000 | SPT 16000 | | SPT 16000/D | 42,3 | – | 63 | 24,3 | – | 40 | 40,2 | 40 | 23,1 | 25 | U 2222 720 |
| 20000 | SPT 20000 | | SPT 20000/D | 52,5 | – | 80 | 30,2 | – | 50 | 50,2 | 50 | 28,9 | 32 | U 2222 720 |
| 25000 | SPT 25000 | | SPT 25000/D | 65,1 | – | 100 | 37,4 | – | 63 | 62,8 | 63 | 36,1 | 40 | U 2222 720 |
| 31500 | SPT 31500 | | SPT 31500/D | 81,5 | – | 125 | 46,9 | – | 80 | 79,1 | 80 | 45,5 | 50 | U 2222 722 |
| 40000 | SPT 40000 | | SPT 40000/D | 102 | 160 (*) | | 59,1 | – | 100 | 100 | 100 | 57,7 | 63 | U 2222 722 |
| 50000 | SPT 50000 | | SPT 50000/D | 129 | 200 (*) | | 74,4 | – | 125 | 126 | 125 | 72,2 | 80 | U 2222 723 |
| 63000 | SPT 63000 | | SPT 63000/D | 162 | 250 (*) | | 93,1 | 160 (*) | | 158 | 160 (*) | 90,9 | 100 | U 2222 723 |
| 80000 | SPT 80000 | | SPT 80000/D | 206 | 320 (*) | | 118 | 200 (*) | | 200 | 200 (*) | 115 | 125 | K20EI500/004 |
| 100000 | SPT 100000 | | SPT 100000/D | 258 | 400 (*) | | 148 | 250 (*) | | 251 | 250 (*) | 144 | 160 (*) | K20EI500/003 |

## Isolating-transformers – Energy Efficient – EN61558-2-4 – Chapter 6.3

| Ps VA | Type | Upri = 3 x 230V Δ or 3 x 400V Y+N | Upri = 3 x 400V Δ | Upri 230V Δ Ipri A | Type C A | Type D A | Upri 400V Y+N Ipri A | Type C A | Type D A | Usec 230V Δ Isec A | Type C A | Usec 400V Y+N Isec A | Type C A | IP20 cover Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | – | | | | Upri 400V Δ | | | Usec 230V Δ | | Usec 400V Y+N | | IP20 cover |
| 1000 | SPT 1000/BTE | | SPT 1000/D/BTE | 2,63 | 10 | 6 | 1,52 | 6 | 3 | 2,51 | 3 | 1,44 | 2 | K20BTE/005 |
| 1600 | SPT 1600/BTE | | SPT 1600/D/BTE | 4,17 | 16 | 8 | 2,41 | 10 | 6 | 4,02 | 4 | 2,31 | 3 | K20BTE/010 |
| 2500 | SPT 2500/BTE | | SPT 2500/D/BTE | 6,5 | 25 | 13 | 3,75 | 16 | 8 | 6,28 | 8 | 3,61 | 4 | K20BTE/020 |
| 4000 | SPT 4000/BTE | | SPT 4000/D/BTE | 10,4 | 32 | 16 | 5,99 | 20 | 10 | 10,0 | 10 | 5,77 | 6 | K20BTE/030 |
| 6300 | SPT 6300/BTE | | SPT 6300/D/BTE | 16,3 | 63 | 32 | 9,41 | 40 | 20 | 15,8 | 16 | 9,09 | 10 | K20BTE/030 |
| 10000 | SPT 10000/BTE | | SPT 10000/D/BTE | 25,9 | – | 50 | 14,9 | 63 | 32 | 25,1 | 25 | 14,4 | 16 | K20BTE/040 |
| 11000 | ECT 11000/IRC | | ECT 11000/D/IRC | 28,6 | 32 | 32 | 16,5 | 16 | 16 | – | – | 16 | 16 | K20ECT/040 |
| 16000 | SPT 16000/BTE | | SPT 16000/D/BTE | 41,2 | – | 63 | 23,7 | – | 40 | 40,2 | 40 | 23,1 | 25 | K20BTE/040 |
| 20000 | SPT 20000/BTE | | SPT 20000/D/BTE | 51,4 | – | 80 | 29,5 | – | 50 | 50,2 | 50 | 28,9 | 32 | K20BTE/050 |
| 22000 | ECT 22000/IRC | | ECT 22000/D/IRC | 57,2 | 63 | 63 | 33,0 | 32 | 32 | – | – | 32 | 32 | K20ECT/050 |
| 25000 | SPT 25000/BTE | | SPT 25000/D/BTE | 64,1 | – | 100 | 36,9 | – | 63 | 62,8 | 63 | 36,1 | 40 | K20BTE/050 |
| 31500 | SPT 31500/BTE | | SPT 31500/D/BTE | 80,6 | – | 125 | 46,4 | – | 80 | 79,1 | 80 | 45,5 | 50 | K20BTE/060 |
| 44000 | ECT 44000/IRC | | ECT 44000/D/IRC | 112,0 | 125 | 125 | 64,8 | 63 | 63 | – | – | 63 | 63 | K20ECT/060 |

(*) = MCCB = Moulded Case Circuit Breaker

# Single-phase transformers

## TS – 1 Phase Safety Transformers – EN 61558-2-6 – Chapter 1.2 – 1.3

**IP20**

| Ps VA | types | code | Upri | Usec |
|---|---|---|---|---|
| **Transformers 12V or 24V** | | | | |
| 30 | EDR 212TS30 | 2785 | 0-230-400V | 2x 0-12V |
| 63 | EDR 212TS63 | 2786 | 0-230-400V | 2x 0-12V |
| 100 | EDR 212TS100 | 2787 | 0-230-400V | 2x 0-12V |
| 160 | EDR 212TS160 | 2788 | 0-230-400V | 2x 0-12V |
| 250 | E 212TS250 | 2789 | 0-230-400V | 2x 0-12V |
| 400 | E 212TS400 | 2790 | 0-230-400V | 2x 0-12V |
| **Transformers 24V** | | | | |
| 10 | EDR 24TS10 | 2408 | 0-230-400V | 0-24V |
| 30 | EDR 24TS30 | 2409 | 0-230-400V | 0-24V |
| 63 | EDR 24TS63 | 2401 | 0-230-400V | 0-24V |
| 100 | EDR 24TS100 | 2402 | 0-230-400V | 0-24V |
| 160 | EDR 24TS160 | 2403 | 0-230-400V | 0-24V |
| 250 | E 24TS250 | 2404 | 0-230-400V | 0-24V |
| 400 | E 24TS400 | 2642 | 0-230-400V | 0-24V |
| 630 | E 24TS630 | 2643 | 0-230-400V | 0-24V |

**IP54**

| Ps VA | types | code | Upri | Usec |
|---|---|---|---|---|
| **Transformers 12V or 24V** | | | | |
| 100 | EF 212SC100 | 2047 | 0-230V | 2x 0-12V |
| 160 | EF 212SC160 | 2048 | 0-230V | 2x 0-12V |
| 250 | EF 212SC250 | 2049 | 0-230V | 2x 0-12V |
| 400 | EF 212SC400 | 2050 | 0-230V | 2x 0-12V |
| **Transformers 24V or 48V** | | | | |
| 100 | EF 224SB100 | 2051 | 0-230-400V | 2x 0-24V |
| 160 | EF 224SB160 | 2052 | 0-230-400V | 2x 0-24V |
| 250 | EF 224SB250 | 2053 | 0-230-400V | 2x 0-24V |
| 400 | EF 224SB400 | 2054 | 0-230-400V | 2x 0-24V |
| 630 | EF 224SB630 | 2055 | 0-230-400V | 2x 0-24V |

For higher power ranges - see below: TC series

## TC – 1 Phase Control Transformers – EN 61558-2-2 – Chapter 3

**IP20**

| Ps VA | types | code | Upri | Usec | Oproepvermogen VA | |
|---|---|---|---|---|---|---|
| **Transformers 24V (IP20)** | | | | | | |
| 40 | EDR 24TC40 | 2220 | 15-0-230-400V | 0-0-24V | 90 | |
| 63 | EDR 24TC63 | 2221 | 15-0-230-400V | 0-0-24V | 160 | |
| 100 | EDR 24TC100 | 2222 | 15-0-230-400V | 0-0-24V | 260 | |
| 160 | EDR 24TC160 | 2223 | 15-0-230-400V | 0-0-24V | 430 | |
| 250 | E 24TC250 | 2224 | 15-0-230-400V | 0-0-24V | 680 | |
| 400 | E 24TC400 | 2225 | 15-0-230-400V | 0-24V | 1100 | |
| 630 | E 24TC630 | 2226 | 15-0-230-400V | 0-24V | 1800 | |
| **Transformers 24V or 48V (IP00)** | | | | | | **IP20 Cover** |
| 1000 | 224TC1000 | 2227 | 15-0-230-400V | 2x 0-24V | 3200 | U 22 763 |
| 1600 | 224TC1600 | 2228 | 15-0-230-400V | 2x 0-24V | 5300 | U 22 757 |
| 2500 | 224TC2500 | 2229 | 15-0-230-400V | 2x 0-24V | 8200 | U 22 757 |
| **Transformers 230V (IP20)** | | | | | | |
| 40 | EDR 230TC40 | 2200 | 15-0-230-400V | 0-0-230V | 90 | |
| 63 | EDR 230TC63 | 2201 | 15-0-230-400V | 0-0-230V | 160 | |
| 100 | EDR 230TC100 | 2202 | 15-0-230-400V | 0-0-230V | 260 | |
| 160 | EDR 230TC160 | 2203 | 15-0-230-400V | 0-0-230V | 430 | |
| 250 | E 230TC250 | 2204 | 15-0-230-400V | 0-0-230V | 680 | |
| 400 | E 230TC400 | 2205 | 15-0-230-400V | 0-0-230V | 1100 | |
| 630 | E 230TC630 | 2206 | 15-0-230-400V | 0-0-230V | 1800 | |
| **Transformers 115V or 230V (IP00)** | | | | | | **IP20 Cover** |
| 1000 | 230TC1000 | 2207 | 15-0-230-400V | 2x 0-115V | 3200 | U 22 763 |
| 1600 | 230TC1600 | 2208 | 15-0-230-400V | 2x 0-115V | 5300 | U 22 757 |
| 2500 | 230TC2500 | 2209 | 15-0-230-400V | 2x 0-115V | 8200 | U 22 757 |
| 3700 | 230EC3700/IRC | 11536 | 15-0-230V | 0-0-230V | 11000 | K20EC/030 |
| 4000 | 230TC4000 | 2210 | 15-0-230-400V | 2x 0-115V | 11000 | U 222 751 |
| 6300 | 230TC6300 | 2211 | 15-0-230-400V | 2x 0-115V | 17000 | U 222 748 |
| 7400 | 230EC7400/IRC | 11537 | 15-0-230V | 0-0-230V | 20000 | K20EC/035 |
| 10000 | 230TC10000 | 2212 | 15-0-230-400V | 2x 0-115V | 27000 | U 222 748 |
| 11000 | 230EC11000/IRC | 11580 | 15-0-230V | 0-0-230V | 30000 | K20EC/045 |

### IP20-23-65 Cover – Chapter 9

**Legend**

| | |
|---|---|
| E | Encapsulated with synthetic resin |
| EDR | DIN-rail montable |
| EF | IP54 |
| 0-0 | Double zero-terminal |
| 15-0-... | Terminal +15V primary side |
| EN | European Norm |
| Ps | Apparent Power |
| IRC | Low inrush current transformer |
| | Compatible charging point e-vehicle |
| | Primary protection type C or D: depending form network impedance |

## TI – 1 Phase Isolating Transformers – EN 61558-2-4 – Chapter 2.2 – 2.3

**IP20**

| Ps VA | types | code | Upri | Usec |
|---|---|---|---|---|
| **Transformers 115V or 230V** | | | | |
| 63 | EDR 2115TI63 | 3980 | 0-230-400V | 2x 0-115V |
| 100 | EDR 2115TI100 | 3981 | 0-230-400V | 2x 0-115V |
| 160 | EDR 2115TI160 | 3982 | 0-230-400V | 2x 0-115V |
| 250 | E 2115TI250 | 3983 | 0-230-400V | 2x 0-115V |
| 400 | E 2115TI400 | 3984 | 0-230-400V | 2x 0-115V |
| 630 | E 2115TI630 | 3985 | 0-230-400V | 2x 0-115V |
| **Transformers 230V** | | | | |
| 63 | EDR 230TI63 | 2301 | 0-230-400V | 0-0-230V |
| 100 | EDR 230TI100 | 2302 | 0-230-400V | 0-0-230V |
| 160 | EDR 230TI160 | 2303 | 0-230-400V | 0-0-230V |
| 250 | E 230TI250 | 2304 | 0-230-400V | 0-0-230V |
| 400 | E 230TI400 | 2635 | 0-230-400V | 0-0-230V |
| 630 | E 230TI630 | 2636 | 0-230-400V | 0-0-230V |

**IP54**

| Ps VA | types | code | Upri | Usec |
|---|---|---|---|---|
| **Transformers 115V or 230V** | | | | |
| 100 | EFSP 100 | 2065 | 0-230-400V | 2x 0-115V |
| 160 | EFSP 160 | 2066 | 0-230-400V | 2x 0-115V |
| 250 | EFSP 250 | 2067 | 0-230-400V | 2x 0-115V |
| 400 | EFSP 400 | 2068 | 0-230-400V | 2x 0-115V |
| 630 | EFSP 630 | 2069 | 0-230-400V | 2x 0-115V |

For higher power ranges – see above: TC series

Available in stock
Warranty 3 years

| Type | DR-SPS 75W12V/BTE | DR-SPS 75W24V/BTE | DR-SPS 120W12V/BTE | DR-SPS 120W24V/BTE | DR-SPS 240W24V/BTE | DR-SPS 480W24V/BTE | DR-SPS-B 120W24V | DR-SPS-B 240W24V |
|---|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |  |
| Code | 11810 | 11809 | 11808 | 11807 | 11806 | 11805 | 9859 | 9860 |
| Power (W) | 75 W | 75 W | 120 W | 120 W | 240 W | 480 W | 120 W | 240 W |
| $V_{AC}$ Input ($V_{AC}$) | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 180-550 $V_{AC}$ | 180-550 $V_{AC}$ |
| $V_{DC}$ Input ($V_{DC}$) | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 254-780 $V_{DC}$ | 254-780 $V_{DC}$ |
| $V_{DC}$ Out ($V_{DC}$) | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ |
| $V_{DC}$ Out: Adjustable ($V_{DC}$) | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ |
| $I_{DC}$ Nominal current out (A) | 6,3 A | 3,2 A | 10,0 A | 5,0 A | 10,0 A | 20,0 A | 5,0 A | 10,0 A |
| Input Current (A) | 1,45 A/115 V<br>0,9 A/230 V | 1,45 A/115 V<br>0,9 A/230 V | 2,25 A/115 V<br>1,3 A/230 V | 2,25 A/115 V<br>1,3 A/230 V | 2,5 A/115 V<br>1,3 A/230 V | 4,8 A/115 V<br>2,4 A/230 V | 0,55 A/400 V<br>1,2 A/230 V | 1,0 A/400 V<br>2,0 A/230 V |
| Inrush Current (A) | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 50 A | 50 A |
| Ripple (mV) | 80 mVp-p | 120 mVp-p | 100 mVp-p | 120 mVp-p | 150 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p |
| Efficiency (%) | 85,5% | 88% | 85,5% | 88% | 88,5% | 92,5% | 91% | 90% |
| Protection – Overload (%) (1) | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% |
| Protection – Overvoltage ($V_{DC}$) | 14-17 $V_{DC}$ | 29-33 $V_{DC}$ | 14-17 $V_{DC}$ | 29-33 $V_{DC}$ | 29-33 $V_{DC}$ | 29-33 $V_{DC}$ | 130-150% | 130-150% |
| DC OK | Led | Led | Led | Led | Led | Led | Relay Contact | Relay Contact |
| Operating temperature range (°C) | -20 +70 °C | -20 +70 °C | -20 +70 °C | -20 +70 °C | -20 +70 °C | -20 +70 °C | -25 +70 °C | -30 +70 °C |
| $t_a$ ambient temperature (°C) | 45 °C | 45 °C | 50 °C | 50 °C | 50 °C | 50 °C | 60 °C | 50 °C |
| Dimensions (w x h x d) (mm) | 32 x 125,2 x 102 | 32 x 125,2 x 102 | 40 x 125,2 x 113,5 | 40 x 125,2 x 113,5 | 63 x 125,2 x 113,5 | 85,5 x 125,2 x 128,5 | 40 x 126 x 114 | 63 x 126 x 114 |
| Weight (kg) | 0,51 kg | 0,51 kg | 0,60 kg | 0,60 kg | 1,00 kg | 1,50 kg | 0,70 kg | 1,12 kg |

(1) Overload: constant current limiting - Autorecovery / Overtemperature: Power Shut Down - Autorecovery

**NEW** **Evolution – BTE – Energy efficient** blue e³ CE

**Broad** CE UL

Available in stock
Warranty 3 years

| Type | DR-SPS-M 60W12V/BTE | DR-SPS-M 60W24V/BTE | DR-SPS-M 100W12V/BTE | DR-SPS-M 100W24V/BTE | DR-SPS-N 40W12V | DR-SPS-N 40W24V | DR-SPS-N 100W12V | DR-SPS-N 100W24V |
|---|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |  |
| Code | 11812 | 11811 | 11826 | 11827 | 9857 | 9858 | 9855 | 9856 |
| Power (W) | 60 W | 60 W | 100 W | 100 W | 40 W | 40 W | 100 W | 100 W |
| $V_{AC}$ Input ($V_{AC}$) | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ |
| $V_{DC}$ Input ($V_{DC}$) | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ |
| $V_{DC}$ Out ($V_{DC}$) | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ |
| $V_{DC}$ Out: Adjustable ($V_{DC}$) | 11-13 $V_{DC}$ | 22-26 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ |
| $I_{DC}$ Nominal current out (A) | 5,0 A | 2,5 A | 8,4 A | 4,2 A | 3,3 A | 1,7 A | 7,5 A | 4,0 A |
| Input Current (A) | 1,2 A/115 V<br>0,8 A/230 V | 1,2 A/115 V<br>0,8 A/230 V | 3 A/115 V<br>1,6 A/230 V | 3 A/115 V<br>1,6 A/230 V | 1,1A/115 V<br>0,7A/230 V | 1,1 A/115 V<br>0,7 A/230 V | 1,3 A/115 V<br>0,8 A/230 V | 1,3 A 115 V<br>0,8 A/230 V |
| Inrush Current (A) | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>50 A/230 V | 30 A/115 V<br>50 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V |
| Ripple (mV) | 120 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p |
| Efficiency (%) | 88% | 90% | 88% | 90% | 86% | 88% | 85% | 86% |
| Protection – Overload (%) (1) | 105-160% | 105-160% | 102-110% | 102-110% | 105-150% | 105-150% | 105-150% | 105-150% |
| Protection – Overvoltage ($V_{DC}$) | 14,2-16,2% | 30-36% | 14,2-16,2% | 30-36% | 125-150% | 125-150% | 125-150% | 125-150% |
| DC OK | Led | Led | Led | Led | Relay Contact | Relay Contact | Relay Contact | Relay Contact |
| Operating temperature range (°C) | -30 +70 °C | -30 +70 °C | -30 +70 °C | -30 +70 °C | -20 +70 °C | -20 +70 °C | -20 +60 °C | -20 +60 °C |
| $t_a$ ambient temperature (°C) | 45 °C | 45 °C | 40 °C | 40 °C | 60 °C | 60 °C | 40 °C | 40 °C |
| Dimensions (w x h x d) (mm) | 52 x 90 x 54,5 | 52 x 90 x 54,5 | 70 x 90 x 54,5 | 70 x 90 x 54,5 | 40 x 90 x 100 | 40 x 90 x 100 | 55 x 90 x 100 | 55 x 90 x 100 |
| Weight (kg) | 0,19 kg | 0,19 kg | 0,27 kg | 0,27 kg | 0,32 kg | 0,32 kg | 0,45 kg | 0,45 kg |

(1) Overload: constant current limiting - Autorecovery / Overtemperature: Power Shut Down - Autorecovery

NEW **Modular – BTE – Energy efficient** blue e3 CE

**Narrow** CE UL

EREA
TRANSFORMERS
erea · energy · engineering

CERTIFIED ISO 9001:2015 COMPANY

QUALITY PRODUCT EREA MADE IN BELGIUM

## Single phase / Einphasig

230V
L N PE

ΔU[N⟷PE]

= 0V

NO
TRANSFORMER
KEIN
TRANSFORMATOR

Charging station / Ladestation

16A 32A 48A

≠ 0V

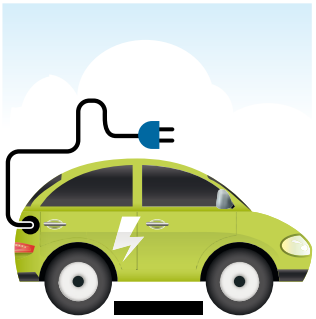
Transfo type:
230EC3700/IRC (16A)
230EC7400/IRC (32A)
230EC11000/IRC (48A)

230V
L1 L2 PE

Transfo type:
230EC3700/IRC (16A)
230EC7400/IRC (32A)
230EC11000/IRC (48A)

Charging station / Ladestation

16A 32A 48A



## Tree-phase / Dreiphasig

3 x 230V
L1 L2 L3 PE

Transfo type:
ECT11000/IRC (16A)
ECT22000/IRC (32A)
ECT44000/IRC (63A)

Charging station / Ladestation

16A 32A 63A

3 x 400V + N
L1 L2 L3 N PE

ΔU[N⟷PE]

≠ 0V

Transfo type:
ECT11000/IRC (16A)
ECT22000/IRC (32A)
ECT44000/IRC (63A)

= 0V

NO
TRANSFORMER
KEIN
TRANSFORMATOR

Charging station / Ladestation

16A 32A 63A

Edition - 2019-09-17 - ECT

EREA TRANSFORMERS
erea · energy · engineering

EC and ECT series
Isolating transformers for coupling
Charging stations - Low inrush current

blue e3 easy start low inrush current IRC

| Charging station type | | Single phase - 16A | Single phase - 32A | Single phase - 48A | Three-phase - 16A | Three-phase - 32A | Three-phase - 63A |
|---|---|---|---|---|---|---|---|
| **Transformer type** | | **230EC 3700/IRC** | **230EC 7400/IRC** | **230EC 11000/IRC** | **ECT 11000/IRC** | **ECT 22000/IRC** | **ECT 44000/IRC** |
| Transformer code | | 11536 | 11537 | 11580 | 11538 | 11539 | 11582 |
| Power | | 3,7 kVA | 7,4 kVA | 11 kVA | 11 kVA | 22 kVA | 44 kVA |
| U primary | | 230V-245V | 230V-245V | 230V-245V | 230V Δ/400V Y+N | 230V Δ/400V Y+N | 230V Δ/400V Y+N |
| U secondary | | 230V+N | 230V+N | 230V+N | 400V Y+N | 400V Y+N | 400V Y+N |
| I primary (230V ) | | 16,5A | 32,9A | 49A | 28,6A | 57,2A | 112A |
| I primary (400V Y+N) | | | | | 16,5A | 33A | 64,7A |
| I Sec (1ph: 230V / 3ph: 400V Y+N) | | 16A | 32A | 48A | 16A | 32A | 63A |
| Protection primary | | 16A type C | 32A type C | 50A type C | 230V Δ - 32A type C | 230V Δ - 63A type C | 230V Δ - 125A type C |
| | | | | | 400V Y - 16A type C | 400V Y - 32A type C | 400V Y - 63A type C |
| Protection secondary | | 16A type C | 32A type C | 50A type C | 16A type C | 32A type C | 63A type C |
| No-load losses - PFe (W) | | 42 | 45 | 40 | 58 | 75 | 114 |
| Full-load losses - Pcu (W) | | 78 | 152 | 190 | 222 | 578 | 858 |
| Efficiency - (%) | | 96,9 | 97,4 | 98,0 | 97,5 | 97,2 | 97,8 |
| Voltage drop - dU(%) | | 2,1 | 2,1 | 1,7 | 2,0 | 2,6 | 2,0 |
| Dimensions | | | | | | | |
| mm | Length - A | 240 | 280 | 320 | 420 | 480 | 640 |
| mm | Width - B | 200 | 230 | 260 | 270 | 270 | 390 |
| mm | Height - C | 225 | 365 | 415 | 365 | 415 | 500 |
| mm | Distance between holes - D | 200 | 180 | 210 | 280 | 320 | 400 |
| mm | Distance between holes - E | 177 | 178 | 220 | 223 | 240 | 245 |
| mm | Hole diameter - Ø | 11 | 11,5 | 11,5 | 11 | 11 | 11 |
| kg | Weight | 45 | 76 | 107 | 121 | 168 | 314 |
| Type of enclosure IP20 | | K20EC/030 | K20EC/035 | K20EC/045 | K20ECT/040 | K20ECT/050 | K20ECT/060 |
| | Code | 11540 | 11541 | 11581 | 11542 | 11543 | 11583 |
| mm | Dimensions AxBxC | 270x250x240 | 307x268x420 | 350x355x470 | 460x320x420 | 530x320x470 | 660x470x560 |
| kg | Weight | 3,3 | 5,6 | 8,6 | 8,3 | 9,0 | 15,2 |
| Type omkapping IP23 | | K23EC/030 | K23EC/035 | K23EC/045 | K23ECT/040 | K23ECT/050 | K23ECT/060 |
| | Code | 11544 | 11545 | 11603 | 11546 | 11547 | 11604 |
| mm | Dimensions AxBxC | 290x353x240 | 325x370x420 | 370x460x470 | 480x435x420 | 550x420x470 | 680x570x560 |
| kg | Weight | 5,7 | 8,4 | 12,5 | 12,7 | 14 | 20 |
| Type Silentblock | | SILENT BLOCK 20 | SILENT BLOCK 50 | SILENT BLOCK 50 | SILENT BLOCK 50 | SILENT BLOCK 50 | SILENT BLOCK 120 |
| | Code | 12143 | 11483 | 11483 | 11483 | 11483 | 11484 |

EREA TRANSFORMERS

erea · energy · engineering

## Single phase / Einphasig

230V
L N PE

ΔU[N⟷PE]

= 0V

NO TRANSFORMER
KEIN TRANSFORMATOR

≠ 0V

Transfo type:
230PV xxxx/IRC
On demand
Auf Anfrage

Photovoltaic panels / Photovoltaikmodule

4A >up to … / > bis zu … 50A

230V
L1 L2 PE

Transfo type:
230PV xxxx/IRC
On demand
Auf Anfrage

Photovoltaic panels / Photovoltaikmodule

4A >up to … / > bis zu … 50A

## Tree-phase / Dreiphasig

3 x 230V
L1 L2 L3 PE

Transfo type:
PVTxxxxxx/IRC
See rear side
Siehe Rückseite

Photovoltaic panels / Photovoltaikmodule

10A >up to … / > bis zu … 80A

3 x 400V + N
L1 L2 L3 N PE

ΔU[N⟷PE]

≠ 0V

Transfo type:
PVTxxxxxx/IRC
See rear side
Siehe Rückseite

= 0V

NO TRANSFORMER
KEIN TRANSFORMATOR

Photovoltaic panels / Photovoltaikmodule

10A >up to … / > bis zu … 80A

Edition - 2019-09-17 - PVT

EREA TRANSFORMERS

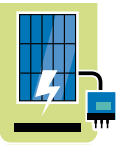
erea · energy · engineering

PVT series

Isolating transformers for coupling photovoltaic inverters

Low inrush current

blue e3 easy start low inrush current IRC



| Inverter type | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Transformer type** | | **PVT6000/IRC** | **PVT8000/IRC** | **PVT10000/IRC** | | **PVT15000/IRC** | **PVT20000/IRC** | **PVT25000/IRC** | **PVT40000/IRC** | **PVT50000/IRC** |
| Transformer code | | 11846 | 11847 | 11848 | | 11849 | 11850 | 11851 | 11852 | 11853 |
| Power | | 6 kVA | 8 kVA | 10 kVA | | 15 kVA | 20 kVA | 25 kVA | 40 kVA | 50 kVA |
| U primary | | 230V Δ / 400V Y+N | 230V Δ / 400V Y+N | 230V Δ / 400V Y+N | | 230V Δ / 400V Y+N | 230V Δ / 400V Y+N | 230V Δ / 400V Y+N | 230V Δ / 400V Y+N | 230V Δ / 400V Y+N |
| U secondary | | 400V Y+N | 400V Y+N | 400V Y+N | | 400V Y+N | 400V Y+N | 400V Y+N | 400V Y+N | 400V Y+N |
| I primary (230V Δ) | | 15,1A | 20,1A | 25,1A | | 37,6A | 50,1A | 62,7A | 100A | 125A |
| I primary (400V Y+N) | | 8,7A | 11,6A | 14,5A | | 21,7A | 29A | 36,2A | 57,9A | 72,4A |
| I secondary (400V Y+N) | | 8,7A | 11,6A | 14,4A | | 21,67A | 28,9A | 36,1A | 57,7A | 72,2A |
| Protection primary (230V Δ) | | 230V Δ - 16A type C | 230V Δ - 20A type C | 230V Δ - 25A type C | | 230V Δ - 40A type C | 230V Δ - 50A type C | 230V Δ - 63A type C | 230V Δ - 100A type C | 230V Δ - 125A type C |
| Protection primary (400V Y+N) | | 400V Y - 10A type C | 400V Y - 13A type C | 400V Y - 16A type C | | 400V Y - 25A type C | 400V Y - 32A type C | 400V Y - 40A type C | 400V Y - 63A type C | 400V Y - 80A type C |
| Protection secondary (400V Y+N) | | 10A type C | 13A type C | 16A type C | | 25A type C | 32A type C | 40A type C | 63A type C | 80A type C |
| No-load losses - PFe (W) | | 30 | 40 | 45 | | 55 | 60 | 65 | 110 | 130 |
| Full-load losses - Pcu (W) | | 140 | 170 | 220 | | 440 | 500 | 660 | 730 | 940 |
| Efficiency - (%) | | 97,2 | 97,4 | 97,4 | | 96,8 | 97,3 | 97,2 | 97,9 | 97,9 |
| Voltage drop - dU(%) | | 2,1 | 2,1 | 2,1 | | 2,9 | 2,5 | 2,6 | 1,8 | 1,9 |
| Dimensions: | | | | | | | | | | |
| mm | Length - A | 420 | 420 | 420 | | 480 | 480 | 640 | 640 | 640 |
| mm | Width - B | 210 | 240 | 240 | | 370 | 400 | 360 | 430 | 460 |
| mm | Height - C | 365 | 365 | 365 | | 415 | 415 | 500 | 500 | 500 |
| mm | Distance between holes - D | 280 | 280 | 280 | | 320 | 320 | 400 | 400 | 400 |
| mm | Distance between holes - E | 163 | 193 | 193 | | 210 | 240 | 180 | 245 | 275 |
| mm | Hole diameter - Ø | 11 | 11 | 11 | | 11 | 11 | 11 | 11 | 11 |
| kg | Weight | 85 | 100 | 110 | | 140 | 185 | 215 | 320 | 360 |
| Type of enclosure IP20 | | K20PVT/006 | K20PVT/010 | K20PVT/010 | | K20PVT/015 | K20PVT/020 | K20PVT/025 | K20PVT/040 | K20PVT/050 |
| Code | | 11854 | 11856 | 11856 | | 11858 | 11862 | 11864 | 11866 | 11868 |
| mm | Dimensions AxBxC | 460x260x420 | 460x290x420 | 460x290x420 | | 530x390x470 | 530x420x470 | 660x400x560 | 660x470x560 | 660x500x560 |
| kg | Weight | 7,5 | 7,9 | 7,9 | | 14,5 | 15,0 | 18,8 | 19,4 | 20,0 |
| Type of enclosure IP23 | | K23PVT/006 | K23PVT/010 | K23PVT/010 | | K23PVT/015 | K23PVT/020 | K23PVT/025 | K23PVT/040 | K23PVT/050 |
| Code | | 11855 | 11857 | 11857 | | 11859 | 11863 | 11865 | 11867 | 11869 |
| mm | Dimensions AxBxC | 480x375x420 | 480x405x420 | 480x405x420 | | 550x490x470 | 550x520x470 | 680x500x560 | 680x570x560 | 680x600x560 |
| kg | Weight | 11,7 | 12,2 | 12,2 | | 17,5 | 18,3 | 24,3 | 25,2 | 25,8 |
| Type Silentblock | | SILENT BLOCK 50 | SILENT BLOCK 50 | SILENT BLOCK 50 | | SILENT BLOCK 50 | SILENT BLOCK 50 | SILENT BLOCK 75 | SILENT BLOCK 120 | SILENT BLOCK 120 |
| Code | | 11483 | 11483 | 11483 | | 11483 | 11483 | 11459 | 11484 | 11484 |

# Transformer types

**separating transformer** (fig. 1)

Is a transformer that has primary and secondary windings electrically isolated by mxeans of basic insulation, so as to limit, in the circuit fed by the secondary winding, the risks in the event of accidental simultaneous contact with earth and live parts.

**isolating transformer** (fig. 1)

Is a separating transformer that has primary and secondary windings electrically isolated by means of double or reinforced insulation.

Frequent applications are:

- Voltage change.
  These types can only transform 230 V or 400 V mains voltage to 230 V or 115 V (depending on type).
- Change of earthing system (= neutral distribution system).
  For reasons of operational and personal safety against indirect contact you can choose to change (several times) from neutral system. By choosing not to earth the secondary side of the isolating transformer, an IT-net is obtained, providing the best guarantees for operational continuity. Typical examples are complex production processes, medical rooms and rooms with increased danger of explosion. Attention should always be paid to personal safety.
- User protection in distorted systems.
  Non-linear loads (thyristor drives, speed controls…) often cause harmonics and parasitical currents on the net. By using an isolating transformer, the galvanic separation between the windings will sweep away the distortions on the primary side. More sensitive users (e.g. computerised processes) will thus be protected, in favour of life span and reliability.
  On demand these transformers can be equipped with an earthed screen between both windings to further clear away distortions.

**safety transformer** (fig. 1)

Isolating transformer used to supply safety extra low voltage (SELV) circuits (safety voltage ≤ 50 V).

Frequent applications are:

- see isolating transformers
- changing the voltage to safety extra-low voltage to ensure personal safety. eg. portable tools, bells, toys… although here additional regulations apply.

**control transformer** (fig. 1)

These transformers have at least a basic isolation between primary and secondary windings and are required for machine control circuits (cf. EN 60 204 – 1).

Frequent applications are:

- Contactor control circuits, signalling, interlocking…
  For this application, the transformer often needs to generate a higher power for a short period of time, without wanting to influence the secondary voltage.
- Voltage change.
  Apart from transforming the tension from 230 or 400V to 24 or 230V, a small correction can be carried out on the primary side by means of a voltage tap.
  EREA control transformers have double or reinforced isolation between the windings. Therefor control transformers operating at safety extra low voltage can be used in humid conditions or for personal safety against indirect contact.
- User protection in distorted systems.
  See also isolating transformers.

Remark: the single-phase control transformers with a power up to 630VA are equipped on the secondary side with a double zero terminal. This terminal is interconnected with one end of the winding. This allows for a proper connection of the earth conductor and prevents an unbalanced secondary circuit.

**auto transformer** (fig. 2)

is a transformer with primary and secondary windings that have a common part.

# Energy-efficient industrial transformers (BTE)

The blue $e^3$ is a new range intended to complete the current standard EREA Industrie isolation transformers. This range has been specifically designed to meet the increasing demand for **more energy-efficient industrial transformers**. EREA Industrie also wants to contribute to the economical management of energy consumption in such a way that also makes life better for the end user. After all, the **greater efficiency** of the EREA Industrie blue $e^3$ range ensures less energy loss. Thanks to this reduced energy loss, the initial extra cost is recuperated after only a few years. And, in comparison with the classic range, even the **initial investment is completely paid back** in the long-term.

**Payback period**

EREA wants to continue to contribute to the efficient use of energy in a way that is beneficial for the end user. After all, the higher efficiency of the EREA blue e³ series (BTE) results in lower energy losses. Compared to the standard transformers, both the core losses and the copper losses were reduced.

Thanks to these lower energy losses, the initial additional cost is already earned back in a few years.

Even more, compared to the Classic range, even the initial investment is fully reimbursed in the longer term. In addition to these ecological and economic benefits, the BTE transformers also have technical advantages over the SPT-Classic series:

The transformer will heat its environment less strongly and also the voltage drop (ΔUsec) will be lower thanks to the lower internal resistance. In addition, they are all designed as isolation transformers (EN61558-2-4)

**BTE – blue e3 – Selection process – customized solution**

1. Evaluate your application and analyze your consumption profile
2. For an average consumption profile for daytime use - make your selection from our BTE series – see our quick product selection card
3. Different consumption profile? – Contact us to produce an even more energy-efficient customized transformer
   – A heavy consumption profile 24/24u – 7/7d ex. telecommunication masts
   – A very low consumption profile– a few hours a day ex. elevators

**Payback period:**

## Transformers with low inrush current (IRC)

easy start low inrush current IRC

**Current peak**

Switching on a transformer is accompanied by a short high current peak on the primary side: the inrush current.

Industrial electricity networks rarely have any problems supplying this current. In residential and tertiary buildings, however, the value of the main circuit breaker of the electrical installation is much smaller. This main circuit breaker is simply often insufficient to supply the current peak needed to switch on the transformer.

Since a few years there has been a steep increase in the number of applications where transformers are needed in homes, shops, offices, ... For example, charging electric cars, heat pumps, …

**Lineprotection with C–type circuit breaker**

To offer a solid solution for these applications, EREA has developed a new range of transformers with a reduced inrush current (IRC range). By providing more core material, we can lower the induction of the transformers and as a result the inrush current decreases also.

As a result, there is no longer any margin to be provided in the electrical installation for switching on the transformer.

The transformers from our IRC range can simply be protected (fused) with a C-type circuit breaker with the nominal current of the transformer.

IRC transformers can thus be used without any problems in situations where the electrical installation can just deliver the nominal power needed.

**Influences**

The magnitude of the inrush current depends on a number of factors.

- The size of the transformer
  The inrush current increases with the size of the transformer, because the volume of iron that needs to be magnetized is increasing.
- The nominal induction of the transformer
  This design parameter of the transformer basically determines the weight, the dimensions, the no-load current and also the inrush current.
- Impedance of the electricity grid
  The greater the network impedance, the more the network will suppress the inrush current. A home in a rural region is often fed via a cable with a length of many kilometers. The greater impedance caused by this longer cable will greatly limit the inrush current. The chance of problems with the inrush current is therefore rather small here.
  In an industrial building, on the other hand, the transformer is connected to the medium-voltage cabin with a short, thick cable. The inrush current will be maximum in this case.
- The exact moment of switching on
  The instantaneous voltage of the electricity grid varies according to a sine wave shape. If the switch-on occurs exactly at the zero crossing of the mains voltage, the switch-on current will be maximum. Because the moment of switching on can always be different, this generates a random factor. It can happen that switching on happens without any problems for weeks, until that one time the transformer is switched on at the exact moment the sine crosses zero.

# Properties of transformers

## Transformer power and typical power

**transformer volume is given by its typical power**

- for a separate winding transformer typical power is equal to its apparent power (fig. 1)
  $P_{type} = P_S$
- for an autotransformer the typical power is lower than the apparent power (fig. 2)

$$P_{type} = \left(\frac{U_1 - U_2}{U_1}\right) \times P_S$$


fig. 1

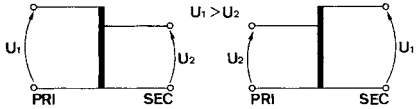



fig. 2

**a transformer is determined by its apparent power**

- for single-phase transformers
  $P_S = U_{SEC} \times I_{SEC}$
- for three-phase transformers
  $P_S = \sqrt{3} \times U_{SEC} \times I_{SEC}$

**our transformers are designed to attain rated power at**

- rated supply voltage
- continuous rated load
- load power factor of 1
- frequency 50-60 Hz
- maximum ambient temperature $t_a$ 40 °C or $t_a$ 50 °C

Under these conditions the transformers deliver their rated output voltage.

**maximum supply voltage $U_{PRI}$ + 6 %**

At this increased supply voltage, output voltage is higher than the rated output voltage.

**the transformer must be selected so that its power is at least equal to load apparent power**

- for single-phase loads $P_S = U \times I$
- for three-phase loads $P_S = \sqrt{3} \times U \times I$

- if load active power and power factor are given $P_S = \frac{P_A}{\cos\phi}$
- if load mechanical power, power factor and efficiency are given $P_A = \frac{P_{mech} \times 100}{Rdt}$

  1 pk = 0,736 kW
- if the transformer is not loaded permanently, a transformer of a smaller rated power may be used (taking operating conditions into account)
- if ambient temperature exceeds $t_a$, a transformer of higher rated power must be used

**occasional transformer overloads are permitted**

Values shown below are only given for guidance purposes and are in no case to be exceeded.

| preceding continuous load | overload of 10 % | 25 % | 40 % |
|---|---|---|---|
| 25 % | 180 min | 60 min | 15 min |
| 75 % | 120 min | 40 min | 10 min |

when transformers must be combined with rectifiers, account must be taken of the fact that values of rectified voltage and current are not equal to those of the alternating voltage and current output values that must be obtained from the transformer, before the rectifier, depend on

- coupling system (bridge or middle point rectifier)
- number of phases of coupling system
- rectifier smoothing, stabilizing and regulation capabilities

**short-circuit voltage $U_{cc}$**

is the voltage to be applied to the input winding to produce, in the short circuited output winding, a current equal to the rated output current. In % versus input voltage.

**voltage drop dU**

is the difference between the no-load output voltage and the output voltage under load. In %: versus output voltage under load.

## Protection class – Electric shock protection

**protection class I**
Class I transfomers have electric shock protection that does not only rely on basic insulation, but includes an additional safety measure in the form of a connection (such as an earthing terminal) of the accessible conductive parts to an earth conductor that must be part of the installation's fixed wiring.

**protection class II**
Class II transformers have electric shock protection that does not only rely on basic insulation, but includes additional safety measures such as double insulation or reinforced insulation. These transformers have no provision for protective earthing.

**protection class III**
Class III transformers have electric shock protection that relies on the safety extra-low voltage supply and do not generate voltages higher than the safety extra-low voltage. These transformers shall not be provided with means for protective earthing.

## Temperature classes

The temperature class of an electrotechnical product such as a transformer, indicates the maximum temperature at which the isolation materials and isolation systems guarantee thermic stability in relation to its age.

Thermic classes and temperatures attributed to it are:

| class | A | E | B | F | H |
|---|---|---|---|---|---|
| temperature | 105 °C | 120 °C | 130 °C | 155 °C | 180 °C |

The temperatures indicated relate to the actual temperatures of the isolating material and not to the warming up of the transformer or its maximum ambient temperature.

## Transformer protection

**primary circuit**
- short-circuit risk protection in primary circuit
- for transformers up to 630 VA fuse rating must be approximately equal to 1,5… 2 x $I_{PRI}$
- for transformers over 630 VA fuse rating must be approximately equal to 2… 2,5 x $I_{PRI}$

The fuse rating must be higher than the primary current value, for the transformer tripping value is higher than the primary current.
The fuse must have a time lag characteristic.

Should the primary current not be known, it may be calculated approximately:
- for transformers up to 630 VA, primary current is roughly equal to

$$1{,}2 \times \frac{P_S}{U_{PRI}}$$

- for transformers over 630 VA, primary current is roughly equal to

$$1{,}1 \times \frac{P_S}{U_{PRI}}$$

(single-phase transformers)

$$1{,}1 \times \frac{P_S}{\sqrt{3} \times U_{PRI}}$$

(three-phase transformers)

EN
DE

**Table 1**

Protection of primary and secondary windings of transformers against short circuit and overload current

Nominal values (A) of primary and secondery protection of safety, control and isolating transformers

| P | Pri | | | | | | Sec | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VA | U=230V | | | U=400V | | | U=24V (2x12V) | | | U=48V (2x24V) | | U=115V | | U=230V (2x115V) | | |
| | Fuse EN60898 | Circuit breaker | Circuit breaker | Fuse EN60898 | Circuit breaker | Circuit breaker | Fuse EN60127 | Fuse EN60898 | Circuit breaker | Fuse EN60898 | Circuit breaker | Fuse EN60898 | Circuit breaker | Fuse EN60127 | Fuse EN60898 | Circuit breaker |
| | aM | C | D | aM | C | D | 5x20 6,3x32 | gG | C | gG | C | gG | C | 5x20 6,3x32 | gG | C |
| 10 | 0,5 | 1 | 0,5 | 0,5 | 1 | 0,5 | 0,5 | 0,5 | | | | | | | | |
| 30 | 0,5 | 1 | 0,5 | 0,5 | 1 | 0,5 | 1,25 | 2 | 2 | | | | | | | |
| 40 | 1 | 1 | 1 | 0,5 | 1 | 0,5 | 2 | 2 | 2 | | | | | 0,5 | | |
| 63 | 1 | 2 | 1 | 0,5 | 1 | 0,5 | 3,15 | 4 | 4 | | | | | 0,315 | | |
| 100 | 1 | 3 | 1 | 1 | 2 | 1 | 5 | 6 | 6 | 2 | 2 | 1 | | 0,5 | 0,5 | 0,5 |
| 160 | 2 | 6 | 2 | 1 | 2 | 1 | | 10 | 10 | 4 | 4 | 2 | 2 | 0,8 | 2 | 2 |
| 250 | 2 | 6 | 2 | 2 | 4 | 2 | | 12 | 16 | 6 | 6 | 2 | 2 | 1,6 | 2 | 2 |
| 400 | 4 | 10 | 4 | 2 | 6 | 2 | | 20 | 20 | 10 | 10 | 4 | 4 | | 2 | 2 |
| 630 | 6 | 16 | 6 | 4 | 10 | 4 | | 32 | 32 | 16 | 16 | 6 | 6 | | 4 | 4 |
| 1000 | 10 | 20 | 10 | 6 | 16 | 6 | | 50 | 50 | 25 | 25 | 10 | 10 | | 6 | 6 |
| 1600 | 16 | | 16 | 10 | 20 | 10 | | 80 | | 40 | 40 | 16 | 16 | | 8 | 8 |
| 2500 | 20 | | 20 | 16 | | 16 | | 100 | | 50 | 50 | 25 | 25 | | 12 | 16 |
| 4000 | 32 | | 32 | 20 | | 20 | | | | | | 40 | 40 | | 20 | 20 |
| 6300 | 40 | | 40 | 32 | | 32 | | | | | | 63 | 63 | | 32 | 32 |
| 10000 | 63 | | 63 | 40 | | 40 | | | | | | 100 | | | 50 | 50 |

**secondary circuit**

- boverload or short-circuit protection in secondary circuit
- fuse rating must be equal or just above secondary current value

Fuse has quick acting or time lag characteristic.

**Table 2**

Single-phase low voltage transformers with secondary protection (max. fuse value 6,3 A and on demand)

Single-phase low voltage transformers with secondary protection (A)

| | safety chapter 1.2 | | isolating chapter 2.2 | | control chapter 3.1 & 3.3 | |
|---|---|---|---|---|---|---|
| Ps/Usec | 24V | 2x12V | 230V | 2x115V | 24V | 230V |
| **40VA** | | | | | EDR 24TC40 F **2 A** | EDR 230TC40 F **0,2 A** |
| **63VA** | EDR 24TS63 F **3,15 A** | EDR 212TS63 F **3,15 A** | EDR 230TI63 F **0,315 A** | EDR 2115TI63 F **0,315 A** | EDR 24TC63 F **3,15 A** | EDR 230TC63 F **0,315 A** |
| **100VA** | EDR 24TS100 F **5 A** | EDR 212TS100 F **5 A** | EDR 230TI100 F **0,5 A** | EDR 2115TI100 F **0,5 A** | EDR 24 TC100 F **5 A** | EDR 230TC100 F **0,5 A** |
| **160VA** | | | EDR 230TI160 F **1 A** | EDR 2115TI160 F **1 A** | | EDR 230TC160 F **1 A** |
| **250VA** | | | EDR 230TI250 F **1,6 A** | EDR 2115TI250 F **1,6 A** | | E 230TC250 F **1,6 A** |

EN

DE

## Symbols and abbreviations

- separating transformer
- isolating transformer
- safety transformer
- control transformer
- auto transformer
- transformer for medical purpose rooms
- bell transformer
- reactor
- non short-circuit proof transformer
- short-circuit proof transformer
- fuse link
  - time lag T
  - quick acting F
- thermal fuse
  - non resettable
- cut-out
  - resettable
  - non self-resetting
  - current and temperature sensitive
- protective earth
- protection class II
- direct current

| | |
|---|---|
| U | voltage, V |
| dU | voltage drop, % |
| $U_{cc}$ | short-circuit voltage in % |
| I | current, A |
| $P_{type}$ | typical power, VA |
| $P_0$ | no-load losses, W |
| $P_{Cu}$ | copper losses due to load, W |
| $P_s$ | apparent power, VA |
| Rdt | efficiency, % |
| $t_a$ | maximum ambient temperature, °C |
| Δt | temperature rise, °C |
| M | weight, kg |
| PRI | primary |
| SEC | secondary |
| N | neutral |
| cos ϕ | power factor |



# 1

# Single-phase safety transformers

# 1.1 Electromagnetic transformers for lighting installations 12V and 24V
# 50 – 630VA

## Common properties

Safety isolating transformer for lighting installations with 12V and 24V halogen lamps

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- safety extra low voltage (≤ 50V)
- no earthing required
- protection class II
- humidity and corrosion resistant
- resettable protection against short-circuit, overload and overheating
- long lifespan
- dimmable with leading edge dimmers for inductive loads (RL) and universal dimmers (RLC)
- not suitable for trailing edge dimmers (RC)

**standards**

EN 61 558-2-6 (EN60742)

## Product presentation

UNO

E 212SC100 SKA

E 212SC400 SKA

## Technical parameters and dimensioning

| Pmax W | type | code | $U_{PRI}$ 50-60Hz V | $U_{SEC}$ V | connection Pri | connection Sec | protection Pri | protection Sec | mounting opening |
|---|---|---|---|---|---|---|---|---|---|
| 50 | UNO | 1800 | 230 | 11,5 | 30 cm cable | 30 cm cable | / | Self-resetting | Ø 63,5 mm |
| 105 | E 212SC100 SKA | 1840 | 230-240 | 2x11,6 | 4 mm² | 2 x 4 mm² | / | Self-resetting | (a) |
| 150 | E 12SC150 SKA | 1533 | 230-240 | 11,6 | 4 mm² | 4 mm² | Thermofuse | Manually resettable | (b) |
| 250 | E 12SC250 SKA | 1534 | 230-240 | 11,6 | 4 mm² | 4 mm² | Thermofuse | Manually resettable | (b) |
| 300 | E 12SC300 SKA | 1535 | 230-240 | 11,6 | 6 mm² | 6 mm² | Thermofuse | Manually resettable | (c) |
| 400 | E 212SC400 SKA | 1449 | 230-240 | 2x11,6 | 6 mm² | 2 x 6 mm² | Thermofuse | Manually resettable | (c) |

(a) 4 Mounting holes - fixing lugs included – din rail mounting with accessory U 4174

(b) 4 Mounting holes – fixing lugs included

(c) 4 Mounting holes

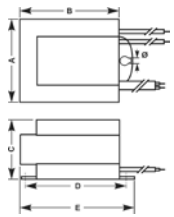


fig. 1

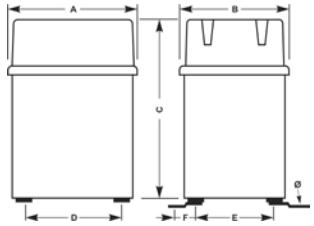


fig. 2

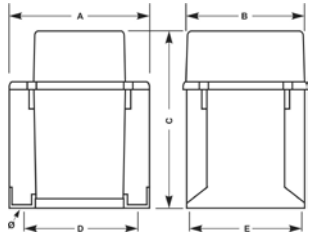


fig. 3

| Pmax WA | type | code | fig. | A mm | B mm | C mm | D mm | E mm | F mm | Ø mm | weight kg | IP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | UNO | 1800 | 1 | 59 | 76 | 45 | 76 | 87 | - | 4,5 | 0,75 | IP20 |
| 105 | E 212SC100 SKA | 1480 | 2 | 85,5 | 72 | 119 | 62 | 50 | 18 | 4,5 | 1.8 | IP20 |
| 150 | E 12SC150 SKA | 1533 | 2 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 2.7 | IP20 |
| 250 | E 12SC250 SKA | 1534 | 2 | 107 | 90 | 142 | 80 | 64 | 18 | 4,5 | 3.7 | IP20 |
| 300 | E 12SC300 SKA | 1535 | 3 | 135 | 115 | 160 | 105 | 90 | - | 6 | 6.3 | IP20 |
| 400 | E 212SC400 SKA | 1449 | 3 | 135 | 115 | 160 | 105 | 90 | - | 6 | 6.4 | IP20 |

EN

DE

# 1.2 Single-phase safety transformers
## 10 VA to 630 VA

## Common properties

for all SELV applications

**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II (no earthing required)
- degree of protection IP20
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 50°C

**connections**
- screw terminal block

**fixing**
- on DIN-rail up to 160 VA – fixing support provided
- support with fixing holes from 250 VA

**standards**
EN 61558-2-6 (EN 60742)

**special executions on request**
- other voltages and power ratings
- with electrostatic screens
- with fuses in secondary circuit

see p. 31

## Product presentation


EDR 24TS10


E 24TS250


E 24TS400

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Rdt % | Ucc % |
|---|---|---|---|---|---|---|---|---|
| 30 | EDR 212TS30 | 2785 | 0-230-400 | 2x0-12 | 13,6 | 2,6 | 81 | 12,6 |
| 63 | EDR 212TS63 | 2786 | 0-230-400 | 2x0-12 | 11,5 | 3,3 | 86 | 10,0 |
| 100 | EDR 212TS100 | 2787 | 0-230-400 | 2x0-12 | 8,9 | 4,4 | 88 | 9,1 |
| 160 | EDR 212TS160 | 2788 | 0-230-400 | 2x0-12 | 8,2 | 6,3 | 89 | 9,7 |
| 250 | E 212TS250 | 2789 | 0-230-400 | 2x0-12 | 5,8 | 10,3 | 91 | 7,1 |
| 400 | E 212TS400 | 2790 | 0-230-400 | 2x0-12 | 4,3 | 15,5 | 92 | 3,5 |
| 10 | EDR 24TS10 | 2408 | 0-230-400 | 0-24 | 18,9 | 1,3 | 76 | 16,9 |
| 30 | EDR 24TS30 | 2409 | 0-230-400 | 0-24 | 13,6 | 2,6 | 81 | 12,6 |
| 63 | EDR 24TS63 | 2401 | 0-230-400 | 0-24 | 11,5 | 3,3 | 86 | 10,0 |
| 100 | EDR 24TS100 | 2402 | 0-230-400 | 0-24 | 8,9 | 4,4 | 88 | 9,1 |
| 160 | EDR 24TS160 | 2403 | 0-230-400 | 0-24 | 8,2 | 6,3 | 89 | 9,7 |
| 250 | E 24TS250 | 2404 | 0-230-400 | 0-24 | 5,8 | 10,3 | 91 | 7,1 |
| 400 | E 24TS400 | 2642 | 0-230-400 | 0-24 | 4,3 | 15,5 | 92 | 3,5 |
| 630 | E 24TS630 | 2643 | 0-230-400 | 0-24 | 3,9 | 20,8 | 93 | 3,4 |

Connection principle serial / parallel – Chapter 1.8

## Dimensioning

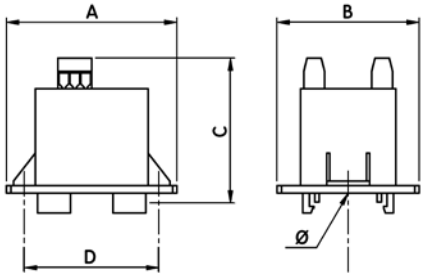



fig. 1

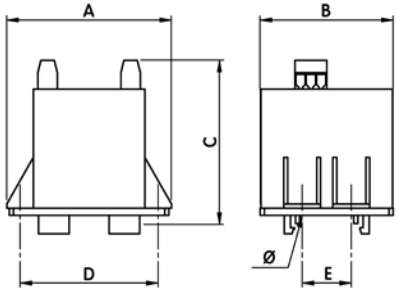



fig. 2

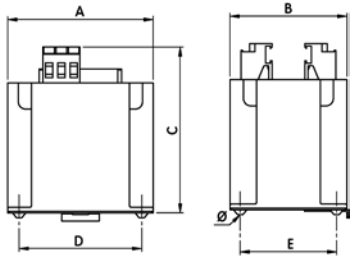



fig. 3

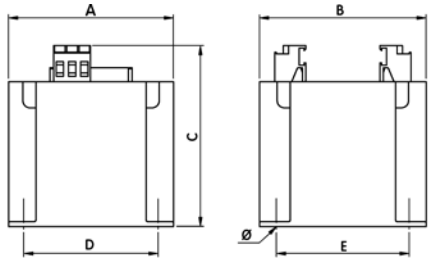



fig. 4

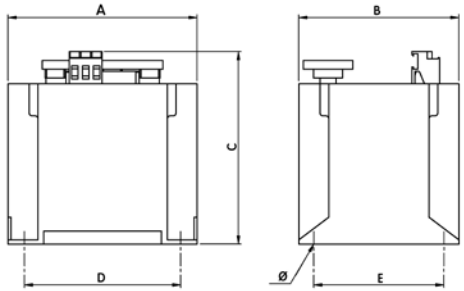



fig. 5

| Ps VA | type | code | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | connections Pri mm² | connections Sec mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | EDR 212TS30 | 2785 | 2 | 81 | 65 | 81 | 68 | 24 | 4,5 | 0,9 | 2,5 | 2,5 |
| 63 | EDR 212TS63 | 2786 | 3 | 80 | 70 | 96 | 67 | 56 | 4,5 | 1,5 | 4 | 4 |
| 100 | EDR 212TS100 | 2787 | 3 | 89 | 72 | 102 | 75 | 58 | 4,5 | 1,9 | 4 | 4 |
| 160 | EDR 212TS160 | 2788 | 3 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 250 | E 212TS250 | 2789 | 4 | 102 | 102 | 110 | 84 | 86 | 5,5 | 3,8 | 4 | 4 |
| 400 | E 212TS400 | 2790 | 5 | 130 | 110 | 132 | 105 | 90 | 6 | 6,4 | 4 | 6 |
| 10 | EDR 24TS10 | 2408 | 1 | 78 | 65 | 67 | 61 | - | 3,5 | 0,5 | 2,5 | 2,5 |
| 30 | EDR 24TS30 | 2409 | 2 | 81 | 65 | 81 | 68 | 24 | 4,5 | 0,9 | 2,5 | 2,5 |
| 63 | EDR 24TS63 | 2401 | 3 | 80 | 70 | 96 | 67 | 56 | 4,5 | 1,5 | 4 | 4 |
| 100 | EDR 24TS100 | 2402 | 3 | 89 | 72 | 102 | 75 | 58 | 4,5 | 1,9 | 4 | 4 |
| 160 | EDR 24TS160 | 2403 | 3 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 250 | E 24TS250 | 2404 | 4 | 102 | 102 | 110 | 84 | 86 | 5,5 | 3,8 | 4 | 4 |
| 400 | E 24TS400 | 2642 | 5 | 130 | 110 | 132 | 105 | 90 | 6 | 6,4 | 4 | 6 |
| 630 | E 24TS630 | 2643 | 5 | 160 | 116 | 157 | 130 | 95 | 6 | 8,3 | 4 | 6 |

EN

DE

# 1.3 Single-phase safety transformers – IP 54
# 100 VA to 630 VA

## Common properties

for all applications requiring safety extra low voltage

**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- no earthing required
- mechanically vibration-free
- humidity and corrosion resistant
- protection class II
- degree of protection IP54
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40°C

**connections**
- screw terminal block

**fixation**
- with screws (included)
- with fixing lugs (included)

**standards**
EN 61558-2-6 (EN 60742)

**special executions on request**
- other voltages and power ratings
- connections with insulated wires ands mains cables
- connections with FAST-ON connectors 4,8 x 0,5 mm (from type 100 VA up to 160 VA)
- with fuses
- with electrostatic screens

## Product presentation

EF 212SC250

EF 224SB630

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | Po W | Rdt % | Ucc % |
|---|---|---|---|---|---|---|---|---|
| 100 | EF 212SC100 | 2047 | 0-230 | 2 x 0 - 12 | 6,0 | 6,5 | 89 | 6,4 |
| 160 | EF 212SC160 | 2048 | 0-230 | 2 x 0 - 12 | 6,5 | 8,0 | 89 | 6,9 |
| 250 | EF 212SC250 | 2049 | 0-230 | 2 x 0 - 12 | 6,0 | 10,0 | 91 | 6,7 |
| 400 | EF 212SC400 | 2050 | 0-230 | 2 x 0 - 12 | 4,0 | 15,5 | 93 | 3,3 |
| 100 | EF 224SB100 | 2051 | 0-230-400 | 2 x 0 - 24 | 5,7 | 6,5 | 89 | 6,1 |
| 160 | EF 224SB160 | 2052 | 0-230-400 | 2 x 0 - 24 | 7,5 | 8,0 | 89 | 7,6 |
| 250 | EF 224SB250 | 2053 | 0-230-400 | 2 x 0 - 24 | 6,5 | 9,5 | 89 | 7,4 |
| 400 | EF 224SB400 | 2054 | 0-230-400 | 2 x 0 - 24 | 4,4 | 15,5 | 92 | 3,5 |
| 630 | EF 224SB630 | 2055 | 0-230-400 | 2 x 0 - 24 | 3,8 | 20,3 | 94 | 3,2 |

Connection principle serial / parallel – Chapter 1.8

## Dimensioning

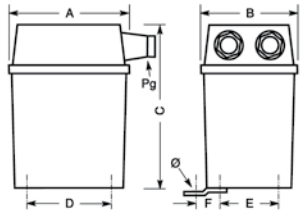



fig. 1

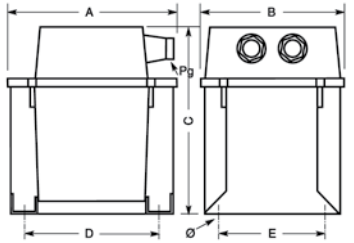



fig. 2

| Ps VA | type | code | fig. | A mm | B mm | C mm | D mm | E mm | F mm | Ø mm | Pg mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | EF 212 SC 100 | 2047 | 1 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 11 | 2,2 |
| 160 | EF 212 SC 160 | 2048 | 1 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 11 | 2,9 |
| 250 | EF 212 SC 250 | 2049 | 1 | 107 | 90 | 142 | 80 | 64 | 18 | 4,5 | 11 | 3,8 |
| 400 | EF 212 SC 400 | 2050 | 2 | 135 | 115 | 160 | 105 | 90 | - | 6,0 | 11+13,5 | 7,7 |
| 100 | EF 224 SB 100 | 2051 | 1 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 11 | 2,2 |
| 160 | EF 224 SB 160 | 2052 | 1 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 11 | 3,6 |
| 250 | EF 224 SB 250 | 2053 | 1 | 107 | 90 | 142 | 80 | 64 | 18 | 4,5 | 11 | 3,8 |
| 400 | EF 224 SB 400 | 2054 | 2 | 135 | 115 | 160 | 105 | 90 | - | 6,0 | 11+13,5 | 7,7 |
| 630 | EF 224 SB 630 | 2055 | 2 | 165 | 120 | 185 | 130 | 95 | - | 6,0 | 11+13,5 | 11,0 |

EN
DE

# 1.4 Single-phase safety transformers
## 1 kVA to 2,5 kVA

## Common properties

for all applications requiring safety extra low voltage

**characteristics**
- vacuum- and pressure- varnish impregnated
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- primary side: + 15 V branch (for higher input voltage)
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to earth 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40 °C
- **IP20, IP23, IP65 – protection cases: chapter 9**

**connections**
- screw terminals

**fixing**
- support with fixing holes

**standards**
EN 61558-2-6 (EN 60742)

**special executions on request**
- protection class II (enclosed execution)
- degree of protection IP23 and IP65 (watertight)
- other voltages and powers
- connections with power socket outlets and with mains cables
- with fuses
- with electrostatic screens
- tropicalized

## Product presentation

224TC1000

U 22 763

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Rdt % | Ucc % | case IP20 fig.2 |
|---|---|---|---|---|---|---|---|---|---|
| 1000 | 224TC1000 | 2227 | 15-0-230-400 | 2 x 0-24 | 3,5 | 31,9 | 94 | 3,1 | U 22 763 |
| 1600 | 224TC1600 | 2228 | 15-0-230-400 | 2 x 0-24 | 3,2 | 43,8 | 94 | 3,1 | U 22 757 |
| 2500 | 224TC2500 | 2229 | 15-0-230-400 | 2 x 0-24 | 1,8 | 69,9 | 96 | 1,7 | U 22 757 |

Connection principle serial / parallel – Chapter 1.8

## Dimensioning

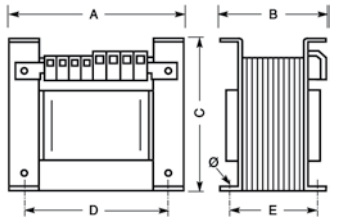



fig. 1

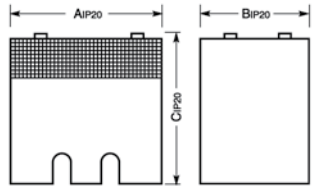



fig. 2

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. Pri mm² | conn. Sec mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 224TC1000 | 1 | 180 | 120 | 175 | 150 | 90 | 9 | 14 | 2,5 | 4 | 203 | 160 | 180 | 1,8 |
| 1600 | 224TC1600 | 1 | 240 | 130 | 225 | 200 | 107 | 11 | 22 | 4 | 10 | 273 | 210 | 231 | 3,0 |
| 2500 | 224TC2500 | 1 | 240 | 160 | 225 | 200 | 137 | 11 | 33 | 4 | 10 | 273 | 210 | 231 | 3,0 |

## Vibration damper

For TC series 1000VA – 10.000VA: Use Silentblock 20
See Chapter 10: Vibration damper

EN
DE

# 1.5 Bell transformers DIN-rail mounting

## Common properties

modular safety transformers for intermittent use

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- safety extra low voltage (≤ 50 V)
- protection class II
- built-in self-resetting short-circuit protection
- dielectric strength 3550 $V_{AC}$
- degree of protection IP20
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**connections**

- Screw clamps with slotted screw, maximum 4 mm²

**standards**

EN 61558-2-8

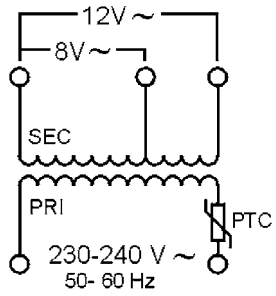
## Product presentation

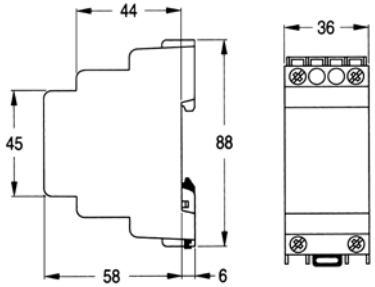
E 12BT8

E 12BT12

E 12BT16

## Dimensioning




| P VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | connections Pri Sec | modules | weight |
|---|---|---|---|---|---|---|---|
| 8 | E12BT8 | 2010 | 230-240 | 8 and 12 | Min. 1 mm² Max. 4 mm² | 2 | 375 g |
| 12 | E12BT12 | 2011 | 230-240 | 8 and 12 | Min. 1 mm² Max. 4 mm² | 2 | 375 g |
| 16 | E12BT16 | 2012 | 230-240 | 8 and 12 | Min. 1 mm² Max. 4 mm² | 2 | 375 g |

EN

DE

# 1.6 Safety transformers DIN-rail mounting

## Common properties

modular safety transformers for continuous use

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- safety extra low voltage (≤ 50 V)
- protection class II
- built-in self-resetting short-circuit protection
- dielectric strength 3550 $V_{AC}$
- degree of protection IP20
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**connections**

- Screw clamps with slotted screw, maximum 4 mm²

**standards**

EN 61558-2-6

**remark**

the no-load voltage of these transformers is about 30 % higher than the indicated rated voltage

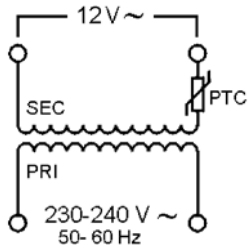
## Product presentation

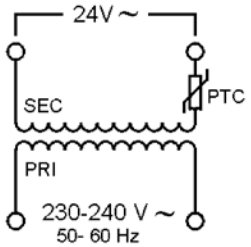
E 12ST8

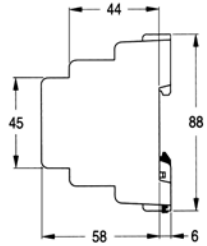
E 12ST12

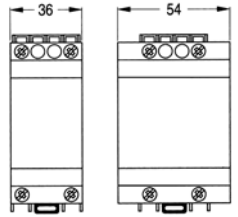
E 12ST16

## Dimensioning




| P VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | connections Pri Sec | modules | weight |
|---|---|---|---|---|---|---|---|
| 8 | E12ST8 | 2020 | 230-240 | 12 | Min. 1 mm² Max. 4 mm² | 2 | 375 g |
| 12 | E12ST12 | 2021 | 230-240 | 12 | | 3 | 500 g |
| 16 | E12ST16 | 2022 | 230-240 | 12 | | 3 | 500 g |
| 8 | E24ST8 | 2023 | 230-240 | 24 | | 2 | 375 g |
| 12 | E24ST12 | 2024 | 230-240 | 24 | | 3 | 500 g |
| 16 | E24ST16 | 2025 | 230-240 | 24 | | 3 | 500 g |

EN

DE

# 1.7 Single-phase safety transformers for printed circuits (PCB mount transformer)

## 1.7.1 standard distance between pins 5,00 mm – **0,6 VA to 40 VA**

### Common properties

especially designed for fitting to printed circuits

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II (no earthing required)
- degree of protection IP00 (for flush mounting)
- dielectric strength 3550 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40 °C
- low heating (t < 40 °C)
- short-circuit proof (only 0,6 - 2,5 VA)

**connections**

- soldering pins, square section 0,7 x 0,7 mm
- standard distance between pins 5,00 mm (metric grid)
- standard pin height 4 mm
- pin holes min Ø 1,2 mm

**fixing**

- 4 fixing points for transformers rated 10 VA and higher

**standards**

EN 61558-2-6 (EN 60742)

**Single-phase safety transformers for printed circuits**

- primary circuit: 230V
- secondary circuit: possible voltages: 6V – 9V – 12V – 15V – 18V – 24V or others on request
- power: possibilities 0,6VA – 1,8VA – 2,5VA – 3,2VA – 5,0VA – 10VA – 16VA – 25VA – 40VA or others on request

**Special executions on request**

- other voltages and other powers
- other pin layouts
- temperature class $t_a$ 70/E

### Product presentation


E 206TR3


E 115TR4

# 1.7.2 standard distance between pins 5,08 mm – **1,6 VA to 40 VA**

## Common properties

especially designed for fitting to printed circuits

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II (no earthing required)
- degree of protection IP00 (for flush mounting)
- dielectric strength 3550 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40 °C
- low heating (t < 40 °C)

**connections**

- soldering pins, square section 0,8 x 0,8 mm
- standard distance between pins 5,08 mm
- standard pin height 4 mm
- pin holes min Ø 1,4 mm

**fixing**

- holes diameter Ø 3,5 mm

**standards**

EN 61558-2-6 (EN 60742)

**special executions on request**

- other voltages and other powers
- other pin layouts
- temperature class $t_a$ 70/E

## Product presentation


E 12TR2

E 16TR25

## Technical parameters – Dimensioning

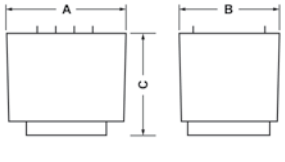



fig. 1

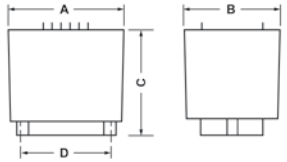



fig. 2

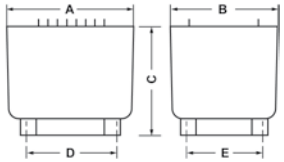



fig. 3

| Ps VA | type | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | fig. | A mm | B mm | C mm | D mm | E mm | M g |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,6 | E 12 TR 2 | 230 | 2X 0-6 | 44 | 1 | 32,5 | 27,5 | 28,0 | - | - | 95 |
| 1,6 | E 24 TR 2 | 230 | 2X 0-12 | 45 | 1 | 32,5 | 27,5 | 28,0 | - | - | 95 |
| 2,5 | E 16 TR 3 | 230 | 2X 0-6-8 | 35 | 2 | 45,5 | 38,5 | 29,0 | 35 | - | 160 |
| 2,5 | E 32 TR 3 | 230 | 2X 0-12-16 | 40 | 2 | 45,5 | 38,5 | 29,0 | 35 | - | 160 |
| 4,0 | E 16 TR 4 | 230 | 2X 0-6-8 | 22 | 2 | 45,5 | 38,5 | 34,5 | 35 | - | 210 |
| 4,0 | E 32 TR 4 | 230 | 2X 0-12-16 | 24 | 2 | 45,5 | 38,5 | 34,5 | 35 | - | 210 |
| 6,3 | E 16 TR 7 | 230 | 2X 0-6-8 | 25 | 2 | 51,5 | 43,5 | 36,0 | 42 | - | 260 |
| 6,3 | E 32 TR 7 | 230 | 2X 0-12-16 | 26 | 2 | 51,5 | 43,5 | 36,0 | 42 | - | 260 |
| 10,0 | E 16 TR 10 | 230 | 2X 0-6-8 | 22 | 2 | 51,5 | 44,0 | 36,0 | 42 | - | 330 |
| 10,0 | E 32 TR 10 | 230 | 2X 0-12-16 | 23 | 2 | 51,5 | 44,0 | 36,0 | 42 | - | 330 |
| 16,0 | E 16 TR 16 | 230 | 2X 0-6-8 | 18 | 2 | 63,5 | 53,5 | 46,0 | 50 | - | 520 |
| 16,0 | E 32 TR 16 | 230 | 2X 0-12-16 | 18 | 2 | 63,5 | 53,5 | 46,0 | 50 | - | 520 |
| 16,0 | E 36 TR 16 | 230 | 4X 0-9 | 17 | 2 | 63,5 | 53,5 | 46,0 | 50 | - | 530 |
| 25,0 | E 16 TR 25 | 230 | 2X 0-6-8 | 16 | 2 | 63,5 | 53,5 | 56,5 | 50 | - | 710 |
| 25,0 | E 32 TR 25 | 230 | 2X 0-12-16 | 16 | 2 | 63,5 | 53,5 | 56,5 | 50 | - | 710 |
| 25,0 | E 36 TR 25 | 230 | 4X 0-9 | 16 | 2 | 63,5 | 53,5 | 56,5 | 50 | - | 720 |
| 40,0 | E 16 TR 40 | 230 | 2X 0-6-8 | 12 | 3 | 71,0 | 60,0 | 59,0 | 50 | 43 | 910 |
| 40,0 | E 32 TR 40 | 230 | 2X 0-12-16 | 12 | 3 | 71,0 | 60,0 | 59,0 | 50 | 43 | 910 |
| 40,0 | E 36 TR 40 | 230 | 4X 0-9 | 12 | 3 | 71,0 | 60,0 | 59,0 | 50 | 43 | 920 |

EN

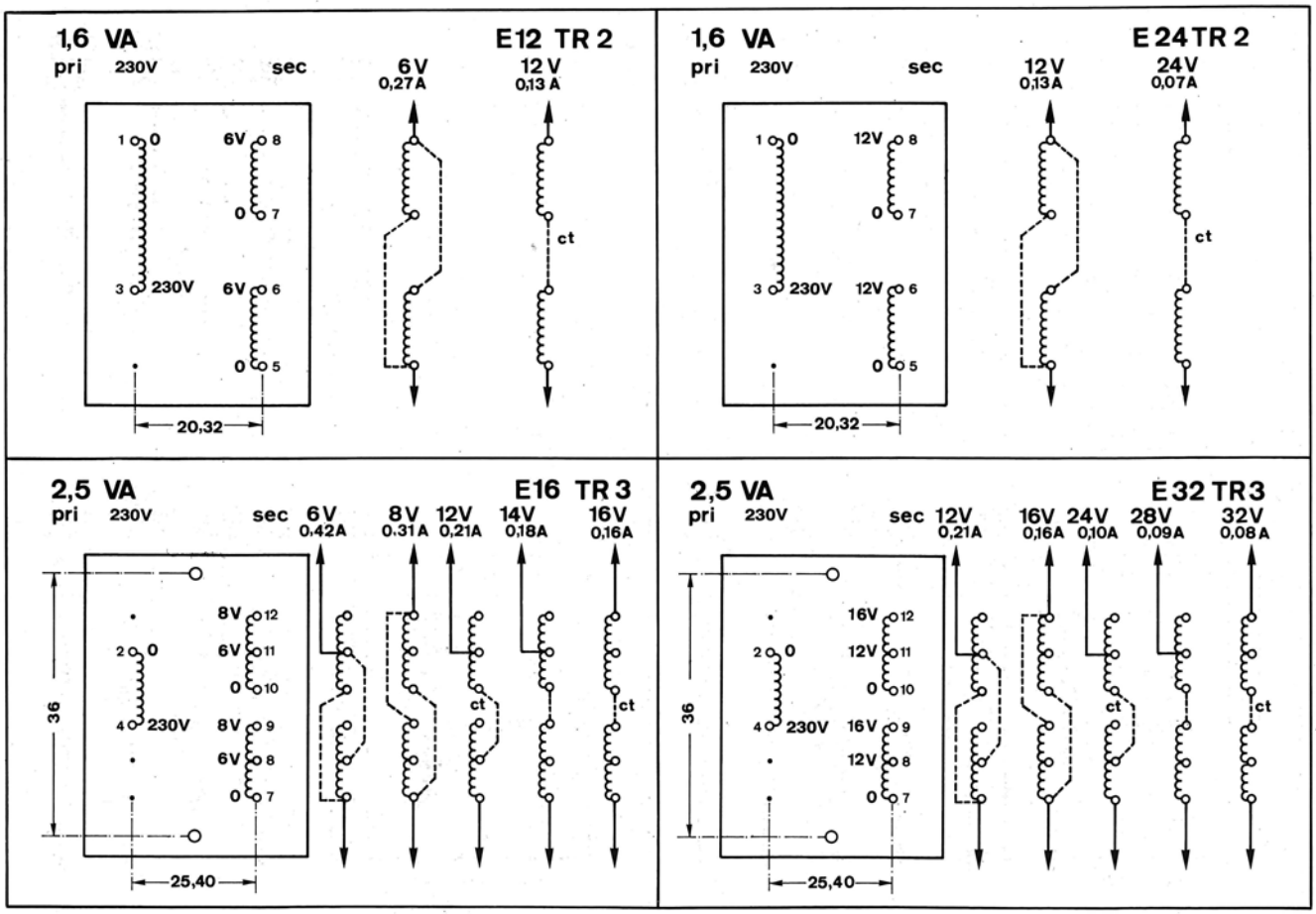
DE

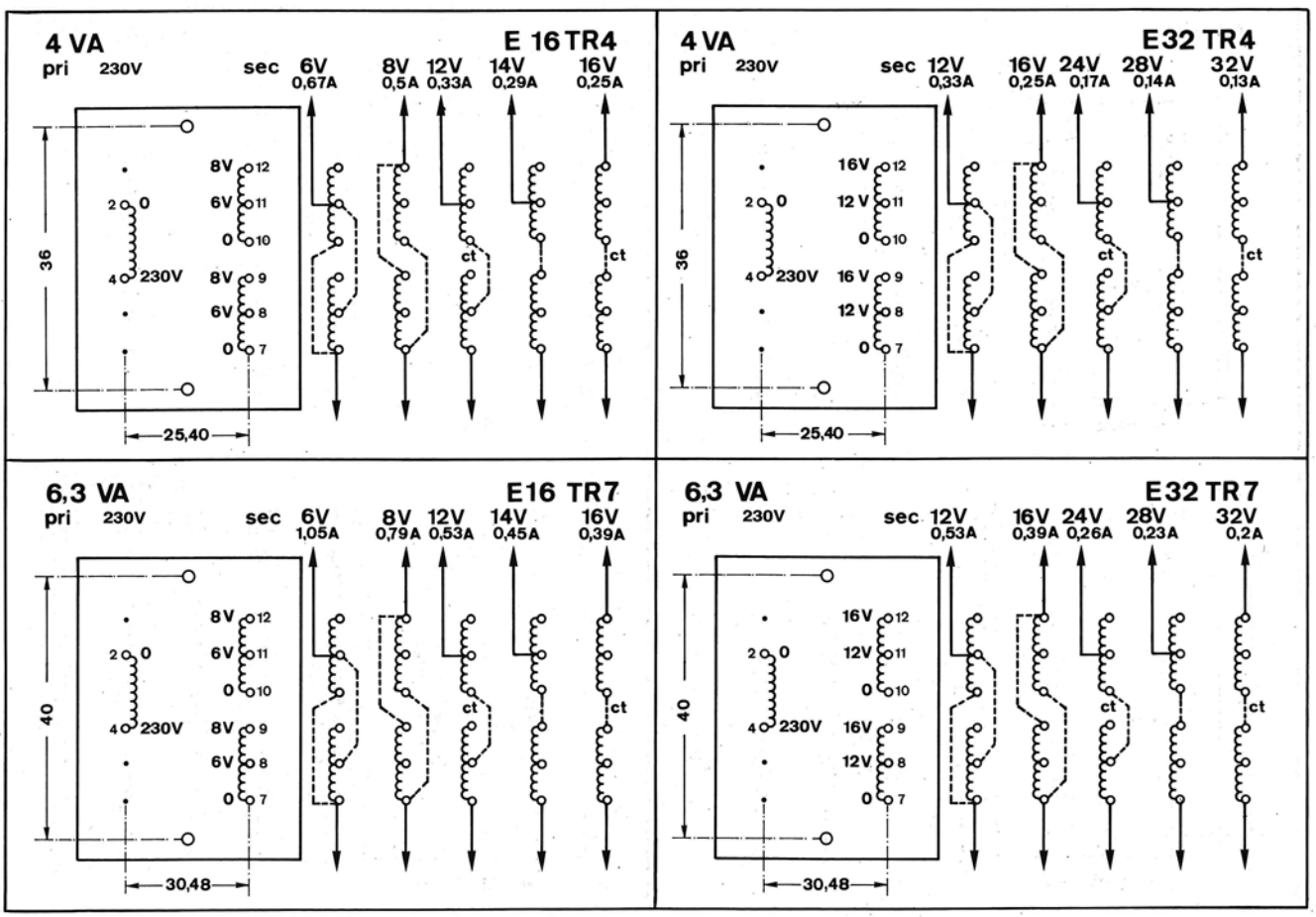
| $U_{SEC}$ (V) | | 6 | 8 | 9 | 12 | 14 | 16 | 18 | 24 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ps VA | type | | | | | $I_{SEC}$ A | | | | | |
| 1,6 | E 12 TR 2 | 0,27 | | | 0,13 | | | | | | |
| 1,6 | E 24 TR 2 | | | | 0,13 | | | | 0,07 | | |
| 2,5 | E 16 TR 3 | 0,42 | 0,31 | | 0,21 | 0,18 | 0,16 | | | | |
| 2,5 | E 32 TR 3 | | | | 0,21 | | 0,16 | | 0,10 | | 0,09 |
| 4,0 | E 16 TR 4 | 0,67 | 0,50 | | 0,33 | 0,29 | 0,25 | | | | |
| 4,0 | E 32 TR 4 | | | | 0,33 | | 0,25 | | 0,17 | | 0,14 |
| 6,3 | E 16 TR 7 | 10,5 | 0,79 | | 0,53 | 0,45 | 0,39 | | | | |
| 6,3 | E 32 TR 7 | | | | 0,53 | | 0,39 | | 0,26 | | 0,23 |
| 10,0 | E 16 TR 10 | 1,67 | 1,25 | | 0,83 | 0,71 | 0,63 | | | | |
| 10,0 | E 32 TR 10 | | | | 0,83 | | 0,63 | | 0,42 | | 0,36 |
| 16,0 | E 16 TR 16 | 2,67 | 2,00 | | 1,33 | 1,14 | 1,00 | | | | |
| 16,0 | E 32 TR 16 | | | | 1,33 | | 1,00 | | 0,67 | | 0,57 |
| 16,0 | E 36 TR 16 | | | 1,78 | | | | 0,89 | | 0,59 | |
| 25,0 | E 16 TR 25 | 4,17 | 3,13 | | 2,08 | 1,79 | 1,56 | | | | |
| 25,0 | E 32 TR 25 | | | | 2,08 | | 1,56 | | 1,04 | | 0,89 |
| 25,0 | E 36 TR 25 | | | 2,78 | | | | 1,39 | | 0,92 | |
| 40,0 | E 16 TR 40 | 6,67 | 5,00 | | 3,33 | 2,86 | 2,50 | | | | |
| 40,0 | E 32 TR 40 | | | | 3,33 | | 2,50 | | 1,67 | | 1,43 |
| 40,0 | E 36 TR 40 | | | 4,44 | | | | 2,22 | | 1,48 | |

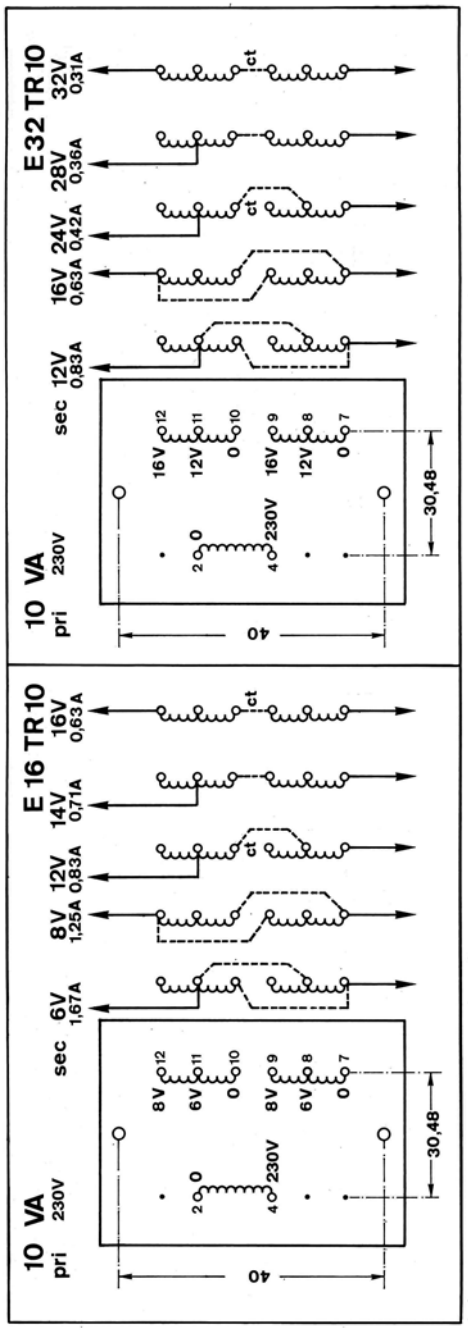
| $U_{SEC}$ (V) | | 32 | 36 | 2x6 | 2x8 | 2x9 | 2x12 | 2x16 | 2x18 | 2x9 + 2x9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ps VA | type | | | | | $I_{SEC}$ A | | | | |
| 1,6 | E 12 TR 2 | | | 0,13 | | | | | | |
| 1,6 | E 24 TR 2 | | | | | | 0,07 | | | |
| 2,5 | E 16 TR 3 | | | 0,21 | 0,16 | | | | | |
| 2,5 | E 32 TR 3 | 0,08 | | | | | 0,10 | 0,08 | | |
| 4,0 | E 16 TR 4 | | | 0,33 | 0,25 | | | | | |
| 4,0 | E 32 TR 4 | 0,13 | | | | | 0,17 | 0,13 | | |
| 6,3 | E 16 TR 7 | | | 0,53 | 0,39 | | | | | |
| 6,3 | E 32 TR 7 | 0,20 | | | | | 0,26 | 0,20 | | |
| 10,0 | E 16 TR 10 | | | 0,83 | 0,63 | | | | | |
| 10,0 | E 32 TR 10 | 0,31 | | | | | 0,42 | 0,31 | | |
| 16,0 | E 16 TR 16 | | | 1,33 | 1,00 | | | | | |
| 16,0 | E 32 TR 16 | 0,50 | | | | | 0,67 | 0,50 | | |
| 16,0 | E 36 TR 16 | | 0,44 | | | 0,89 | | | 0,44 | 0,44 + 0,44 |
| 25,0 | E 16 TR 25 | | | 2,08 | 1,56 | | | | | |
| 25,0 | E 32 TR 25 | 0,78 | | | | | 1,04 | 0,78 | | |
| 25,0 | E 36 TR 25 | | 0,69 | | | 1,39 | | | 0,69 | 0,69 + 0,69 |
| 40,0 | E 16 TR 40 | | | 3,33 | 2,50 | | | | | |
| 40,0 | E 32 TR 40 | 1,25 | | | | | 1,67 | 1,25 | | |
| 40,0 | E 36 TR 40 | | 1,11 | | | 2,22 | | | 1,11 | 1,11 + 1,11 |

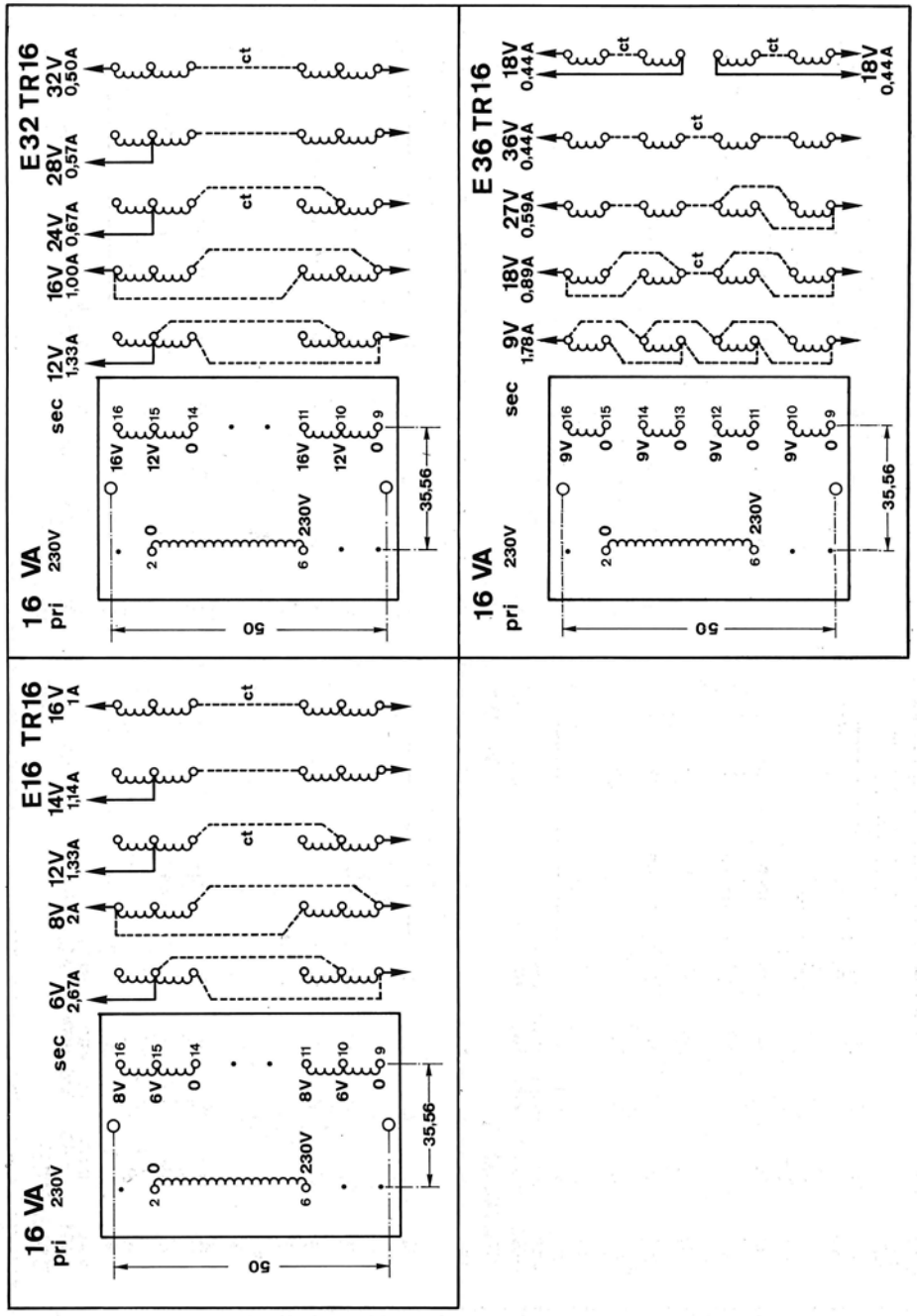
EN

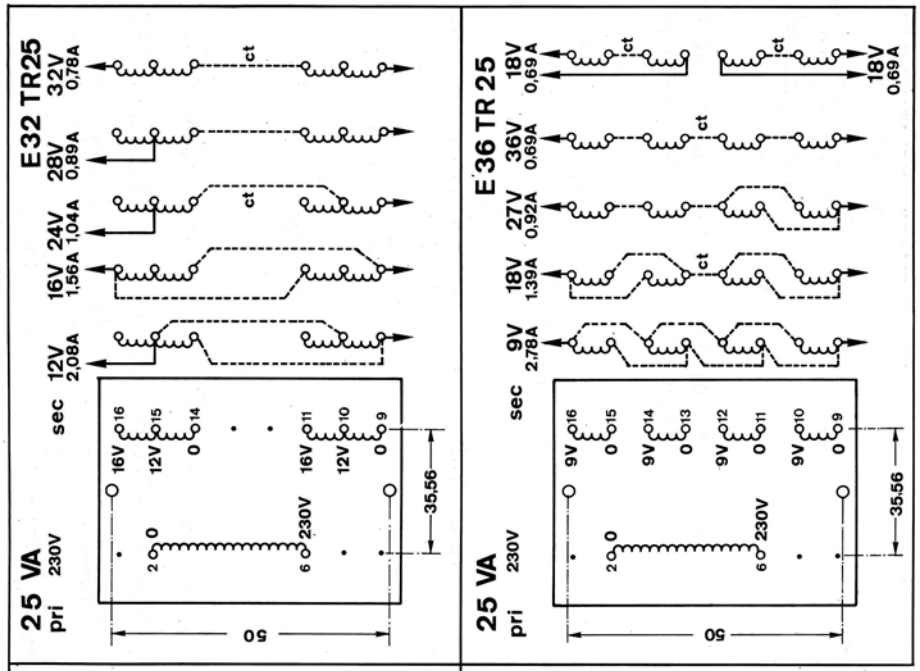
DE

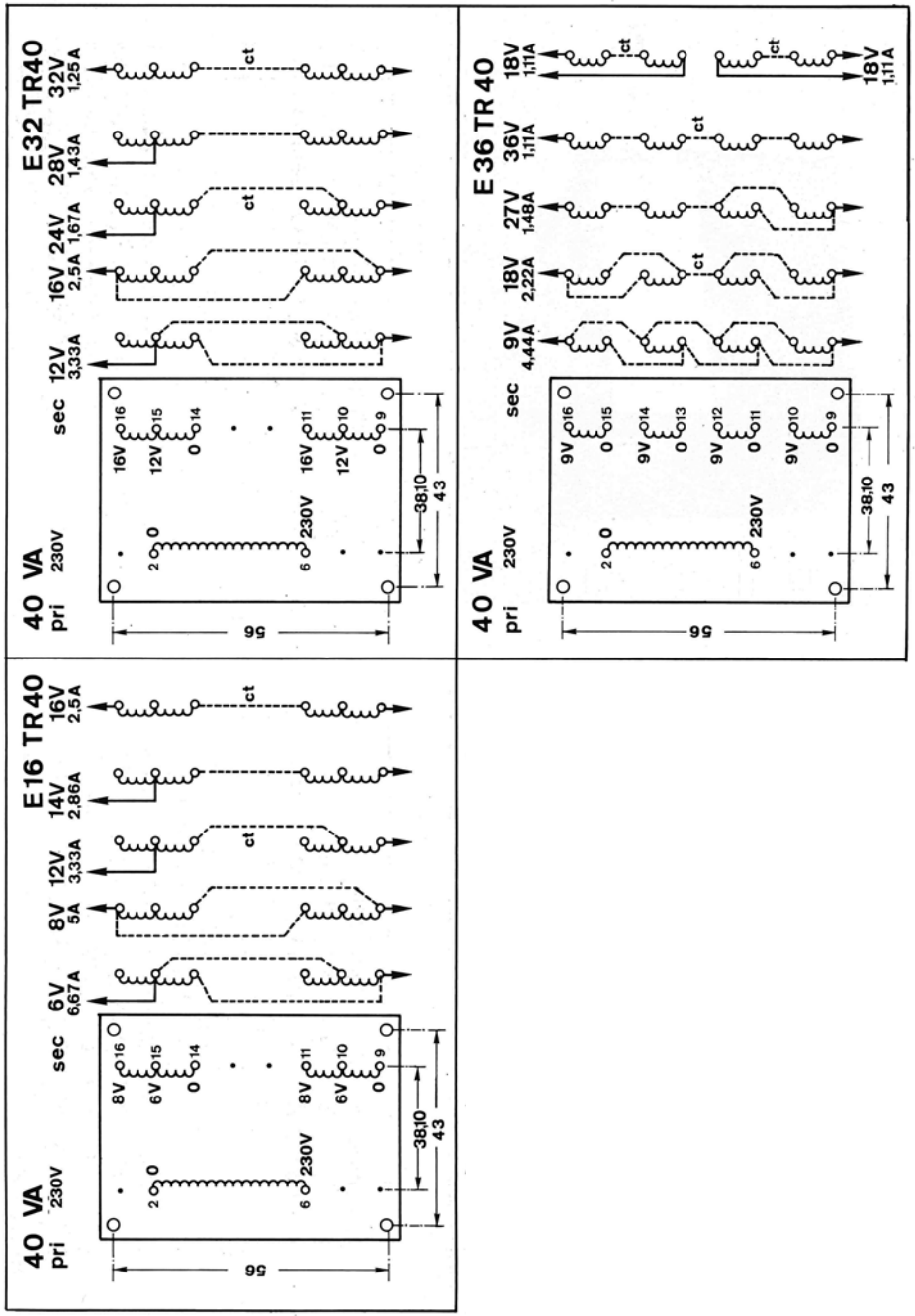

1,6 VA
pri 230V
sec
E12 TR 2
6V 0,27A
12V 0,13A
1 0 6V 8
0 7
3 230V 6V 6
0 5
ct
20,32
1,6 VA
pri 230V
sec
E 24 TR 2
12V 0,13A
24V 0,07A
1 0 12V 8
0 7
3 230V 12V 6
0 5
ct
20,32
2,5 VA
pri 230V
sec 6V 0,42A
8V 0,31A
12V 0,21A
14V 0,18A
16V 0,16A
E16 TR 3
2 0 8V 12
6V 11
0 10
4 230V 8V 9
6V 8
0 7
36
ct
ct
25,40
2,5 VA
pri 230V
sec 12V 0,21A
16V 0,16A
24V 0,10A
28V 0,09A
32V 0,08A
E 32 TR3
2 0 16V 12
12V 11
0 10
4 230V 16V 9
12V 8
0 7
36
ct
ct
25,40


4 VA
pri 230V
sec 6V 0,67A
8V 0,5A
12V 0,33A
14V 0,29A
16V 0,25A
E 16 TR4
2 0 8V 12
6V 11
0 10
4 230V 8V 9
6V 8
0 7
36
ct
ct
25,40
4 VA
pri 230V
sec 12V 0,33A
16V 0,25A
24V 0,17A
28V 0,14A
32V 0,13A
E32 TR4
2 0 16V 12
12 V 11
0 10
4 230V 16 V 9
12 V 8
0 7
36
ct
ct
25,40
6,3 VA
pri 230V
sec 6V 1,05A
8V 0,79A
12V 0,53A
14V 0,45A
16V 0,39A
E16 TR7
2 0 8V 12
6V 11
0 10
4 230V 8V 9
6V 8
0 7
40
ct
ct
30,48
6,3 VA
pri 230V
sec 12V 0,53A
16V 0,39A
24V 0,26A
28V 0,23A
32V 0,2A
E32 TR7
2 0 16V 12
12V 11
0 10
4 230V 16V 9
12V 8
0 7
40
ct
ct
30,48


E 32 TR 10
32V 0,31A
28V 0,36A
24V 0,42A
16V 0,63A
12V 0,83A
sec
10 VA
pri 230V
16V 12V 0 16V 12V 0
12 11 10 9 8 7
2 4 230V
40
30,48
E 16 TR 10
16V 0,63A
14V 0,71A
12V 0,83A
8V 1,25A
6V 1,67A
sec
10 VA
pri 230V
8V 6V 0 8V 6V 0
12 11 10 9 8 7
2 4 230V
40
30,48


E 32 TR16
32V 0,50A
28V 0,57A
24V 0,67A
16V 1,00A
12V 1,33A
sec
16 VA
pri 230V
16V 12V 0 16V 12V 0
16 15 14 11 10 9
2 6 230V
50
35,56
E 36 TR16
18V 0,44A
36V 0,44A
27V 0,59A
18V 0,89A
9V 1,78A
sec
16 VA
pri 230V
9V 0 9V 9V 0 9V
16 15 14 13 12 11 10 9
2 6 230V
50
35,56
E16 TR16
16V 1A
14V 1,14A
12V 1,33A
8V 2A
6V 2,67A
sec
16 VA
pri 230V
8V 6V 0 8V 6V 0
16 15 14 11 10 9
2 6 230V
50
35,56

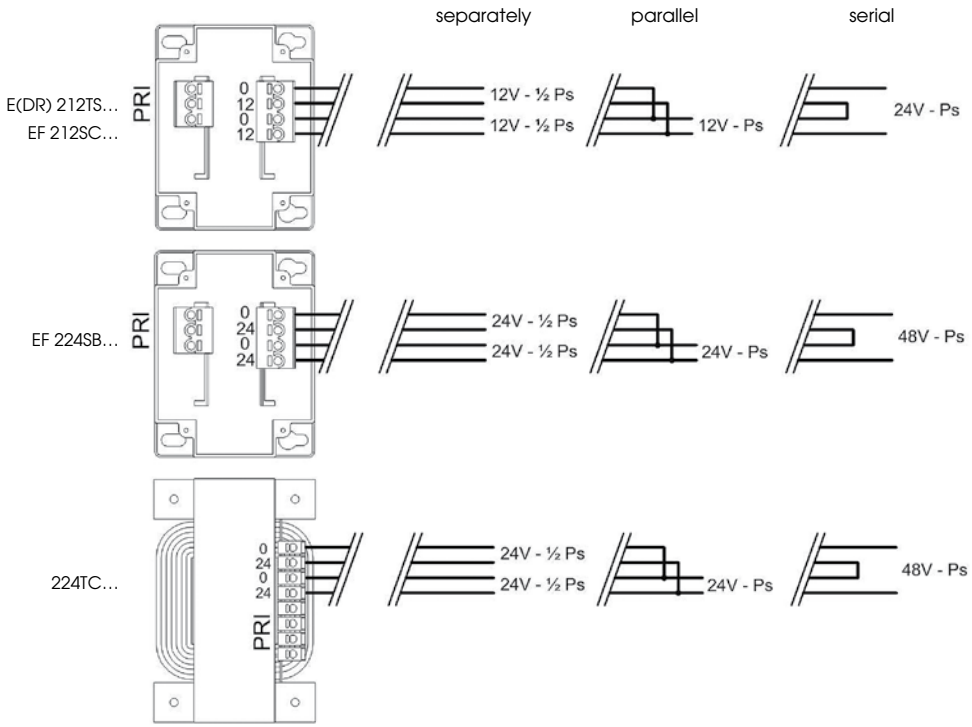

E32 TR25
32V 0,78A
28V 0,89A
16V 24V 1,04A
16V 1,56A
12V 2,08A
sec
25 VA
pri 230V
16V 12V 0 16V 12V 0
230V
50
35,56
E36 TR 25
18V 0,69A
36V 0,69A
27V 0,92A
18V 1,39A
9V 2,78A
9V 0 9V 0 9V 0 9V 0
230V
50
35,56
E16 TR25
16V 1,56A
14V 1,79A
8V 3,13A
12V 2,08A
6V 4,17A
8V 6V 0 8V 6V 0
230V
50
35,56


E32 TR40
32V 1,25A
28V 1,43A
16V 24V 1,67A
16V 2,5A
12V 3,33A
sec
40 VA
pri 230V
16V 12V 0 16V 12V 0
230V
56
38,10
43
E36 TR 40
18V 1,11A
36V 1,11A
27V 1,48A
18V 2,22A
9V 4,44A
9V 0 9V 0 9V 0 9V 0
230V
56
38,10
43
E16 TR40
16V 2,5A
14V 2,86A
8V 5A
12V 3,33A
6V 6,67A
8V 6V 0 8V 6V 0
230V
56
38,10
43

EN

DE

## 1.8 Connection principle serial / parallel 2x12V – 2x24V




# 2

## Single-phase isolating transformers

EN

DE

# 2.1 Single-phase isolating transformers for electronic applications – **50 VA to 250 VA**

## Common properties

particulary suitable for control circuits, contactors and electronic applications

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- no earthing required
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II
- degree of protection IP00 (for flush mounting)
- dielectric strength 3550 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**connections**

- FAST-ON connectors 4,8 x 0,5 mm (also solderable)
- for type E 84 TR 250 connection terminal blocks with screw fixing

**fixing**

- with screws (included)
- with fixing lugs (included)
- on 35 mm rail DIN 46277 (up to type 100 VA) with accessory part U 4174 (78 x 65 mm) (to be ordered separately)

**standards**

EN 61558-2-4 (EN 60742)

**special executions on request**

- other voltages and power ratings
- connections with insulated wires and mains cables

voltage-current table p. 66

## Product presentation

E 42TR100

E 84TR250

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | fig | A mm | B mm | C mm | D mm | E mm | F mm | Ø mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | E 40 TR 50 | 2180 | 230 | 2x 0-4 2x 0-16 | 13 | 1 | 83 | 70 | 82 | 62 | 50 | 18 | 4,5 | 1,29 |
| 63 | E 13 TR 63 | 2181 | 230 | 0 - 1 - 7 - 9 - 11 - 13 | 14 | 1 | 83 | 70 | 82 | 62 | 50 | 18 | 4,5 | 1,31 |
| 63 | E 56 TR 63 | 2182 | 230 | 16 18 20 24<br>26 28 32 36<br>40 48 52 56 | 16 | 1 | 83 | 70 | 82 | 62 | 50 | 18 | 4,5 | 1,36 |
| 100 | E 42 TR 100 | 2183 | 230 | 13 15 18 21<br>23 26 27 30<br>31 36 42 | 13 | 1 | 83 | 70 | 97 | 62 | 50 | 18 | 4,5 | 1,84 |
| 100 | E 62 TR 100 | 2184 | 230 | 20 22 24 26<br>28,5 31 40 44<br>48 52 57 62 | 13 | 1 | 83 | 70 | 97 | 62 | 50 | 18 | 4,5 | 1,82 |
| 160 | E 42 TR 160 | 2185 | 230 | 13 15 18 21<br>23 26 27 30<br>31 36 42 | 9 | 1 | 92 | 77 | 111 | 70 | 56 | 18 | 4,5 | 2,76 |
| 160 | E 66 TR 160 | 2186 | 230 | 21 23 25 28<br>30,5 33 42 46<br>50 56 61 66 | 9 | 1 | 92 | 77 | 111 | 70 | 56 | 18 | 4,5 | 2,80 |
| 250 | E 84 TR 250 | 2187 | 230 | 26 28 31 35<br>38 42 52 56<br>62 70 76 84 | 6 | 2 | 131 | 110 | 125 | 100 | 80 | 26 | 7,0 | 5,70 |

## Dimensioning

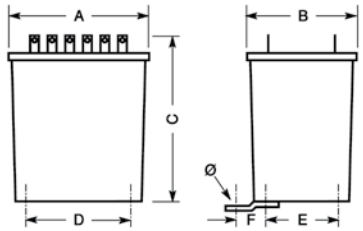



fig. 1

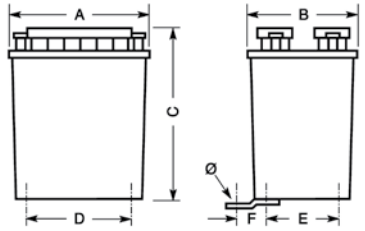



fig. 2

Voltage-current table: $I_{SEC}$ (A) at a given $U_{SEC}$ (V)

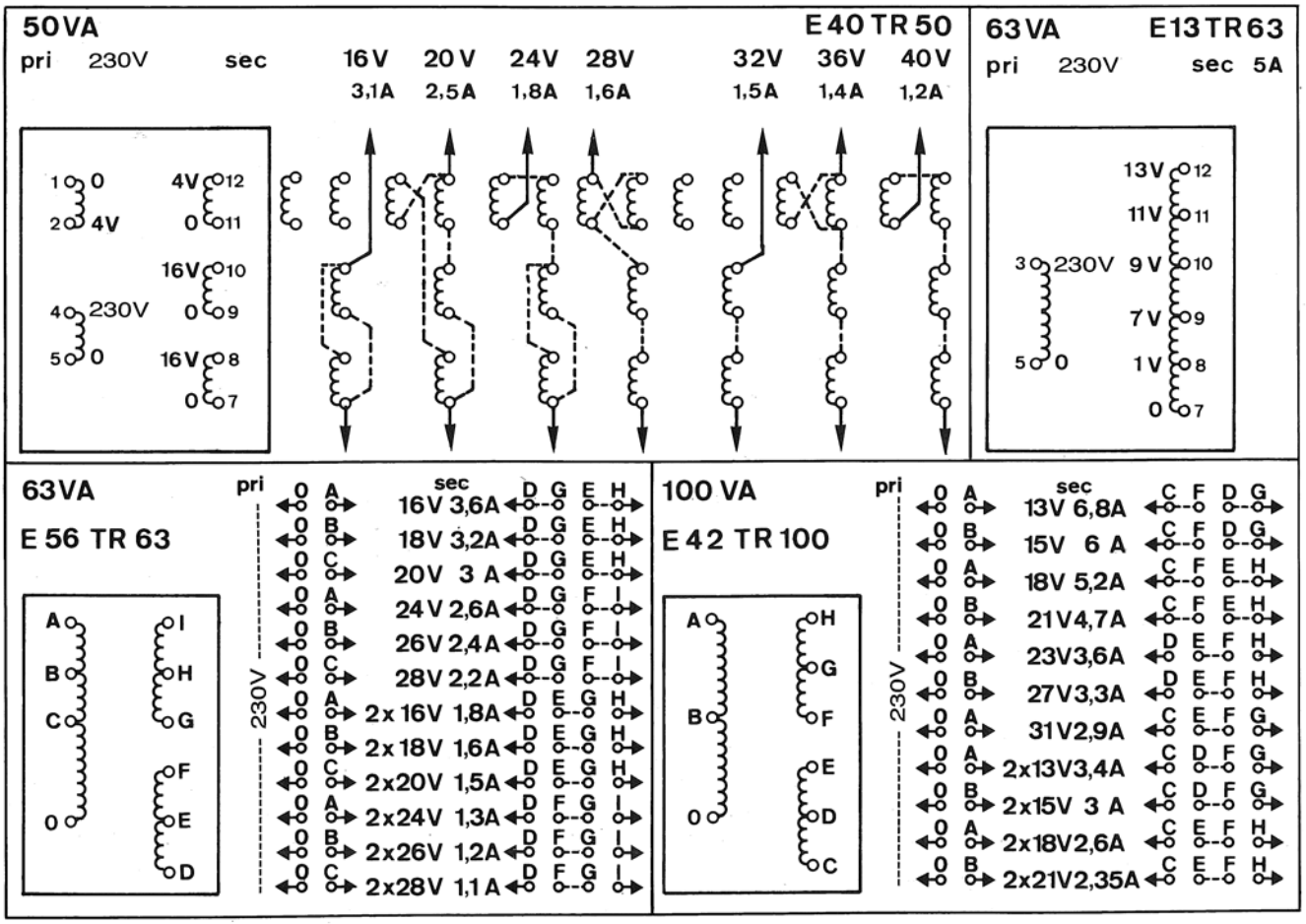
| | $U_{SEC}$ (V) | 1 | 7 | 9 | 11 | 13 | 15 | 16 | 18 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ps (VA) | type | $I_{SEC}$ (A) | | | | | | | | | | | | | |
| 50 | E 40 TR 50 | | | | | | | 3,1 | | 2,5 | | | | 1,8 | |
| 63 | E 13 TR 63 | 5 | 5 | 5 | 5 | 5,0 | | | | | | | | | |
| 63 | E 56 TR 63 | | | | | | | 3,6 | 3,2 | 3,0 | | | | 2,6 | |
| 100 | E 42 TR 100 | | | | | 6,8 | 6 | | 5,2 | | 4,7 | | 3,6 | | |
| 100 | E 62 TR 100 | | | | | | | | | 4,4 | | 4,2 | | 3,9 | |
| 160 | E 42 TR 160 | | | | | 11,2 | 10 | | 8,6 | | 7,6 | | 6,0 | | |
| 160 | E 66 TR 160 | | | | | | | | | | 7,0 | | 6,5 | | 6 |
| 250 | | | | | | | | | | | | | | | |

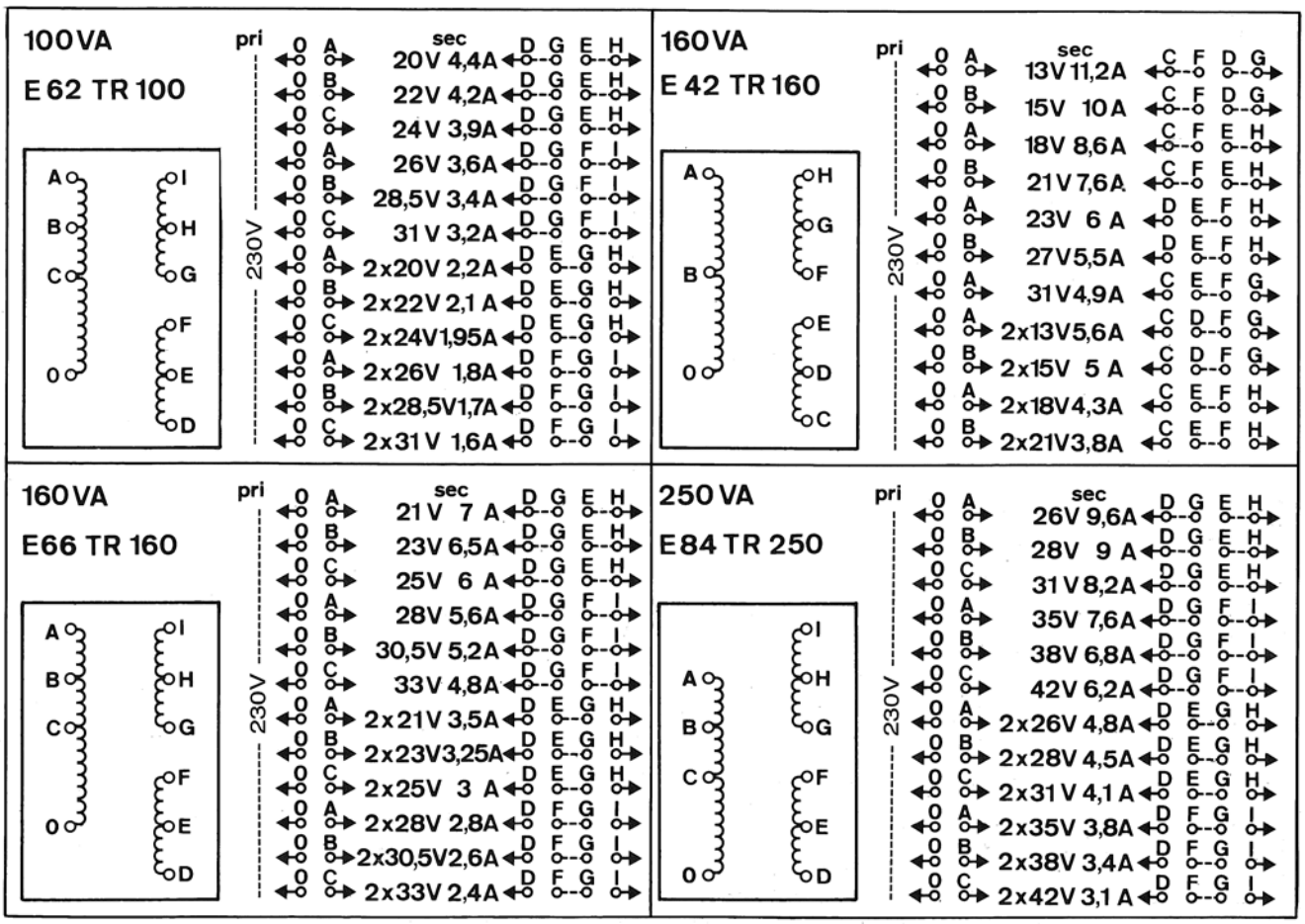
| | $U_{SEC}$ (V) | 2x13 | 2x15 | 2x16 | 2x18 | 2x20 | 2x21 | 2x22 | 2x23 | 2x24 | 2x25 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ps (VA) | type | $I_{SEC}$ (A) | | | | | | | | | |
| 50 | | | | | | | | | | | |
| 63 | E 56 TR 63 | | | 1,8 | 1,6 | 1,5 | | 1,30 | | | |
| 63 | | | | | | | | | | | |
| 100 | E 42 TR 100 | 3,4 | 3 | | 2,6 | | 2,35 | | | | |
| 100 | E 62 TR 100 | | | | | 2,2 | | 2,1 | | 1,95 | |
| 160 | E 42 TR 160 | 5,6 | 5 | | 4,3 | | 3,80 | | | | |
| 160 | E 66 TR 160 | | | | | | 3,50 | | 3,25 | | 3 |
| 250 | | | | | | | | | | | |

| | $U_{SEC}$ (V) | 26 | 27 | 28 | 28,5 | 30 | 30,5 | 31 | 32 | 33 | 35 | 36 | 38 | 40 | 42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ps (VA) | type | $I_{SEC}$ (A) | | | | | | | | | | | | | |
| 50 | E 40 TR 50 | | | 1,6 | | | | | 1,5 | | | 1,4 | | 1,2 | |
| 63 | E 13 TR 63 | | | | | | | | | | | | | | |
| 63 | E 56 TR 63 | 2,4 | | 2,2 | | | | | 1,8 | | | 1,6 | | 1,5 | |
| 100 | E 42 TR 100 | 3,4 | 3,3 | | | 3 | | 2,9 | | | | 2,6 | | | 2,35 |
| 100 | E 62 TR 100 | 3,6 | | | 3,4 | | | 3,2 | | | | | | 2,2 | |
| 160 | E 42 TR 160 | 5,6 | 5,5 | | | 5 | | 4,9 | | | | 4,3 | | | 3,80 |
| 160 | E 66 TR 160 | | | 5,6 | | | 5,2 | | | 4,8 | | | | | 3,50 |
| 250 | E 84 TR 250 | 9,6 | | 9,0 | | | | 8,2 | | | 7,6 | | 6,8 | | 6,20 |

| | $U_{SEC}$ (V) | 2x26 | 2x28 | 2x28,5 | 2x30,5 | 2x31 | 2x33 | 2x35 | 2x38 | 2x42 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ps (VA) | type | $I_{SEC}$ (A) | | | | | | | | |
| 50 | | | | | | | | | | |
| 63 | E 56 TR 63 | 1,2 | 1,1 | | | | | | | |
| 63 | | | | | | | | | | |
| 100 | E 62 TR 100 | 1,8 | | 1,7 | | 1,6 | | | | |
| 100 | | | | | | | | | | |
| 160 | E 66 TR 160 | | 2,8 | | 2,6 | | 2,4 | | | |
| 160 | | | | | | | | | | |
| 250 | E 84 TR 250 | 4,8 | 4,5 | | | 4,1 | | 3,8 | 3,4 | 3,1 |

| | $U_{SEC}$ (V) | 44 | 46 | 48 | 50 | 52 | 56 | 57 | 61 | 62 | 66 | 70 | 76 | 84 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ps (VA) | type | $I_{SEC}$ (A) | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | |
| 63 | E 56 TR 63 | | | 1,30 | | 1,2 | 1,1 | | | | | | | |
| 63 | | | | | | | | | | | | | | |
| 100 | E 62 TR 100 | 2,1 | | 1,95 | | 1,8 | | 1,7 | | 1,6 | | | | |
| 100 | | | | | | | | | | | | | | |
| 160 | E 66 TR 160 | | 3,25 | | 3 | | 2,8 | | 2,6 | | 2,4 | | | |
| 160 | | | | | | | | | | | | | | |
| 250 | E 84 TR 250 | | | | | 4,8 | 4,5 | | | 4,1 | | 3,8 | 3,4 | 3,1 |


50VA
pri 230V sec
E 40 TR 50
16V 3,1A
20V 2,5A
24V 1,8A
28V 1,6A
32V 1,5A
36V 1,4A
40V 1,2A
63VA
E13TR63
pri 230V sec 5A
13V
11V
9V
7V
1V
63VA
E 56 TR 63
pri
sec
16V 3,6A
18V 3,2A
20V 3 A
24V 2,6A
26V 2,4A
28V 2,2A
2x16V 1,8A
2x18V 1,6A
2x20V 1,5A
2x24V 1,3A
2x26V 1,2A
2x28V 1,1A
230V
100 VA
E 42 TR 100
13V 6,8A
15V 6 A
18V 5,2A
21V4,7A
23V3,6A
27V3,3A
31V2,9A
2x13V3,4A
2x15V 3 A
2x18V2,6A
2x21V2,35A


100VA
E 62 TR 100
pri
sec
20V 4,4A
22V 4,2A
24V 3,9A
26V 3,6A
28,5V 3,4A
31V 3,2A
2x20V 2,2A
2x22V 2,1 A
2x24V1,95A
2x26V 1,8A
2x28,5V1,7A
2x31V 1,6A
230V
160VA
E 42 TR 160
13V 11,2A
15V 10A
18V 8,6A
21V 7,6A
23V 6 A
27V5,5A
31V4,9A
2x13V5,6A
2x15V 5 A
2x18V4,3A
2x21V3,8A
160VA
E66 TR 160
21V 7 A
23V 6,5A
25V 6 A
28V 5,6A
30,5V 5,2A
33V 4,8A
2x21V 3,5A
2x23V3,25A
2x25V 3 A
2x28V 2,8A
2x30,5V2,6A
2x33V 2,4A
250 VA
E84 TR 250
26V 9,6A
28V 9 A
31V8,2A
35V 7,6A
38V 6,8A
42V 6,2A
2x26V 4,8A
2x28V 4,5A
2x31V 4,1 A
2x35V 3,8A
2x38V 3,4A
2x42V 3,1 A

# 2.2 Single-phase isolating transformers
# 63 VA to 630 VA

## Common properties

for all applications

**characteristics**

- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- secondary winding: double 'zero-terminal' (interconnected) to enable earthing of the secondary circuit
- no earthing required
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II
- degree of protection IP20
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 50 °C

**connections**

- screw terminal block

**fixing**

- for DIN-rail mounting up to 160 VA – fixing support provided
- support with fixing holes from 250 VA

**standards**

EN 61558-2-4 (EN 60742)

**special executions on request**

- other voltages and power ratings
- with electrostatic screens
- with fuse in the secondary circuit see p. 29

## Product presentation

EDR 2115TI100

E 230TI250

E 230TI400

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Rdt % | Ucc % |
|---|---|---|---|---|---|---|---|---|
| 63 | EDR 2115TI63 | 3980 | 0-230-400 | 2 x 0 - 115 | 12,6 | 3,2 | 85 | 10,6 |
| 100 | EDR 2115TI100 | 3981 | 0-230-400 | 2 x 0 - 115 | 9,1 | 4,4 | 88 | 9,2 |
| 160 | EDR 2115TI160 | 3982 | 0-230-400 | 2 x 0 - 115 | 8,4 | 6,2 | 89 | 9,6 |
| 250 | E 2115TI250 | 3983 | 0-230-400 | 2 x 0 - 115 | 5,9 | 10,3 | 91 | 7,2 |
| 400 | E 2115TI400 | 3984 | 0-230-400 | 2 x 0 - 115 | 4,4 | 15,5 | 92 | 3,6 |
| 630 | E 2115TI630 | 3985 | 0-230-400 | 2 x 0 - 115 | 3,6 | 20,8 | 94 | 3,2 |
| 63 | EDR 230TI63 | 2301 | 0-230-400 | 0-0-230 | 12,5 | 3,2 | 85 | 10,6 |
| 100 | EDR 230TI100 | 2302 | 0-230-400 | 0-0-230 | 9,1 | 4,4 | 88 | 9,2 |
| 160 | EDR 230TI160 | 2303 | 0-230-400 | 0-0-230 | 8,4 | 6,2 | 89 | 9,6 |
| 250 | E 230TI250 | 2304 | 0-230-400 | 0-0-230 | 5,9 | 10,3 | 91 | 7,2 |
| 400 | E 230TI400 | 2635 | 0-230-400 | 0-0-230 | 4,4 | 15,5 | 92 | 3,6 |
| 630 | E 230TI630 | 2636 | 0-230-400 | 0-0-230 | 3,6 | 20,8 | 94 | 3,2 |

Connection principle serial / parallel – Chapter 2.6

## Dimensioning

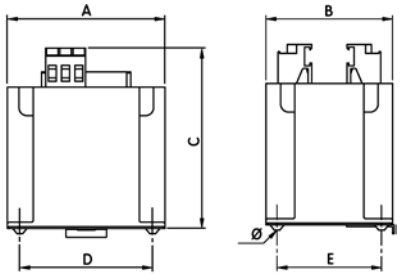



fig. 1

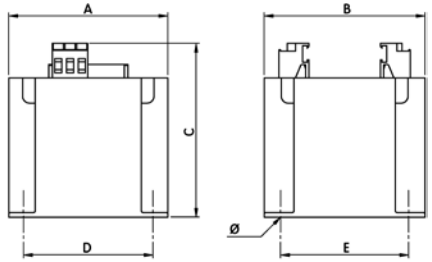



fig. 2

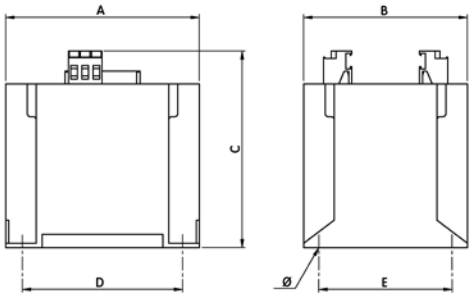



fig. 3

| Ps VA | type | code | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | connections Pri mm² | connections Sec mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | EDR 2115TI63 | 3980 | 1 | 80 | 70 | 96 | 67 | 56 | 4,5 | 1,5 | 4 | 4 |
| 100 | EDR 2115TI100 | 3981 | 1 | 89 | 72 | 102 | 75 | 58 | 4,5 | 1,9 | 4 | 4 |
| 160 | EDR 2115TI160 | 3982 | 1 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 250 | E 2115TI250 | 3983 | 2 | 102 | 102 | 110 | 84 | 86 | 5,5 | 3,8 | 4 | 4 |
| 400 | E 2115TI400 | 3984 | 3 | 130 | 110 | 132 | 105 | 90 | 6 | 6,4 | 4 | 4 |
| 630 | E 2115TI630 | 3985 | 3 | 160 | 116 | 157 | 130 | 95 | 6 | 8,7 | 4 | 4 |
| 63 | EDR 230TI63 | 2301 | 1 | 80 | 70 | 96 | 67 | 56 | 4,5 | 1,5 | 4 | 4 |
| 100 | EDR 230TI100 | 2302 | 1 | 89 | 72 | 102 | 75 | 58 | 4,5 | 1,9 | 4 | 4 |
| 160 | EDR 230TI160 | 2303 | 1 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 250 | E 230TI250 | 2304 | 2 | 102 | 102 | 110 | 84 | 86 | 5,5 | 3,8 | 4 | 4 |
| 400 | E 230TI400 | 2635 | 3 | 130 | 110 | 132 | 105 | 90 | 6 | 6,4 | 4 | 4 |
| 630 | E 230TI630 | 2636 | 3 | 160 | 116 | 157 | 130 | 95 | 6 | 8,7 | 4 | 4 |

EN

DE

# 2.3 Single-phase isolating transformers – IP 54
## 100 VA to 630 VA

## Common properties

for all applications

**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- no earthing required
- mechanically vibration-free
- humidity and corrosion resistant
- protection class II
- degree of protection IP54
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**connections**
- screw terminal block

**fixing**
- with screws (included)
- with fixing lugs (included)
- support with fixing holes (types EFSP 400 and 630)

**standards**
EN 61558-2-4 (EN 60742)

**special executions on request**
- other voltages and power ratings
- connections with insulated wires and with mains cables
- connections with FAST-ON connectors 4,8 x 0,5 mm (from type 100 VA up to 160 VA)
- with fuses
- with electrostatic screens

## Product presentation

EFSP 250

EFSP 630

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | Po W | Rdt % | Ucc % |
|---|---|---|---|---|---|---|---|---|
| 100 | EFSP 100 | 2065 | 0-230-400 | 2 x 0 – 115 | 5,1 | 6,5 | 85 | 5,9 |
| 160 | EFSP 160 | 2066 | 0-230-400 | 2 x 0 – 115 | 7,2 | 8,0 | 89 | 7,6 |
| 250 | EFSP 250 | 2067 | 0-230-400 | 2 x 0 – 115 | 6,4 | 10,0 | 90 | 7,3 |
| 400 | EFSP 400 | 2068 | 0-230-400 | 2 x 0 – 115 | 3,8 | 15,5 | 92 | 3,5 |
| 630 | EFSP 630 | 2069 | 0-230-400 | 2 x 0 – 115 | 3,6 | 20,5 | 94 | 3,2 |

Connection principle serial / parallel – Chapter 2.6

## Dimensioning

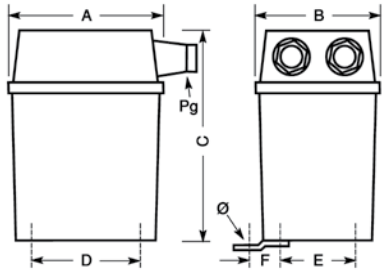



fig. 1

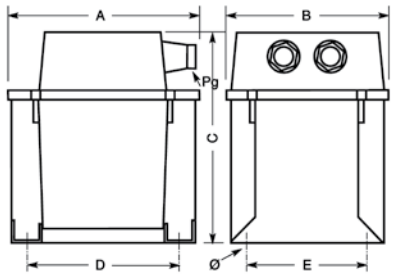



fig. 2

| Ps VA | type | code | fig. | A mm | B mm | C mm | D mm | E mm | F mm | Ø mm | Pg mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | EFSP 100 | 2065 | 1 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 11 | 2,2 |
| 160 | EFSP 160 | 2066 | 1 | 95 | 80 | 133 | 70 | 56 | 18 | 4,5 | 11 | 3,0 |
| 250 | EFSP 250 | 2067 | 1 | 107 | 90 | 142 | 80 | 64 | 18 | 4,5 | 11 | 3,8 |
| 400 | EFSP 400 | 2068 | 2 | 135 | 115 | 160 | 105 | 90 | - | 6,0 | 11 + 13,5 | 7,6 |
| 630 | EFSP 630 | 2069 | 2 | 165 | 120 | 185 | 130 | 95 | - | 6,0 | 11 + 13,5 | 11,5 |

EN
DE

# 2.4 Isolating transformers
## 1 kVA to 10 kVA

## Common properties

for all applications

**characteristics**
- vacuum- and pressure- varnish impregnated
- separate windings
- reversible
- on primary side: + 15 V branch (for higher input voltage)
- provided with one earthing terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- **IP20, IP23, IP65 – protection cases: chapter 9**

**connections**
- screw terminals

**fixing**
- supports or angle sections with fixing holes

**standards**
EN 61558-2-4 (EN 60742)

**special executions on request**
- protection class II (enclosed execution)
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- connections with power socket outlets and with mains cables
- with fuses
- with electrostatic screens
- tropicalized

## Product presentation


230TC1000


230TC4000


U 22 763

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | Po W | Rdt % | Ucc % | Pcu W | case IP20 fig.3 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 230TC1000 | 2207 | 15-0-230-400 | 2 x 0-115 | 3,3 | 32 | 94 | 2,9 | 33 | U 22 763 |
| 1600 | 230TC1600 | 2208 | 15-0-230-400 | 2 x 0-115 | 2,7 | 48 | 95 | 2,6 | 44 | U 22 757 |
| 2500 | 230TC2500 | 2209 | 15-0-230-400 | 2 x 0-115 | 1,8 | 68 | 96 | 1,7 | 44,5 | U 22 757 |
| 4000 | 230TC4000 | 2210 | 15-0-230-400 | 2 x 0-115 | 2,9 | 50 | 96 | 2,5 | 118 | U 222 751 |
| 6300 | 230TC6300 | 2211 | 15-0-230-400 | 2 x 0-115 | 2,7 | 58 | 97 | 2,4 | 166 | U 222 748 |
| 10000 | 230TC10000 | 2212 | 15-0-230-400 | 2 x 0-115 | 1,8 | 75 | 97 | 1,7 | 184 | U 222 748 |

Connection principle serial / parallel – Chapter 2.6

## Dimensioning

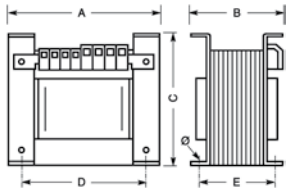


fig. 1

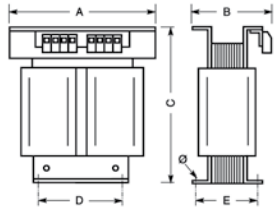


fig. 2

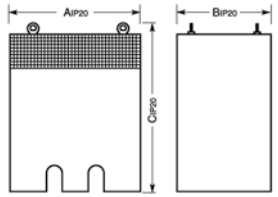


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. Pri mm² | conn. Sec mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 230TC1000 | 1 | 180 | 120 | 175 | 150 | 90 | 9 | 14 | 2,5 | 2,5 | 203 | 160 | 180 | 1,8 |
| 1600 | 230TC1600 | 1 | 240 | 130 | 225 | 200 | 107 | 11 | 22 | 4 | 4 | 273 | 210 | 231 | 3,0 |
| 2500 | 230TC2500 | 1 | 240 | 160 | 225 | 200 | 137 | 11 | 33 | 4 | 4 | 273 | 210 | 231 | 3,0 |
| 4000 | 230TC4000 | 2 | 240 | 180 | 310 | 150 | 140 | 11 | 35 | 10 | 10 | 268 | 225 | 360 | 4,0 |
| 6300 | 230TC6300 | 2 | 320 | 190 | 415 | 210 | 150 | 11 | 50 | 10 | 10 | 348 | 305 | 465 | 7,4 |
| 10000 | 230TC10000 | 2 | 320 | 210 | 415 | 210 | 170 | 11 | 73 | 10 | 10 | 348 | 305 | 465 | 7,4 |

## Vibration damper

For TC series 1000VA – 10.000VA: use Silentblock 20
See Chapter 10: Vibration damper

EN
DE

# 2.5 Single-phase Isolating transformers for loading electric vehicles Low inrush current – Energy efficient

**3,7 – 7,4 – 11 kVA** PRI 1ph 230V-245V // SEC 1ph 230V+N

## Common properties

Specifically for situations that require a low inrush current, such as charging stations or heat pumps in a residential or tertiary environment.

**characteristics**

- inrush current: < 8x Inominal
- primary and secondary windings electrically isolated by means of reinforced insulation
- vacuum- and pressure- varnish impregnated
- natural convection cooling
- on primary side: + 15 V branch (for higher input voltage)
- provided with one earthing terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Vibration damper: Silentblock: chapter 10**

**connections**

- screw terminals

**fixing**

- supports or angles with fixing holes

**standards**

EN 61558-2-2 – EN 61558-2-4

## Product presentation

230EC3700/IRC

230EC7400/IRC

K20EC/030

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 3700 | 230EC3700/IRC | 11536 | 230V-245V | 230V+N | 2,1 | 42 | 78 | 96,9 | K20EC/030 |
| 7400 | 230EC7400/IRC | 11537 | 230V-245V | 230V+N | 2,1 | 45 | 152 | 97,4 | K20EC/035 |
| 11000 | 230EC11000/IRC | 11580 | 230V-245V | 230V+N | 1,7 | 40 | 190 | 98,0 | K20EC/045 |

## Dimensioning

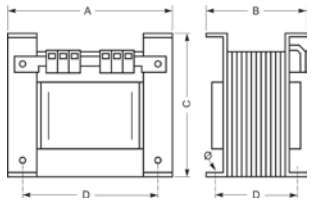



fig. 1

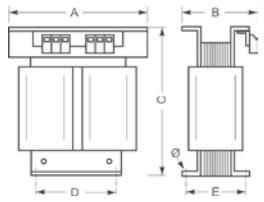



fig. 2

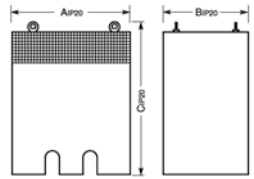


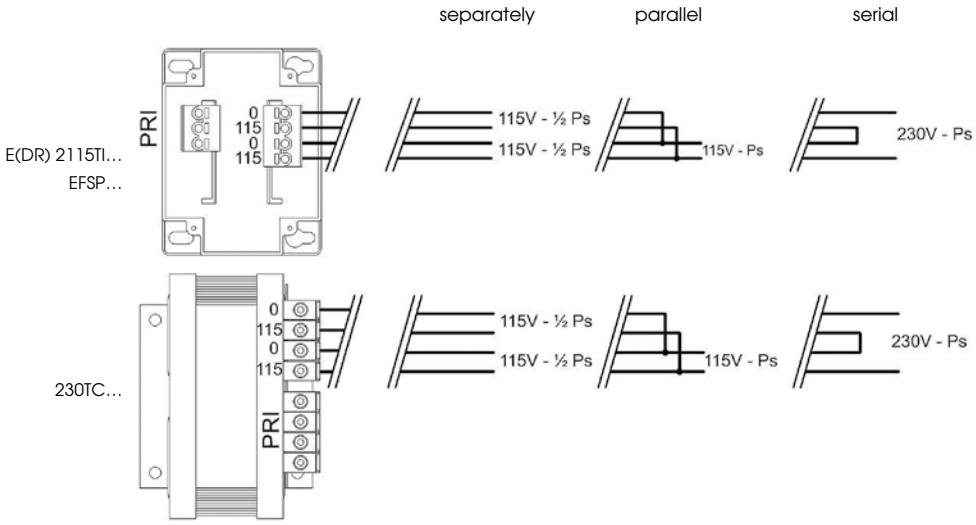

fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3700 | 230EC3700/IRC | 1 | 240 | 200 | 225 | 200 | 177 | 11,0 | 47 | 10 | 270 | 250 | 240 | 50,3 |
| 7400 | 230EC7400/IRC | 2 | 280 | 230 | 365 | 180 | 178 | 11,5 | 76 | 10 | 307 | 268 | 420 | 81,6 |
| 11000 | 230EC11000/IRC | 2 | 320 | 260 | 415 | 210 | 220 | 11,5 | 107 | 10 | 350 | 355 | 470 | 115,6 |

## Vibration damper

For EC series 3700VA – 11.000VA: use Silentblock 20 – 50
See Chapter 10: Vibration damper

## 2.6 Connection principle serial / parallel 2 x 115V






3

# Single-phase control transformers

EN

DE

# 3.1 Single-phase control transformers – 24 V
# 40 VA to 630 VA

## Common properties

for all applications, especially designed for inrush power in control circuits (contactor and relay coils)

**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- on primary side: + 15 V branch (for higher input voltage)
- secondary winding: double 'zero terminal' (interconnected) for possible earthing of the secondary circuit (up to 250 VA)
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II
- degree of protection IP20
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 50 °C

**connections**
- screw terminals

**fixing**
- for DIN-rail mounting up to 160 VA fixing plate provided
- angle sections with fixing holes from 250 VA

**standards**
EN 61558-2-2 – EN 61558-2-6 (EN 60472)

**special executions on request**
- other voltages and power ratings
- connections with electrostatic screens
- FAST-ON connectors 4,8 x 0,5 mm
- with fuse in the secondary circuit see p. 31

## Product presentation


EDR 24TC63


E 24TC250


E 24TC630

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | inrush power VA (1) | dU % | Po W | Rdt % | Ucc % |
|---|---|---|---|---|---|---|---|---|---|
| 40 | EDR 24TC40 | 2220 | 15-0-230-400 | 0-0-24 | 90 | 6,3 | 3,3 | 87 | 5,7 |
| 63 | EDR 24TC63 | 2221 | 15-0-230-400 | 0-0-24 | 160 | 4,9 | 4,5 | 89 | 4,4 |
| 100 | EDR 24TC100 | 2222 | 15-0-230-400 | 0-0-24 | 260 | 4,4 | 6,3 | 90 | 3,8 |
| 160 | EDR 24TC160 | 2223 | 15-0-230-400 | 0-0-24 | 430 | 8,1 | 6,1 | 89 | 7,6 |
| 250 | E 24TC250 | 2224 | 15-0-230-400 | 0-0-24 | 680 | 5,8 | 10,2 | 91 | 5,3 |
| 400 | E 24TC400 | 2225 | 15-0-230-400 | 0-24 | 1100 | 4,3 | 15,5 | 92 | 3,8 |
| 630 | E 24TC630 | 2226 | 15-0-230-400 | 0-24 | 1800 | 3,9 | 20,8 | 93 | 3,4 |

(1) : at $\cos\phi = 0,5$

## Dimensioning

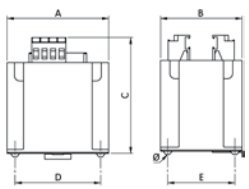


fig. 1

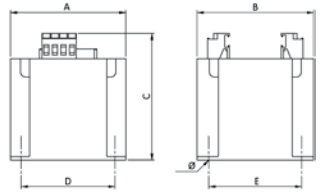


fig. 2

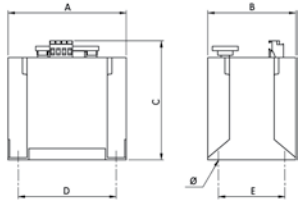


fig. 3

| Ps VA | type | code | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | connections Pri mm² | connections Sec mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | EDR 24TC40 | 2220 | 1 | 80 | 70 | 96 | 67 | 56 | 4,5 | 1,5 | 4 | 4 |
| 63 | EDR 24TC63 | 2221 | 1 | 89 | 72 | 102 | 75 | 58 | 4,5 | 1,9 | 4 | 4 |
| 100 | EDR 24TC100 | 2222 | 1 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 160 | EDR 24TC160 | 2223 | 1 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 250 | E 24TC250 | 2224 | 2 | 102 | 102 | 110 | 84 | 86 | 5,5 | 3,3 | 4 | 4 |
| 400 | E 24TC400 | 2225 | 3 | 130 | 110 | 132 | 105 | 90 | 6 | 6,4 | 4 | 6 |
| 630 | E 24TC630 | 2226 | 3 | 160 | 116 | 157 | 130 | 95 | 6 | 8,7 | 4 | 6 |

# 3.2 Single-phase control transformers – 2 x 24 V
## 1 kVA to 2,5 kVA

## Common properties

for all applications, especially designed for inrush power in control circuits (contactor and relay coils)

**characteristics**
- vacuum- and pression- varnish impregnated
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- on primary side: + 15 V branch (for higher input voltage)
- provided with earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40°C
- **IP20, IP23, IP65 – protection cases: chapter 9**

**connections**
- screw terminals

**fixing**
- supports with fixing holes

**standards**
EN 61558-2-2 – EN 61558-2-6 (EN 60742)

**special executions on request**
- protection class II (enclosed execution)
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- connections with power socket outlets and with mains cables
- with fuses
- with electrostatic screens
- tropicalized

## Product presentation


224TC1000


224TC2500


U 22 763

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | inrush power VA (1) | dU % | Po W | Rdt % | Ucc % | case IP20 fig.2 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 224TC1000 | 2227 | 15-0-230-400 | 2 x 0-24 | 3200 | 3,5 | 31,9 | 94 | 3,1 | U 22 763 |
| 1600 | 224TC1600 | 2228 | 15-0-230-400 | 2 x 0-24 | 5300 | 3,2 | 43,8 | 94 | 3,1 | U 22 757 |
| 2500 | 224TC2500 | 2229 | 15-0-230-400 | 2 x 0-24 | 8200 | 1,8 | 69,9 | 96 | 1,7 | U 22 757 |

(1) : at cos ϕ = 0,5
Connection principle serial / parallel – chapter 3.6

## Dimensioning

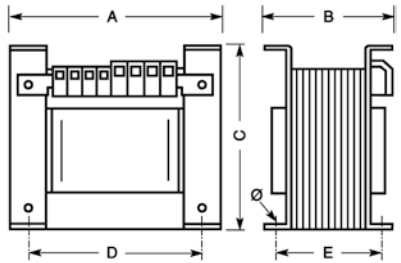


fig. 1

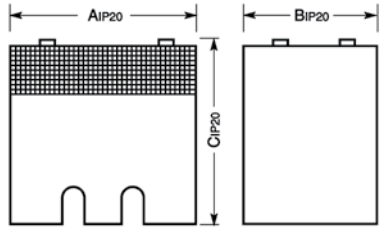


fig. 2

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. Pri mm² | conn. Sec mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 224TC1000 | 1 | 180 | 120 | 175 | 150 | 90 | 9 | 14 | 2,5 | 4 | 203 | 160 | 180 | 1,8 |
| 1600 | 224TC1600 | 1 | 240 | 130 | 225 | 200 | 107 | 11 | 22 | 4 | 10 | 273 | 210 | 231 | 3,0 |
| 2500 | 224TC2500 | 1 | 240 | 160 | 225 | 200 | 137 | 11 | 33 | 4 | 10 | 273 | 210 | 231 | 3,0 |

## Vibration damper

For TC series1000VA – 10.000VA: use Silentblock 20
See Chapter 10: Vibration damper

EN
DE

# 3.3 Single-phase control transformers – 230 V
# 40 VA to 630 VA

## Common properties

for all applications, especially designed for inrush power in control circuits (contactor and relay coils)

**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- separate windings
- on primary side: + 15 V branch (for higher input voltage)
- secondary winding: double 'zero terminal' (interconnected) to enable earthing of the secondary circuit
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II
- degree of protection IP20
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 50°C

**connections**
- screw terminals

**fixing**
- for DIN-rail mounting up to 160 VA fixing plate provided
- angle sections with fixing holes from 250 VA

**standards**
EN 61558-2-2 – EN 61558-2-4 (EN 60742)

**special executions on request**
- other voltages and other power ratings
- with electrostatic screens
- with fuses in the secondary circuit

see p. 31

## Product presentation


EDR 230TC160


E 230TC250


E 230TC400

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | inrush power VA (1) | dU % | Po W | Rdt % | Ucc % |
|---|---|---|---|---|---|---|---|---|---|
| 40 | EDR 230TC40 | 2200 | 15-0-230-400 | 0-0-230 | 90 | 6,2 | 3,3 | 87 | 5,6 |
| 63 | EDR 230TC63 | 2201 | 15-0-230-400 | 0-0-230 | 160 | 4,9 | 4,5 | 89 | 4,4 |
| 100 | EDR 230TC100 | 2202 | 15-0-230-400 | 0-0-230 | 260 | 4,5 | 6,3 | 90 | 3,9 |
| 160 | EDR 230TC160 | 2203 | 15-0-230-400 | 0-0-230 | 430 | 8,4 | 6,1 | 89 | 7,9 |
| 250 | E 230TC250 | 2204 | 15-0-230-400 | 0-0-230 | 680 | 5,6 | 10,2 | 91 | 5,1 |
| 400 | E 230TC400 | 2205 | 15-0-230-400 | 0-0-230 | 1100 | 4,4 | 15,5 | 92 | 3,9 |
| 630 | E 230TC630 | 2206 | 15-0-230-400 | 0-0-230 | 1800 | 3,6 | 20,8 | 94 | 3,2 |

(1) : at cos ϕ = 0,5

## Dimensioning

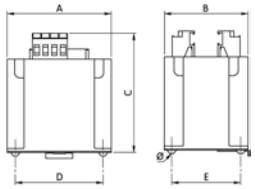


fig. 1

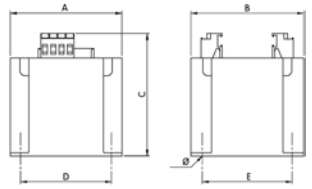


fig. 2

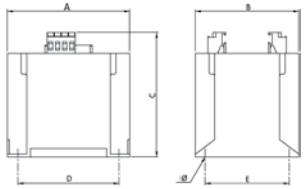


fig. 3

| Ps VA | type | code | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | connections Pri mm² | connections Sec mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | EDR 230TC40 | 2200 | 1 | 80 | 70 | 96 | 97 | 67 | 56 | 1,5 | 4 | 4 |
| 63 | EDR 230TC63 | 2201 | 1 | 89 | 72 | 102 | 75 | 58 | 4,5 | 1,9 | 4 | 4 |
| 100 | EDR 230TC100 | 2202 | 1 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 160 | EDR 230TC160 | 2203 | 1 | 101 | 79 | 112 | 84 | 62 | 5,5 | 2,6 | 4 | 4 |
| 250 | E 230TC250 | 2204 | 2 | 102 | 102 | 110 | 84 | 86 | 5,5 | 3,3 | 4 | 4 |
| 400 | E 230TC400 | 2205 | 3 | 130 | 110 | 132 | 105 | 90 | 6 | 6,4 | 4 | 4 |
| 630 | E 230TC630 | 2206 | 3 | 160 | 116 | 157 | 130 | 95 | 6 | 8,7 | 4 | 4 |

# 3.4 Single-phase control transformers – 2 x 115 V
# 1 kVA tot 10 kVA

## Common properties

for all applications, especially designed to supply inrush power
in control circuits (contactor and relay coils)

**characteristics**
- vacuum- and pression- varnish impregnated
- separate windings
- reversible
- on primary side: + 15 V branch (for higher input voltage)
- provided with earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40°C
- **IP20, IP23, IP65 – protection cases: chapter 9**

**connections**
- screw terminals with screw fixing

**fixing**
- supports with fixing holes

**standards**
EN 61558-2-2 – EN 61558-2-4 (EN 60472)

**special executions on request**
- protection class II (enclosed execution)
- degree of protection IP23 and IP65 (watertight)
- other voltages and other power ratings
- connections with power socket outlets and with mains cables
- with fuses
- with electrostatic screens
- tropicalized

## Product presentation


230TC2500


230TC4000


U 22 763

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | inrush power VA (1) | dU % | Po W | Rdt % | Ucc % | Pcu W | case IP20 fig.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 230TC1000 | 2207 | 15-0-230-400 | 2 x 0-115 | 3200 | 3,3 | 32 | 94 | 2,9 | 33 | U 22 763 |
| 1600 | 230TC1600 | 2208 | 15-0-230-400 | 2 x 0-115 | 5300 | 2,7 | 48 | 95 | 2,6 | 44 | U 22 757 |
| 2500 | 230TC2500 | 2209 | 15-0-230-400 | 2 x 0-115 | 8200 | 1,8 | 68 | 96 | 1,7 | 45 | U 22 757 |
| 4000 | 230TC4000 | 2210 | 15-0-230-400 | 2 x 0-115 | 11000 | 2,9 | 50 | 96 | 2,5 | 118 | U 222 751 |
| 6300 | 230TC6300 | 2211 | 15-0-230-400 | 2 x 0-115 | 17000 | 2,7 | 58 | 97 | 2,4 | 166 | U 222 748 |
| 10000 | 230TC10000 | 2212 | 15-0-230-400 | 2 x 0-115 | 27000 | 1,8 | 75 | 97 | 1,7 | 184 | U 222 748 |

(1) : at cos ϕ = 0,5
Connection principle serial / parallel – Chapter 3.6

## Dimensioning

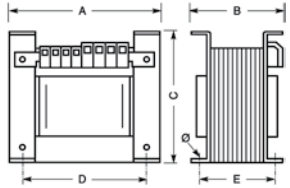


fig. 1

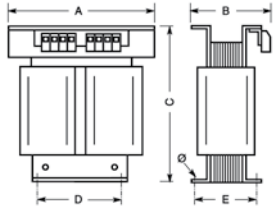


fig. 2

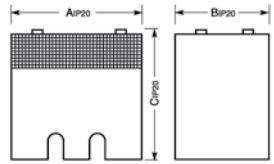


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. Pri mm² | conn. Sec mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | 230TC1000 | 1 | 180 | 120 | 175 | 150 | 90 | 9 | 14 | 2,5 | 2,5 | 203 | 160 | 180 | 1,8 |
| 1600 | 230TC1600 | 1 | 240 | 130 | 225 | 200 | 107 | 11 | 22 | 4 | 4 | 273 | 210 | 231 | 3,0 |
| 2500 | 230TC2500 | 1 | 240 | 160 | 225 | 200 | 137 | 11 | 33 | 4 | 4 | 273 | 210 | 231 | 3,0 |
| 4000 | 230TC4000 | 2 | 240 | 180 | 310 | 150 | 140 | 11 | 35 | 10 | 10 | 268 | 225 | 360 | 4,0 |
| 6300 | 230TC6300 | 2 | 320 | 190 | 415 | 210 | 150 | 11 | 50 | 10 | 10 | 348 | 305 | 465 | 7,4 |
| 10000 | 230TC10000 | 2 | 320 | 210 | 415 | 210 | 170 | 11 | 73 | 10 | 10 | 348 | 305 | 465 | 7,4 |

## Vibration damper

For TC series 1000VA – 10.000VA: use Silentblock 20
See Chapter 10: Vibration damper

EN
DE

# 3.5 Single-phase Isolating transformers for loading electric vehicles Low inrush current – Energy efficient

**3,7 – 7,4 – 11 kVA** PRI 1ph 230V-245V // SEC 1ph 230V+N

## Common properties

Specifically for situations that require a low inrush current, such as charging stations or heat pumps in a residential or tertiary environment.

**characteristics**

- inrush current: < 8x Inominal
- primary and secondary windings electrically isolated by means of reinforced insulation
- vacuum- and pressure- varnish impregnated
- natural convection cooling
- on primary side: + 15 V branch (for higher input voltage)
- provided with one earthing terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Vibration damper: Silentblock: chapter 10**

**connections**

- screw terminals

**fixing**

- supports or angles with fixing holes

**standards**

EN 61558-2-2 – EN 61558-2-4

## Product presentation

230EC3700/IRC

230EC7400/IRC

K20EC/030

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | inrush power VA (1) | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3700 | 230EC3700/IRC | 11536 | 230V-245V | 230V+N | 11000 | 2,1 | 42 | 78 | 96,9 | K20EC/030 |
| 7400 | 230EC7400/IRC | 11537 | 230V-245V | 230V+N | 20000 | 2,1 | 45 | 152 | 97,4 | K20EC/035 |
| 11000 | 230EC11000/IRC | 11580 | 230V-245V | 230V+N | 30000 | 1,7 | 40 | 190 | 98,0 | K20EC/045 |

(1) : at cos ϕ = 0,5

## Dimensioning

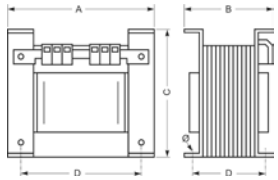


fig. 1

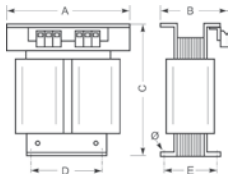


fig. 2

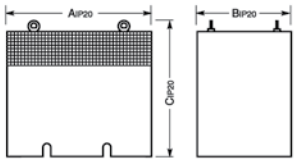


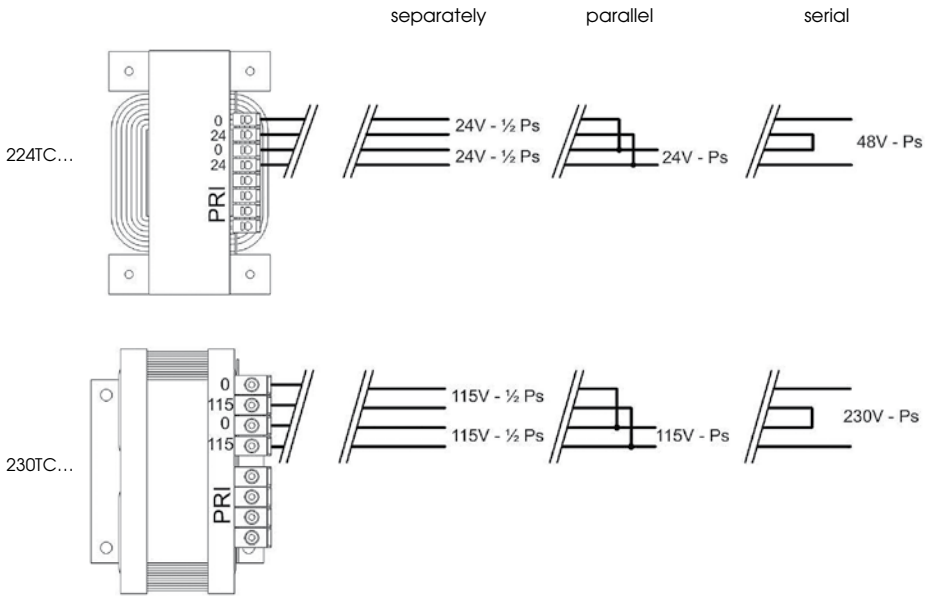
fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3700 | 230EC3700/IRC | 1 | 240 | 200 | 225 | 200 | 177 | 11,0 | 47 | 10 | 270 | 250 | 240 | 50,3 |
| 7400 | 230EC7400/IRC | 2 | 280 | 230 | 365 | 180 | 178 | 11,5 | 76 | 10 | 307 | 268 | 420 | 81,6 |
| 11000 | 230EC11000/IRC | 2 | 320 | 260 | 415 | 210 | 220 | 11,5 | 107 | 10 | 350 | 355 | 470 | 115,6 |

## Vibration damper

For EC series 3700VA – 11.000VA: use Silentblock 20 – 50
See Chapter 10: Vibration damper

## 3.6 Connection principle serial / parallel 2x24V – 2x115V




# 4

# Single-phase autotransformer


EN

DE

# 4.1 Single-phase autotransformer
## 35 VA to 1000 VA

## Common properties

for all applications

**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- windings partly common
- reversible
- no earthing required
- mechanically vibration-free
- humidity and corrosion resistant
- prepared for protection class II
- degree of protection IP00
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**connections**
- screw terminals

**fixing**
- with screws (included)
- with fixing lugs (included)
- provided with fixing lugs (type CA 35 – TAB 750 – TAB 1000)
- on 35 mm rail DIN 46277 (type CA 35 and TAB 200) with accessory part type U 4174 (78 x 65 mm) (to be ordered separately)

**standards**
EN 61558-2-13

**special executions on request**
- other voltages and power ratings
- connections with insulated and mains cables
- FAST-ON connectors 4,8 x 0,5 mm
- with fuses

## Product presentation


CA35


TAB200


FR500

## Dimensioning

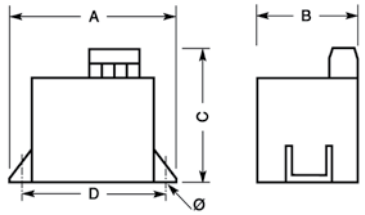


fig. 1

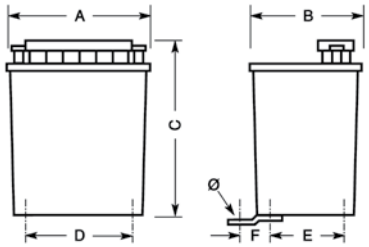


fig. 2

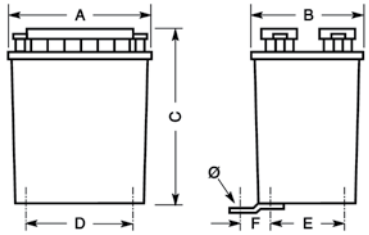


fig. 3

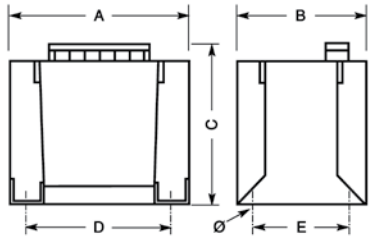


fig. 4

| Ps VA | type | code | U 50-60 Hz | fig. | A mm | B mm | C mm | D mm | E mm | F mm | Ø mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | CA 35 | 2528 | 0-110-130-230 | 1 | 72 | 44 | 58 | 61 | - | - | 3,5 | 0,4 |
| 200 | TAB 200 | 2723 | 0-110-130-230-240 | 2 | 83 | 70 | 98 | 62 | 50 | 18 | 4,5 | 1,7 |
| 500 | FR 500 | 2672 | 0-100-110-120-130 -140-150-190-200 -210-220-230-240 | 3 | 105 | 88 | 119 | 80 | 64 | 18 | 4,5 | 3,7 |
| 750 | TAB 750 | 2724 | 0-110-130-230-240 | 4 | 130 | 110 | 125 | 105 | 90 | - | 6,0 | 6,3 |
| 1000 | TAB 1000 | 2026 | 0-110-130-230-240 | 4 | 160 | 115 | 150 | 130 | 95 | - | 6,0 | 8,9 |

EN
DE

# 4.2 Single-phase autotransformers
## 1,6 kVA to 4 kVA

## Common properties

for industrial applications

**characteristics**
- vacuum- and pressure-varnish impregnated
- windings partly common
- reversible
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength referred to frame 2000 $V_{AC}$
- temperature class B
- maximum ambient temperature $t_a$ 40 °C
- **IP20, IP23, IP65 – protection cases: chapter 9**

**connections**
- screw terminals

**fixing**
- supports with fixing holes

**standards**
EN 60076-11 (EN 60726)
EN 61558-2-13 P<2kVA

**special executions on request**
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- connections with power socket outlets and with mains cables
- with fuses
- tropicalized

## Product presentation

TAB2500

U 22 763

## Technical parameters

| Ps VA | type | code | U 50-60 Hz V | Po W | PCu W | Rdt % | IP20 case |
|---|---|---|---|---|---|---|---|
| 1600 | TAB 1600 | 2027 | 0-110-130-230-240 | 27,0 | 33,5 | 96,4 | U 22763 |
| 2500 | TAB 2500 | 2028 | 0-110-130-230-240 | 34,5 | 36,0 | 97,2 | U 22763 |
| 4000 | TAB 4000 | 2029 | 0-110-130-230-240 | 54,0 | 60,0 | 97,2 | U 22757 |

## Dimensioning

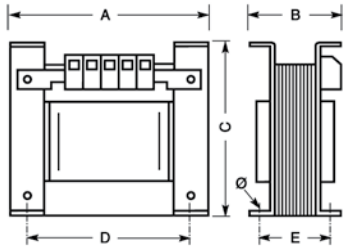



fig. 1

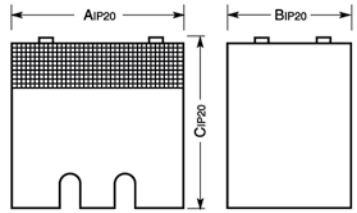



fig. 2

| Ps VA | type | code | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | AIP20 mm | BIP20 mm | CIP20 mm | MIP20 kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1600 | TAB 1600 | 2027 | 1 | 180 | 110 | 174 | 150 | 80 | 9,0 | 12,0 | 203 | 160 | 180 | 13,8 |
| 2500 | TAB 2500 | 2028 | 1 | 180 | 130 | 174 | 150 | 100 | 9,0 | 15,9 | 203 | 160 | 180 | 17,6 |
| 4000 | TAB 4000 | 2029 | 1 | 240 | 145 | 224 | 200 | 122 | 11,0 | 24,9 | 273 | 210 | 231 | 27,9 |

## Vibration damper

For TAB series 1600VA – 4.000VA: Use Silentblock 20
See Chapter 10: Vibration damper

# 5

EN

DE

## Portable single-phase transformers

# 5.1 Portable single-phase safety transformers (24V)
# 100 VA to 630 VA

## Common properties

for all applications

**characteristics**
- separate windings
- output voltage ≤ 50 V (safety extra low voltage)
- in plastic case
- no earthing required
- protection class II
- degree of protection IP44 (protected from water splashes)
- dielectric strength 3550 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**protection**
- transformers are provided with fuse in primary circuit

**connections**
- mains cable
- CEE 17-socket outlet on types ECS (CEE 17-plug included)

**standards**
EN 61558-2-6 (EN 60742)

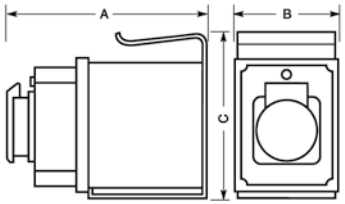
**special executions on request**
- other voltages and power ratings
- with electrostatic screens

## Product presentation

ECS 250

ECS 630

## Dimensioning




| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | PRI | A mm | B mm | C mm | M kg |
|---|---|---|---|---|---|---|---|---|---|
| 100 | ECS 100 | 2653 | 230 | 24 | fuse 0,8 A/T | 186 | 90 | 145 | 3,7 |
| 250 | ECS 250 | 2654 | 230 | 24 | fuse 1,6 A/T | 186 | 90 | 145 | 5,5 |
| 400 | ECS 400 | 2655 | 230 | 24 | fuse 2,5 A/T | 225 | 140 | 215 | 9,2 |
| 630 | ECS 630 | 2656 | 230 | 24 | fuse 4 A/T | 255 | 140 | 215 | 13,2 |

EN
DE

# 5.2 Portable single-phase protection transformers – (230V) – **250 VA to 630 VA**

## Common properties

for all applications

**characteristics**

- separate windings
- in plastic case
- no earthing required
- protection class II
- degree of protection IP44 (protected from water splashes)
- dielectric strength 3550 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**protection**

- transformers are provided with fuse in primary circuit

**connections**

- mains cable
- socket outlet

**standards**

EN 61558-2-4 (EN 60742)

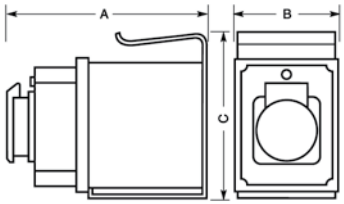
**special executions on request**

- other voltages and power ratings
- with electrostatic screens

## Product presentation

EPSP 400

## Dimensioning




| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | PRI | A mm | B mm | C mm | M kg |
|---|---|---|---|---|---|---|---|---|---|
| 250 | EPSP 250 | 2658 | 230 | 230 | fuse 1,6 A/T | 164 | 90 | 145 | 5,5 |
| 400 | EPSP 400 | 2659 | 230 | 230 | fuse 2,5 A/T | 195 | 140 | 215 | 9,2 |
| 630 | EPSP 630 | 2660 | 230 | 230 | fuse 4 A/T | 225 | 140 | 215 | 13,2 |

EN

DE

# 5.3 Portable single-phase autotransformers
# 100 VA to 1,5 kVA

## Common properties

for all applications

**characteristics**

- windings partly common
- reversible
- in plastic case (types, BA, BAT 350 – 500)
- in metal case (types BAT 750 – 1000 – 1500)
- no earthing required (types BA)
- protection class II
  (types, BA, BAT 350 – 500)
- protection class I
  (types BAT 750 – 1000 – 1500)
- degree of protection IP20
- dielectric strength referred to frame
  2000 $V_{AC}$
- temperature class E
- maximum ambient temperature $t_a$ 40 °C

**connections**

- mains cable
- socket outlet

**standards**

EN 61558-2-13

**special executions on request**

- other voltages and power ratings

## Product presentation

BAT350

BAT1500

## Dimensioning

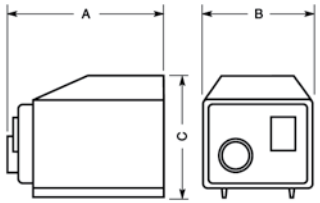



fig. 1

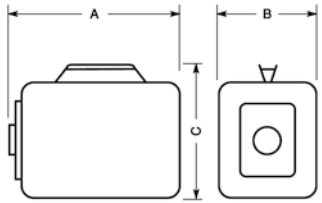



fig. 2

| Ps VA | type | code | U 50-60 Hz V | fig | A mm | B mm | C mm | M kg |
|---|---|---|---|---|---|---|---|---|
| 100 | BA 100 | 2521 | 110-230 | 1 | 160 | 110 | 120 | 1,6 |
| 200 | BA 200 | 2522 | 110-230 | 1 | 160 | 110 | 120 | 3,0 |
| 350 | BAT 350 | 2525 | 110-230 | 1 | 160 | 110 | 120 | 3,6 |
| 500 | BAT 500 | 2526 | 110-230 | 1 | 160 | 110 | 120 | 3,9 |
| 750 | BAT 750 | 2527 | 110-130-230 | 2 | 220 | 130 | 180 | 7,8 |
| 1000 | BAT 1000 | 2523 | 110-130-230 | 2 | 240 | 150 | 200 | 10,2 |
| 1500 | BAT 1500 | 2524 | 110-130-230 | 2 | 240 | 150 | 200 | 14,0 |

# 6

# Three-phase transformers

EN

DE

# 6.1 Three-phase isolating transformers
# 1 kVA to 10 kVA

## 6.1.1 PRI 3 X 230V Δ / 400V Y+N // SEC 3 X 230V Δ / 400V Y+N

### Common properties

for industrial applications

**characteristics**
- vacuum-and pressure- varnish impregnated
- separate windings
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**
- screw terminals

**fixing**
- supports or angles with fixing holes

**standards**
EN 61558-2-4 (EN 60742)

**special executions on request**
- protection class II (enclosed executions)
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- zigzag connection sets
- connections with power socket outlets and with mains cables / with fuses
- with electrostatic screens
- tropicalized

### Product presentation


SPT2500


SPT6300


U 222 752

### Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000 | 2704 | 230 Δ/400 Y | 230 Δ/400 Y | 4,70 | 22,5 | 47 | 93 | K 20 EI 150 |
| 1600 | SPT 1600 | 2706 | 230 Δ/400 Y | 230 Δ/400 Y | 3,15 | 45,5 | 52 | 94 | K 20 EI 190 |
| 2500 | SPT 2500 | 2709 | 230 Δ/400 Y | 230 Δ/400 Y | 2,80 | 45,5 | 70 | 95 | K 20 EI 220 |
| 4000 | SPT 4000 | 2712 | 230 Δ/400 Y | 230 Δ/400 Y | 4,70 | 56,0 | 181 | 94 | U 222 752 |
| 6300 | SPT 6300 | 2715 | 230 Δ/400 Y | 230 Δ/400 Y | 2,80 | 89,5 | 168 | 96 | U 222 752 |
| 10000 | SPT 10000 | 2705 | 230 Δ/400 Y | 230 Δ/400 Y | 3,14 | 92,5 | 298 | 96 | U 2222 720 |

The three-phase transformers SPT are also available with primary 400V delta – par 6.1.2

### Dimensioning

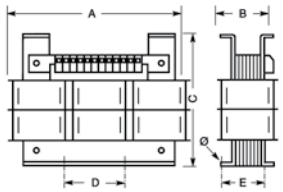


fig. 1

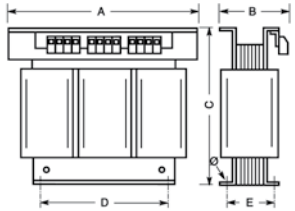


fig. 2

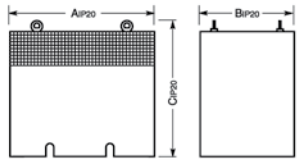


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | conn. mm² | M kg | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000 | 1 | 180 | 110 | 175 | 75 | 90 | 9 | 2,5 | 10,3 | 203 | 160 | 180 | 12,1 |
| 1600 | SPT 1600 | 1 | 225 | 135 | 215 | 87 | 110 | 10 | 2,5 | 19,0 | 263 | 180 | 225 | 21,7 |
| 2500 | SPT 2500 | 1 | 260 | 140 | 243 | 100 | 117 | 11 | 2,5 | 27,3 | 303 | 210 | 250 | 30,3 |
| 4000 | SPT 4000 | 2 | 360 | 150 | 310 | 240 | 120 | 11 | 2,5 | 35,6 | 388 | 225 | 360 | 40,8 |
| 6300 | SPT 6300 | 2 | 360 | 175 | 310 | 240 | 145 | 11 | 4 | 52,6 | 388 | 225 | 360 | 57,8 |
| 10000 | SPT 10000 | 2 | 480 | 180 | 415 | 320 | 150 | 11 | 10 | 70,2 | 533 | 272 | 470 | 79,2 |

EN
DE

# 6.1.2 PRI 3 X 400V Δ // SEC 3 X 230V Δ / 400V Y+N

## Common properties

for industrial applications

**characteristics**

- vacuum-and pressure- varnish impregnated
- separate windings
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**

- screw terminals

**fixing**

- supports or angles with fixing holes

**standards**

EN 61558-2-4 (EN 60742)

**special executions on request**

- protection class II (enclosed executions)
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- zigzag connection sets
- connections with power socket outlets and with mains cables / with fuses
- with electrostatic screens
- tropicalized

## Product presentation

SPT 1600/D

SPT 10000/D

U 222 752

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000/D | 1730 | 400V Δ | 230 Δ/400 Y | 4,70 | 22,5 | 47 | 93,0 | K 20 EI 150 |
| 1600 | SPT 1600/D | 1731 | 400V Δ | 230 Δ/400 Y | 3,15 | 45,5 | 52 | 94,0 | K 20 EI 190 |
| 2500 | SPT 2500/D | 1732 | 400V Δ | 230 Δ/400 Y | 2,80 | 45,5 | 70 | 95,0 | K 20 EI 220 |
| 4000 | SPT 4000/D | 1733 | 400V Δ | 230 Δ/400 Y | 4,70 | 56,0 | 181 | 94,0 | U 222 752 |
| 6300 | SPT 6300/D | 1734 | 400V Δ | 230 Δ/400 Y | 2,80 | 89,5 | 168 | 96,0 | U 222 752 |
| 10000 | SPT 10000/D | 1735 | 400V Δ | 230 Δ/400 Y | 2,60 | 92,5 | 270 | 96,5 | U 2222 720 |

The three-phase transformers SPT are also available with primary 230V Δ/400V Y – par 6.1.1

## Dimensioning

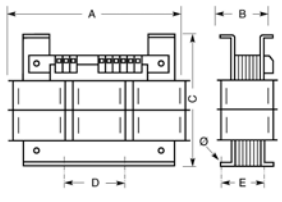



fig. 1

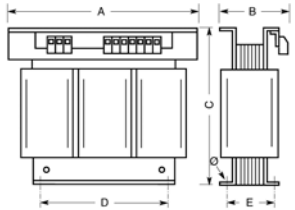



fig. 2

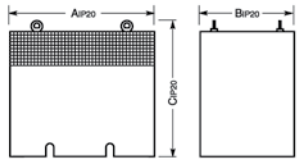



fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | conn. $mm^2$ | M kg | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000/D | 1 | 180 | 110 | 175 | 75 | 90 | 9 | 2,5 | 10,3 | 203 | 160 | 180 | 12,1 |
| 1600 | SPT 1600/D | 1 | 225 | 135 | 215 | 87 | 110 | 10 | 2,5 | 19,0 | 263 | 180 | 225 | 21,7 |
| 2500 | SPT 2500/D | 1 | 260 | 140 | 243 | 100 | 117 | 11 | 2,5 | 27,3 | 303 | 210 | 250 | 30,3 |
| 4000 | SPT 4000/D | 2 | 360 | 150 | 310 | 240 | 120 | 11 | 2,5 | 35,6 | 388 | 225 | 360 | 40,8 |
| 6300 | SPT 6300/D | 2 | 360 | 175 | 310 | 240 | 145 | 11 | 4 | 52,6 | 388 | 225 | 360 | 57,8 |
| 10000 | SPT 10000/D | 2 | 480 | 180 | 415 | 320 | 150 | 11 | 10 | 70,2 | 533 | 272 | 470 | 79,2 |

EN

DE

# 6.2 Three-phase separating transformers
# 16 kVA to 100 kVA

## 6.2.1 PRI 3 X 230V Δ / 400V Y+N // SEC 3 X 230V Δ / 400V Y+N

### Common properties

for industrial applications

**characteristics**

- vacuum-and pressure- varnish impregnated
- separate windings
- natural convection cooling (with ventilation ducts)
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class F
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**

- screw terminals or nut fixing

**fixing**

- angles with fixing holes

**standards**

EN 60076-11 (EN 60726)

**special executions on request**

- three-phase isolating transformers
- protection class II (enclosed executions)
- degree of protection IP23 and IP65 (watertight)
- other voltages and powers
- zigzag connection sets
- connections with power socket outlets and with mains cables / with fuses
- with electrostatic screens
- tropicalized

### Product presentation

SPT16000

SPT40000

SPT80000

### Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 16000 | SPT 16000 | 2707 | 230 Δ/400 Y | 230 Δ/400 Y | 4,70 | 108 | 750 | 95,7 | U 2222 720 |
| 20000 | SPT 20000 | 2708 | 230 Δ/400 Y | 230 Δ/400 Y | 3,82 | 135 | 768 | 95,7 | U 2222 720 |
| 25000 | SPT 25000 | 2710 | 230 Δ/400 Y | 230 Δ/400 Y | 2,97 | 180 | 747 | 96,4 | U 2222 720 |
| 31500 | SPT 31500 | 2711 | 230 Δ/400 Y | 230 Δ/400 Y | 2,39 | 228 | 759 | 96,8 | U 2222 722 |
| 40000 | SPT 40000 | 2713 | 230 Δ/400 Y | 230 Δ/400 Y | 2,00 | 295 | 805 | 97,7 | U 2222 722 |
| 50000 | SPT 50000 | 2714 | 230 Δ/400 Y | 230 Δ/400 Y | 2,21 | 285 | 1078 | 97,0 | U 2222 723 |
| 63000 | SPT 63000 | 2716 | 230 Δ/400 Y | 230 Δ/400 Y | 1,79 | 376 | 1101 | 97,7 | U 2222 723 |
| 80000 | SPT 80000 | 9246 | 230 Δ/400 Y | 230 Δ/400 Y | 1,37 | 405 | 1080 | 98,1 | K 20 EI 500/004 |
| 100000 | SPT 100000 | 9214 | 230 Δ/400 Y | 230 Δ/400 Y | 1,28 | 435 | 1260 | 98,3 | K 20 EI 500/003 |

The three-phase transformers SPT are also available with primary 400V delta – par 6.2.2

### Dimensioning

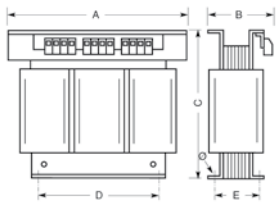



fig. 1

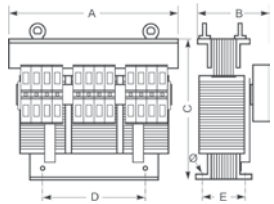



fig. 2

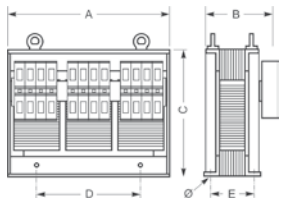



fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | conn. mm² | M kg | AIP20 mm | BIP20 mm | CIP20 mm | MIP20 kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16000 | SPT 16000 | 1 | 480 | 200 | 415 | 320 | 160 | 11 | 10 | 85 | 533 | 272 | 470 | 95 |
| 20000 | SPT 20000 | 1 | 480 | 210 | 415 | 320 | 170 | 11 | M8 | 95 | 533 | 272 | 470 | 105 |
| 25000 | SPT 25000 | 2 | 480 | 280 | 415 | 320 | 190 | 11 | M8 | 119 | 533 | 272 | 470 | 129 |
| 31500 | SPT 31500 | 2 | 480 | 310 | 415 | 320 | 210 | 11 | M8 | 141 | 533 | 420 | 470 | 156 |
| 40000 | SPT 40000 | 2 | 480 | 340 | 415 | 320 | 240 | 11 | M8 | 174 | 533 | 420 | 470 | 189 |
| 50000 | SPT 50000 | 3 | 640 | 360 | 500 | 400 | 180 | 11 | M10 | 200 | 663 | 450 | 560 | 220 |
| 63000 | SPT 63000 | 3 | 640 | 385 | 500 | 400 | 210 | 11 | M10 | 250 | 663 | 450 | 560 | 270 |
| 80000 | SPT 80000 | 3 | 640 | 430 | 500 | 400 | 245 | 11 | M12 | 320 | 660 | 470 | 560 | 340 |
| 100000 | SPT 100000 | 3 | 640 | 470 | 500 | 400 | 275 | 11 | M12 | 380 | 660 | 500 | 560 | 400 |

A-IP20; B-IP20, C-IP20: chapter 9 – Protection case – Dimensioning

EN

DE

# 6.2.2 PRI 3 X 400V Δ // SEC 3 X 230V Δ / 400V Y+N

## Common properties

for industrial applications

**characteristics**
- vacuum-and pressure- varnish impregnated
- separate windings
- natural convection cooling (with ventilation ducts)
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class F
- maximum ambient temperature $t_a$ 40 °C
- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**
- screw terminals or nut fixing

**fixing**
- angles with fixing holes

**standards**
EN 60076-11 (EN 60726)

**special executions on request**
- three-phase isolating transformers
- protection class II (enclosed executions)
- degree of protection IP23 and IP65 (watertight)
- other voltages and powers
- zigzag connection sets
- connections with power socket outlets and with mains cables / with fuses
- with electrostatic screens
- tropicalized

## Product presentation


SPT16000/D


SPT 40000/D


SPT50000/D

## Technical parameters

| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 16000 | SPT 16000/D | 1736 | 400 Δ | 230 Δ/400 Y | 4,30 | 112 | 695 | 95,2 | U 2222 720 |
| 20000 | SPT 20000/D | 1737 | 400 Δ | 230 Δ/400 Y | 3,40 | 135 | 700 | 96,0 | U 2222 720 |
| 25000 | SPT 25000/D | 1738 | 400 Δ | 230 Δ/400 Y | 2,70 | 175 | 720 | 96,5 | U 2222 720 |
| 31500 | SPT 31500/D | 1739 | 400 Δ | 230 Δ/400 Y | 2,20 | 225 | 730 | 97,1 | U 2222 722 |
| 40000 | SPT 40000/D | 1740 | 400 Δ | 230 Δ/400 Y | 1,90 | 305 | 780 | 97,4 | U 2222 722 |
| 50000 | SPT 50000/D | 1741 | 400 Δ | 230 Δ/400 Y | 2,21 | 285 | 1078 | 97,0 | U 2222 723 |
| 63000 | SPT 63000/D | 1742 | 400 Δ | 230 Δ/400 Y | 1,79 | 376 | 1101 | 97,7 | U 2222 723 |
| 80000 | SPT 80000/D | 1743 | 400 Δ | 230 Δ/400 Y | 1,37 | 405 | 1080 | 98,1 | K 20 EI 500/004 |
| 100000 | SPT 100000/D | 1744 | 400 Δ | 230 Δ/400 Y | 1,28 | 435 | 1260 | 98,3 | K 20 EI 500/003 |

The three-phase transformers SPT are also available with primary 230V Δ/400V Y – par 6.2.1

## Dimensioning

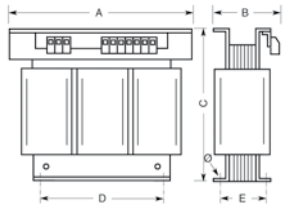


fig. 1

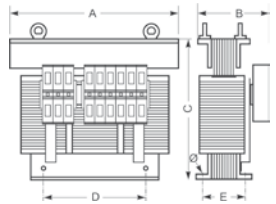


fig. 2

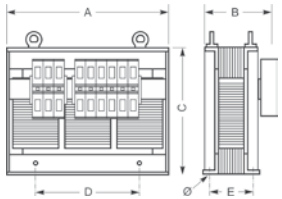


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | conn. mm² | M kg | AIP20 mm | BIP20 mm | CIP20 mm | MIP20 kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16000 | SPT 16000/D | 1 | 480 | 200 | 415 | 320 | 160 | 11 | 10 | 85 | 533 | 272 | 470 | 95 |
| 20000 | SPT 20000/D | 1 | 480 | 210 | 415 | 320 | 175 | 11 | M8 | 95 | 533 | 272 | 470 | 105 |
| 25000 | SPT 25000/D | 2 | 480 | 280 | 415 | 320 | 190 | 11 | M8 | 119 | 533 | 272 | 470 | 129 |
| 31500 | SPT 31500/D | 2 | 480 | 310 | 415 | 320 | 210 | 11 | M8 | 141 | 533 | 420 | 470 | 156 |
| 40000 | SPT 40000/D | 2 | 480 | 340 | 415 | 320 | 240 | 11 | M8 | 174 | 533 | 420 | 470 | 189 |
| 50000 | SPT 50000/D | 3 | 640 | 360 | 500 | 400 | 180 | 11 | M10 | 200 | 663 | 450 | 560 | 220 |
| 63000 | SPT 63000/D | 3 | 640 | 385 | 500 | 400 | 210 | 11 | M10 | 250 | 663 | 450 | 560 | 270 |
| 80000 | SPT 80000/D | 3 | 640 | 430 | 500 | 400 | 245 | 11 | M12 | 320 | 660 | 470 | 560 | 340 |
| 100000 | SPT 100000/D | 3 | 640 | 470 | 500 | 400 | 275 | 11 | M12 | 380 | 660 | 500 | 560 | 400 |

A-IP20; B-IP20, C-IP20: chapter 9 – Protection case – Dimensioning

# 6.3 Three-phase energy-efficient isolating transformers – **1 to 31,5kVA**

## 6.3.1 PRI 3 X 230V Δ / 400V Y+N // SEC 3 X 230V Δ / 400V Y+N

### Common properties

for industrial applications

**characteristics**

- isolating transformer is a separating transformer that has primary and secondary windings electrically isolated by means of reinforced insulation.
- vacuum-and pressure- varnish impregnated
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class F
- maximum ambient temperature $t_a$ 40 °C
- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**

- screw terminals or nut fixing

**fixing**

- supports or angles with fixing holes

**standards**

EN 61558-2-4 (EN 60742)

**speciale uitvoeringen op aanvraag**

- protection class II (enclosed executions)
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- zigzag connection sets
- connections with power socket outlets and with mains cables / with fuses
- with electrostatic screens
- tropicalized

### Product presentation

SPT1600/BTE blue e3

SPT10000/BTE blue e3

SPT25000/BTE blue e3



### Technical parameters

blue e3



| Ps VA | type | code | Upri 50-60 Hz V | Usec V | dU % | Po W | Pcu W | Rdt % | cases IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000/BTE | 1707 | 230 Δ/400 Y | 230 Δ/400 Y | 4,7 | 14 | 46 | 94,3 | K20BTE/005 |
| 1600 | SPT 1600/BTE | 1708 | 230 Δ/400 Y | 230 Δ/400 Y | 3,2 | 26 | 46 | 95,7 | K20BTE/010 |
| 2500 | SPT 2500/BTE | 1709 | 230 Δ/400 Y | 230 Δ/400 Y | 3,2 | 35 | 69 | 96,0 | K20BTE/020 |
| 4000 | SPT 4000/BTE | 1710 | 230 Δ/400 Y | 230 Δ/400 Y | 4,7 | 44 | 108 | 96,3 | K20BTE/030 |
| 6300 | SPT 6300/BTE | 1711 | 230 Δ/400 Y | 230 Δ/400 Y | 2,8 | 58 | 160 | 96,7 | K20BTE/030 |
| 10000 | SPT 10000/BTE | 1713 | 230 Δ/400 Y | 230 Δ/400 Y | 2,0 | 78 | 220 | 97,1 | K20BTE/040 |
| 16000 | SPT 16000/BTE | 1715 | 230 Δ/400 Y | 230 Δ/400 Y | 1,8 | 102 | 313 | 97,5 | K20BTE/040 |
| 20000 | SPT 20000/BTE | 1716 | 230 Δ/400 Y | 230 Δ/400 Y | 1,7 | 117 | 354 | 97,7 | K20BTE/050 |
| 25000 | SPT 25000/BTE | 1717 | 230 Δ/400 Y | 230 Δ/400 Y | 1,4 | 150 | 387 | 97,9 | K20BTE/050 |
| 31500 | SPT 31500/BTE | 1718 | 230 Δ/400 Y | 230 Δ/400 Y | 1,3 | 176 | 451 | 98,0 | K20BTE/060 |

The three-phase transformers SPT are also available with primary 400V delta – par 6.3.2

### Dimensioning

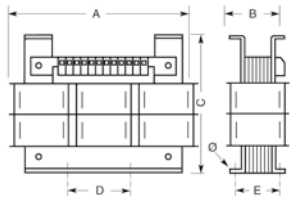



fig. 1

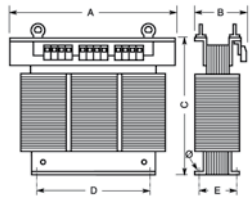



fig. 2

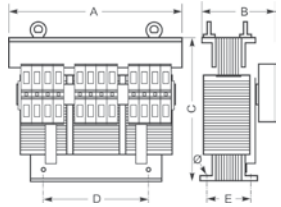



fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | Aip20 mm | Bip20 mm | Cip20 mm | Mip20 kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000/BTE | 1 | 180 | 110 | 175 | 75 | 90 | 9 | 10 | 4 | 203 | 160 | 180 | 12 |
| 1600 | SPT 1600/BTE | 1 | 225 | 135 | 215 | 87 | 110 | 10 | 19 | 4 | 263 | 180 | 229 | 22 |
| 2500 | SPT 2500/BTE | 1 | 260 | 140 | 243 | 100 | 117 | 11 | 27 | 4 | 303 | 210 | 253 | 31 |
| 4000 | SPT 4000/BTE | 2 | 360 | 150 | 310 | 240 | 120 | 11 | 36 | 4 | 388 | 225 | 360 | 41 |
| 6300 | SPT 6300/BTE | 2 | 360 | 175 | 310 | 240 | 145 | 11 | 53 | 4 | 388 | 225 | 360 | 58 |
| 10000 | SPT 10000/BTE | 2 | 480 | 190 | 415 | 320 | 160 | 11 | 84 | 10 | 533 | 272 | 470 | 93 |
| 16000 | SPT 16000/BTE | 2 | 480 | 220 | 415 | 320 | 180 | 11 | 110 | 10 | 533 | 272 | 470 | 119 |
| 20000 | SPT 20000/BTE | 2 | 480 | 240 | 415 | 320 | 200 | 11 | 130 | M8 | 533 | 320 | 470 | 139 |
| 25000 | SPT 25000/BTE | 3 | 480 | 330 | 415 | 320 | 220 | 11 | 160 | M8 | 533 | 320 | 470 | 170 |
| 31500 | SPT 31500/BTE | 3 | 480 | 355 | 415 | 320 | 250 | 11 | 197 | M8 | 533 | 445 | 470 | 209 |

A-IP20; B-IP20, C-IP20: chapter 9 – Protection case – Dimensioning

# 6.3.2 PRI 3 X 400V Δ // SEC 3 X 230V Δ / 400V Y+N

## Common properties

for industrial applications

**characteristics**

- isolating transformer is a separating transformer that has primary and secondary windings electrically isolated by means of reinforced insulation.
- vacuum-and pressure- varnish impregnated
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class F
- maximum ambient temperature $t_a$ 40 °C
- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**

- screw terminals or nut fixing

**fixing**

- supports or angles with fixing holes

**standards**

EN 61558-2-4 (EN 60742)

**speciale uitvoeringen op aanvraag**

- protection class II (enclosed executions)
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- zigzag connection sets
- connections with power socket outlets and with mains cables / with fuses
- with electrostatic screens
- tropicalized

## Product presentation

SPT1000/D/BTE

SPT6300/D/BTE

SPT25000/D/BTE

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Pcu W | Rdt % | cases IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000/D/BTE | 1765 | 400 Δ | 230 Δ/400 Y | 4,7 | 14 | 46 | 94,3 | K20BTE/005 |
| 1600 | SPT 1600/D/BTE | 1766 | 400 Δ | 230 Δ/400 Y | 3,2 | 26 | 46 | 95,7 | K20BTE/010 |
| 2500 | SPT 2500/D/BTE | 1767 | 400 Δ | 230 Δ/400 Y | 3,2 | 35 | 69 | 96,0 | K20BTE/020 |
| 4000 | SPT 4000/D/BTE | 1768 | 400 Δ | 230 Δ/400 Y | 4,7 | 44 | 108 | 96,3 | K20BTE/030 |
| 6300 | SPT 6300/D/BTE | 1769 | 400 Δ | 230 Δ/400 Y | 2,8 | 58 | 160 | 96,7 | K20BTE/030 |
| 10000 | SPT 10000/D/BTE | 1770 | 400 Δ | 230 Δ/400 Y | 2,0 | 78 | 220 | 97,1 | K20BTE/040 |
| 16000 | SPT 16000/D/BTE | 1771 | 400 Δ | 230 Δ/400 Y | 1,8 | 102 | 313 | 97,5 | K20BTE/040 |
| 20000 | SPT 20000/D/BTE | 1772 | 400 Δ | 230 Δ/400 Y | 1,7 | 117 | 354 | 97,7 | K20BTE/050 |
| 25000 | SPT 25000/D/BTE | 1773 | 400 Δ | 230 Δ/400 Y | 1,4 | 150 | 387 | 97,9 | K20BTE/050 |
| 31500 | SPT 31500/D/BTE | 1774 | 400 Δ | 230 Δ/400 Y | 1,3 | 176 | 451 | 98,0 | K20BTE/060 |

The three-phase transformers SPT are also available with primary 230V Δ/400V Y – par 6.3.1

## Dimensioning

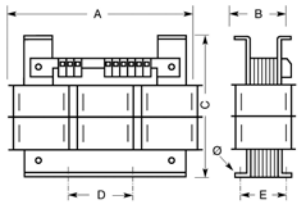



fig. 1

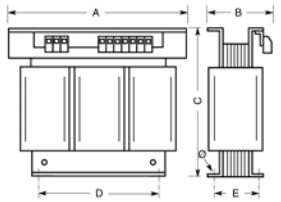



fig. 2

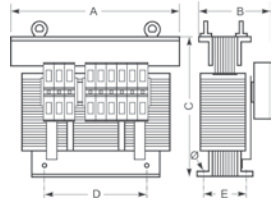



fig.3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. $mm^2$ | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | SPT 1000/D/BTE | 1 | 180 | 110 | 175 | 75 | 90 | 9 | 10 | 4 | 203 | 160 | 180 | 12 |
| 1600 | SPT 1600/D/BTE | 1 | 225 | 135 | 215 | 87 | 110 | 10 | 19 | 4 | 263 | 180 | 229 | 22 |
| 2500 | SPT 2500/D/BTE | 1 | 260 | 140 | 243 | 100 | 117 | 11 | 27 | 4 | 303 | 210 | 253 | 31 |
| 4000 | SPT 4000/D/BTE | 2 | 360 | 150 | 310 | 240 | 120 | 11 | 36 | 4 | 388 | 225 | 360 | 41 |
| 6300 | SPT 6300/D/BTE | 2 | 360 | 175 | 310 | 240 | 145 | 11 | 53 | 4 | 388 | 225 | 360 | 58 |
| 10000 | SPT 10000/D/BTE | 2 | 480 | 190 | 415 | 320 | 160 | 11 | 84 | 10 | 533 | 272 | 470 | 93 |
| 16000 | SPT 16000/D/BTE | 2 | 480 | 220 | 415 | 320 | 180 | 11 | 110 | 10 | 533 | 272 | 470 | 119 |
| 20000 | SPT 20000/D/BTE | 2 | 480 | 240 | 415 | 320 | 200 | 11 | 130 | M8 | 533 | 320 | 470 | 139 |
| 25000 | SPT 25000/D/BTE | 3 | 480 | 330 | 415 | 320 | 220 | 11 | 160 | M8 | 533 | 320 | 470 | 170 |
| 31500 | SPT 31500/D/BTE | 3 | 480 | 355 | 415 | 320 | 250 | 11 | 197 | M8 | 533 | 445 | 470 | 209 |

A-IP20; B-IP20, C-IP20: chapter 9 – Protection case – Dimensioning

EN DE

# 6.4 Three-phase Isolating transformers
# Low inrush current – Energy efficient

**6kVA to 50kVA** PRI 3x 230V Δ / 400V Y+N // SEC 3x 400V Y+N

## Common properties

For industrial applications - in particular for:

- creation of neutral
- situations that require a transformer with low inrush current (IRC)

**characteristics**

- inrush current: < 8x Inominal
- isolating transformer is a separating transformer that has primary and secondary windings electrically isolated by means of reinforced insulation.
- vacuum- and pressure- varnish impregnated
- natural convection cooling
- at primary side: 3 x 230V Δ of 3x 400V Y+N
- provided with one earthing terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength 4500 $V_{AC}$
- dielectric strength referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Vibration damper: Silentblock: chapter 10**

**connections**

- screw terminals or nut fixing

**fixing**

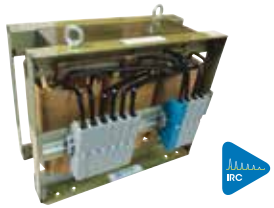
- supports or angles with fixing holes

**standards**

EN 61558-2-4

## Product presentation

PVT15000/IRC



ECT44000/IRC

K20PVT/015

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Pcu W | Rdt % | case IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 6000 | PVT6000/IRC | 11846 | 230 Δ/400 Y | 400 Y+N | 2,1 | 30 | 140 | 97,2 | K20PVT/006 |
| 8000 | PVT8000/IRC | 11847 | 230 Δ/400 Y | 400 Y+N | 2,1 | 40 | 170 | 97,4 | K20PVT/010 |
| 10000 | PVT10000/IRC | 11848 | 230 Δ/400 Y | 400 Y+N | 2,1 | 45 | 220 | 97,4 | K20PVT/010 |
| 11000 | ECT11000/IRC | 11538 | 230 Δ/400 Y | 400 Y+N | 2,0 | 58 | 222 | 97,5 | K20ECT040 |
| 15000 | PVT15000/IRC | 11849 | 230 Δ/400 Y | 400 Y+N | 2,9 | 55 | 440 | 96,8 | K20PVT/015 |
| 20000 | PVT20000/IRC | 11850 | 230 Δ/400 Y | 400 Y+N | 2,5 | 60 | 500 | 97,3 | K20PVT/020 |
| 22000 | ECT22000/IRC | 11539 | 230 Δ/400 Y | 400 Y+N | 2,6 | 75 | 578 | 97,2 | K20ECT/050 |
| 25000 | PVT25000/IRC | 11851 | 230 Δ/400 Y | 400 Y+N | 2,6 | 65 | 660 | 97,2 | K20PVT/025 |
| 40000 | PVT40000/IRC | 11852 | 230 Δ/400 Y | 400 Y+N | 1,8 | 110 | 730 | 97,9 | K20PVT/040 |
| 44000 | ECT44000/IRC | 11582 | 230 Δ/400 Y | 400 Y+N | 2,0 | 114 | 858 | 97,8 | K20ECT/060 |
| 50000 | PVT50000/IRC | 11853 | 230 Δ/400 Y | 400 Y+N | 1,9 | 130 | 940 | 97,9 | K20PVT/050 |

## Dimensioning

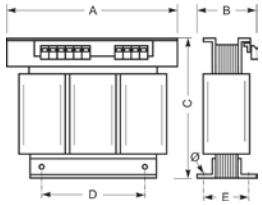



fig. 1

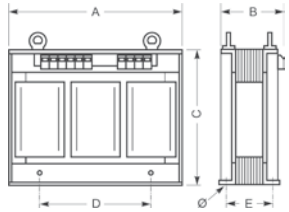



fig. 2

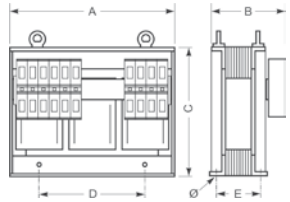



fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6000 | PVT6000/IRC | 1 | 420 | 210 | 365 | 280 | 163 | 11 | 85 | 4 | 460 | 260 | 420 | 92,5 |
| 8000 | PVT8000/IRC | 1 | 420 | 240 | 365 | 280 | 193 | 11 | 100 | 10 | 460 | 290 | 420 | 108 |
| 10000 | PVT10000/IRC | 1 | 420 | 240 | 365 | 280 | 193 | 11 | 110 | 10 | 460 | 290 | 420 | 118 |
| 11000 | ECT11000/IRC | 1 | 420 | 270 | 365 | 280 | 223 | 11 | 121 | 10 | 460 | 320 | 420 | 129,3 |
| 15000 | PVT15000/IRC | 1 | 480 | 370 | 415 | 320 | 210 | 11 | 140 | 10 | 530 | 390 | 470 | 155 |
| 20000 | PVT20000/IRC | 1 | 480 | 400 | 415 | 320 | 240 | 11 | 185 | 10 | 530 | 420 | 470 | 200 |
| 22000 | ECT22000/IRC | 1 | 480 | 270 | 415 | 320 | 240 | 11 | 168 | 10 | 530 | 320 | 470 | 177,0 |
| 25000 | PVT25000/IRC | 2 | 640 | 360 | 500 | 400 | 180 | 11 | 215 | 10 | 660 | 400 | 560 | 234 |
| 40000 | PVT40000/IRC | 3 | 640 | 430 | 500 | 400 | 245 | 11 | 320 | M8 | 660 | 470 | 560 | 339 |
| 44000 | ECT44000/IRC | 3 | 640 | 390 | 500 | 400 | 245 | 11 | 314 | M8 | 660 | 470 | 560 | 329,2 |
| 50000 | PVT50000/IRC | 3 | 640 | 460 | 500 | 400 | 275 | 11 | 360 | M8 | 660 | 500 | 560 | 380 |

A-IP20; B-IP20, C-IP20: chapter 9 – Protection case – Dimensioning

EN DE

# 6.5 Three-phase autotransformers
## 2,75 kVA to 145 kVA

## Common properties

for industrial applications

**characteristics**
- vacuum- and pressure- varnish impregnated
- windings partly common
- YNa connected (reversible)
- natural convection cooling (with ventilation ducts from type 40 kVA)
- provided with one earthing terminal block
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strength referred to frame 2500 $V_{AC}$
- temperature class B
- temperature class F (from type 40 kVA)
- maximum ambient temperature $t_a$ 40 °C

- **IP20, IP23, IP65 – protection cases: chapter 9**
- **Silentblock: chapter 10**

**connections**
- screw terminals or nut fixing

**fixing**
- supports or angles with fixing holes

**standards**
EN 60076-11 (EN 60726)

**special executions on request**
- degree of protection IP23 and IP65 (watertight)
- other voltages and power ratings
- connections with power socket outlets and with mains cables
- with fuses
- tropicalized

## Product presentation


ATT 6800


ATT 25000


ATT 145000

## Technical parameters

| Ps VA | type | code | 50-60 Hz V | dU % | Po W | Pcu W | Rdt % | cases IP20 |
|---|---|---|---|---|---|---|---|---|
| 2750 | ATT 2750 | 2515 | 0-230-400 | 2,10 | 28 | 61 | 96,5 | K 20 EI 190 |
| 4400 | ATT 4400 | 2517 | 0-230-400 | 1,26 | 46 | 60 | 97,0 | K 20 EI 190 |
| 6800 | ATT 6800 | 2519 | 0-230-400 | 1,20 | 54 | 79 | 97,0 | K 20 EI 220 |
| 11000 | ATT 11000 | 2512 | 0-230-400 | 1,65 | 56 | 173 | 97,0 | U 222 752 |
| 17500 | ATT 17500 | 2513 | 0-230-400 | 1,15 | 85 | 188 | 98,0 | U 222 752 |
| 25000 | ATT 25000 | 2514 | 0-230-400 | 1,03 | 79 | 259 | 99,6 | U 2222 720 |
| 40000 | ATT 40000 | 2516 | 0-230-400 | 1,80 | 110 | 700 | 98,0 | U 2222 721 |
| 50000 | ATT 50000 | 9242 | 0-230-400 | 1,60 | 130 | 680 | 98,4 | U 2222 721 |
| 63000 | ATT 63000 | 2518 | 0-230-400 | 1,30 | 167 | 767 | 98,5 | U 2222 721 |
| 95000 | ATT 95000 | 2520 | 0-230-400 | 1,20 | 261 | 841 | 98,8 | U 2222 722 |
| 120000 | ATT 120000 | 9243 | 0-230-400 | 1,25 | 280 | 1040 | 98,9 | U 2222 723 |
| 145000 | ATT 145000 | 9244 | 0-230-400 | 1,15 | 295 | 1125 | 99,0 | U 2222 723 |

## Dimensioning

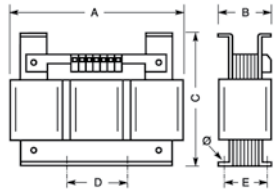


fig. 1

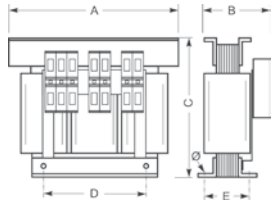


fig. 2

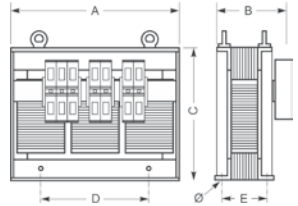


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | conn. mm² | M kg | AIP20 mm | BIP20 mm | CIP20 mm | MIP20 kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2750 | ATT 2750 | 1 | 225 | 110 | 215 | 87 | 90 | 9 | 2,5* | 12,8 | 263 | 180 | 225 | 15,5 |
| 4400 | ATT 4400 | 1 | 230 | 135 | 215 | 87 | 115 | 10 | 2,5* | 20,0 | 263 | 180 | 225 | 22,7 |
| 6800 | ATT 6800 | 1 | 260 | 150 | 240 | 100 | 127 | 11 | 4 | 29,8 | 303 | 210 | 253 | 32,8 |
| 11000 | ATT 11000 | 2 | 360 | 150 | 310 | 240 | 120 | 11 | 10 | 42,8 | 388 | 225 | 360 | 48,0 |
| 17500 | ATT 17500 | 2 | 360 | 175 | 310 | 240 | 145 | 11 | 10 | 58,9 | 388 | 225 | 360 | 64,1 |
| 25000 | ATT 25000 | 3 | 480 | 185 | 415 | 320 | 150 | 11 | M8 | 80,4 | 533 | 272 | 470 | 89,4 |
| 40000 | ATT 40000 | 3 | 480 | 270 | 415 | 320 | 160 | 11 | M8 | 84,7 | 533 | 370 | 470 | 95,3 |
| 50000 | ATT 50000 | 3 | 480 | 285 | 415 | 320 | 175 | 11 | M10 | 101,5 | 533 | 370 | 470 | 112,1 |
| 63000 | ATT 63000 | 3 | 480 | 295 | 415 | 320 | 190 | 11 | M10 | 120,0 | 533 | 370 | 470 | 130,6 |
| 95000 | ATT 95000 | 3 | 480 | 350 | 415 | 320 | 240 | 11 | M12 | 178,7 | 533 | 420 | 470 | 190,0 |
| 120000 | ATT 120000 | 3 | 640 | 360 | 500 | 400 | 180 | 11 | M16 | 209,0 | 663 | 450 | 560 | 224,5 |
| 145000 | ATT 145000 | 3 | 640 | 390 | 500 | 400 | 210 | 11 | M16 | 255,0 | 663 | 450 | 560 | 270,5 |

A-IP20; B-IP20, C-IP20: see chapter 9 – Metal sheet protection cases – Dimensioning
* Neutral has a 4mm² terminal

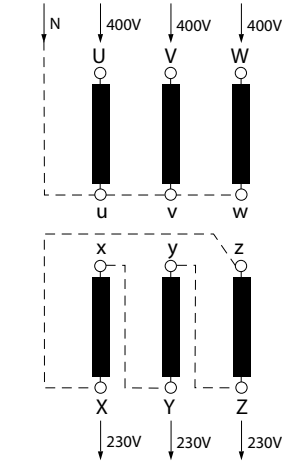
## 6.6 Vibration damper

For three-phase transformers: SPT – SPT/D – SPT/BTE – SPT/D/BTE – ECT/ IRC – PVT/IRC – ATT: use Silentblock 50 – 75 – 120
See Chapter 10: Vibration damper

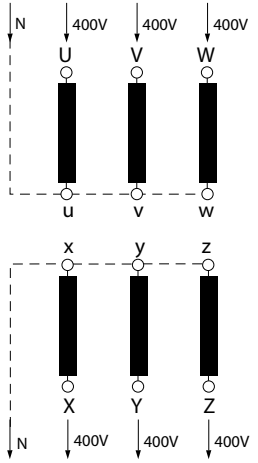
## 6.7 Connection sets for three-phase transformers

### 6.7.1 Connection sets for three-phase transformers SPT

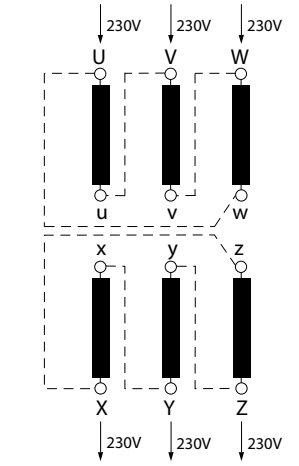
**Vector Group Yd1**
**Input 3 x 400V + N**
**Output 3 x 230V**



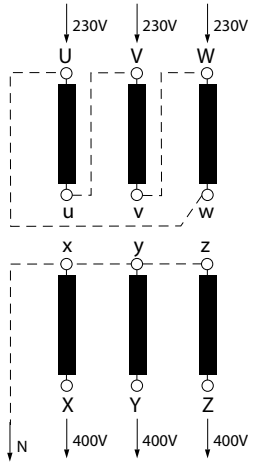

**Vector Group Yy0**
**Input 3 x 400V + N**
**Output 3 x 400V + N**




**Vector Group Dd0**
**Input 3 x 230V**
**Output 3 x 230V**



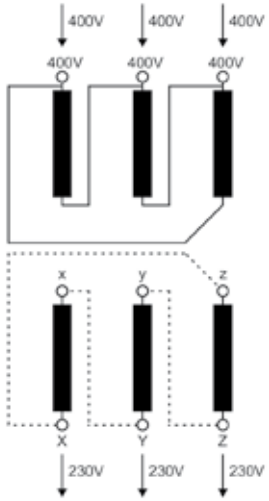

**Vector Group Dy11**
**Input 3 x 230V**
**Output 3 x 400V + N**



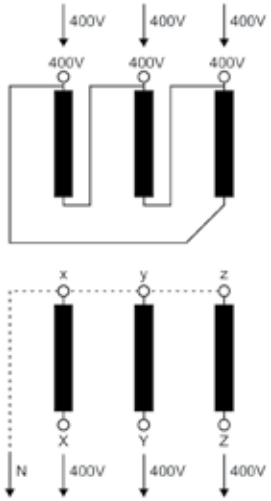

Remark: de dotted lines indicate the connections you should carry out yourself! (----)

## 6.7.2 Connection sets for three-phase transformers SPT/D

**Vector Group Dd0**
**Input 3 x 400V**
**Output 3 x 230V**



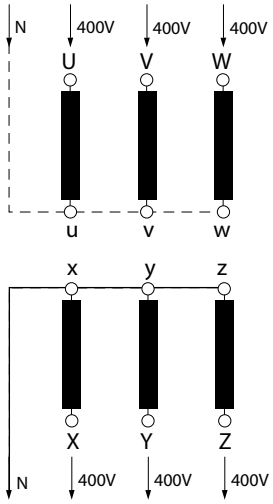

**Vector Group Dy11**
**Input 3 x 400V**
**Output 3 x 400V + N**



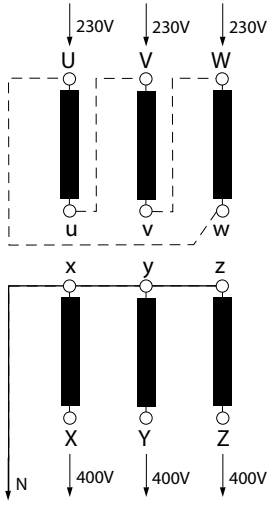

Remark: de dotted lines indicate the connections you should carry out yourself! (----)

## 6.7.3 Connection sets for three-phase transformers ECT and PVT

**Vector Group Yy0**
**Input 3 x 400V + N**
**Output 3 x 400V + N**



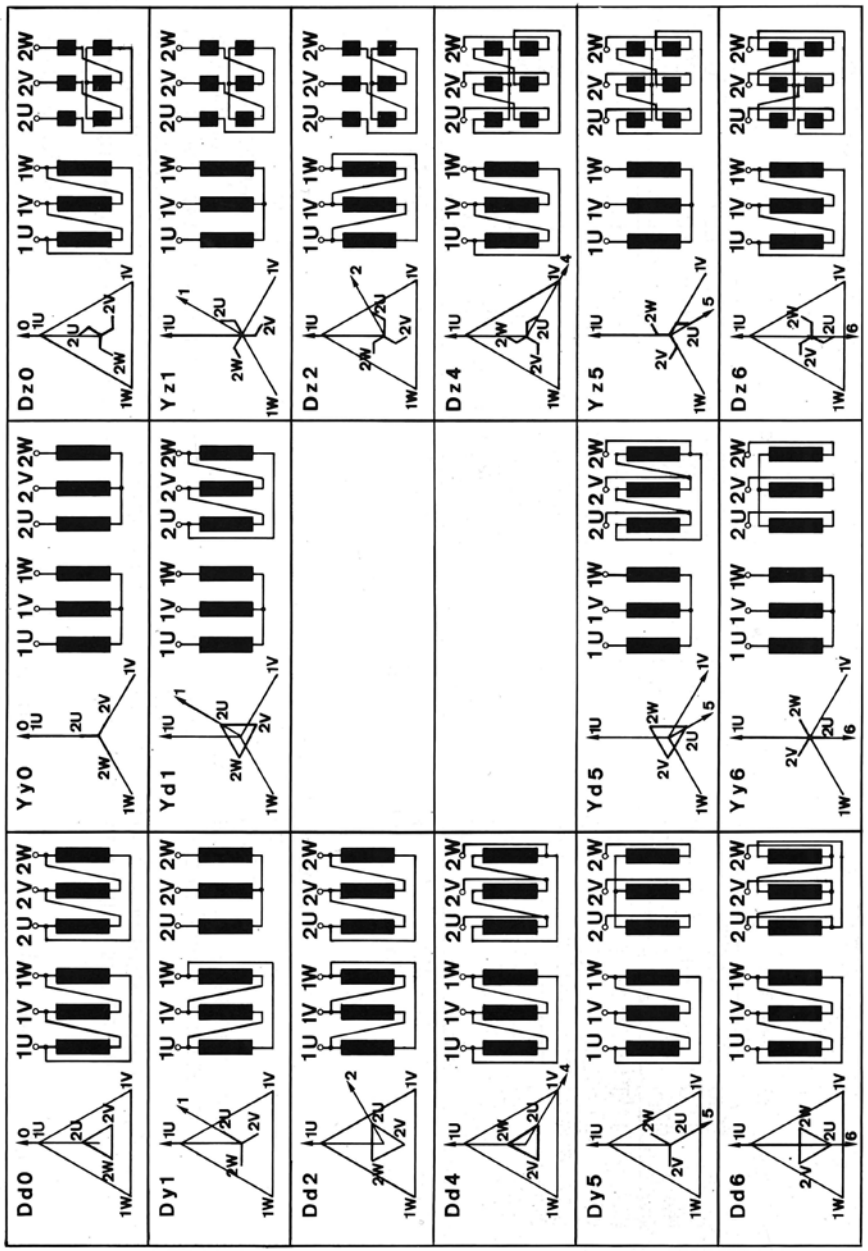

**Vector Group Dy11**
**Input 3 x 230V**
**Output 3 x 400V + N**

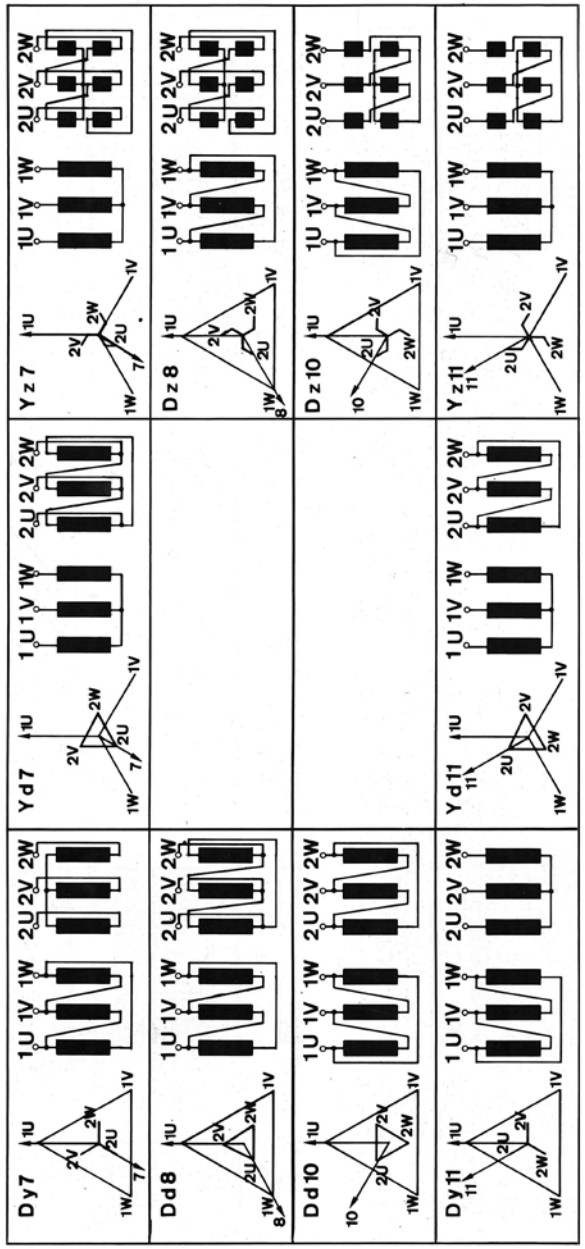



Remark: de dotted lines indicate the connections you should carry out yourself! (----)

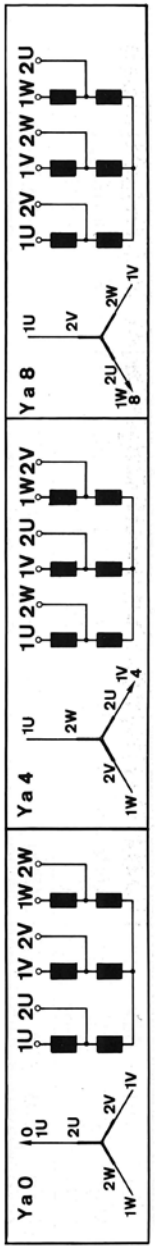
# 6.8 Vector groups for customized three-phase transformers

Three-phase separating transformers




Three-phase autotransformers




EN

DE

# 7

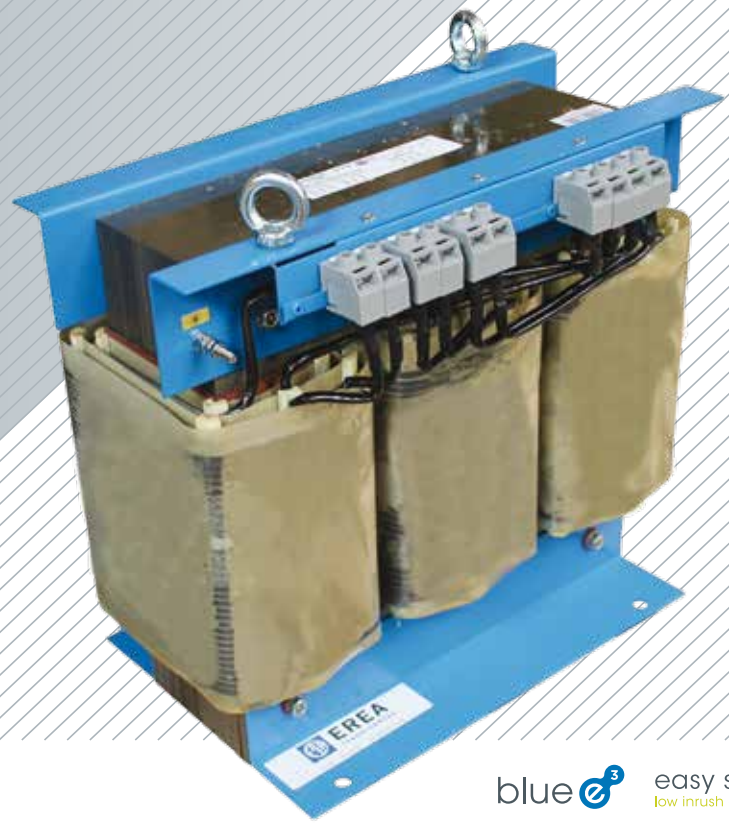
EN

DE

NEW!

## Isolating transformers for charging of electric vehicles

- Limited Inrush Current (IRC) and
- Energy efficient (BTE)




blue e3

easy start
low inrush current
IRC

# 7.1 Single phase Isolating transformers – Limited Inrush Current – Energy efficient

## 3,7 – 7,4 – 11 kVA

PRI 1ph 230V-245V // SEC 1ph 230V+N

## Common properties

for industrial applications - in particular for:

- creation of neutral conductor for charging stations (16A, 32A or 48A)
- situations that require a limited inrush current transformer

**characteristics**

- power adjusted to charging current charging station (16A - 32A - 48A)
- limited inrush current: Io <8x Inominal
- separated windings with reinforced insulation between the primary and secondary windings
- vacuum-and pressure- varnish impregnated
- natural convection cooling
- on the primary side: + 15 V branch (for higher input voltage)
- provided with a ground terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strenght 4500 $V_{AC}$
- dielectric strenght referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40°C

- **IP20, IP23, IP65 – Protection cases: Ch 9**
- **Vibration damper: Silentblock: Ch 10**

**connections**

- screw terminals

**fixing**

- supports or angles with fixing holes

**standards**

EN 61558-2-2 – EN 61558-2-4

## Product presentation

230EC3700/IRC

230EC7400/IRC

K20EC/030

## Technical parameters

| Ps VA | type | code | $U_{PRI}$ 50-60 Hz V | $U_{SEC}$ V | dU % | Po W | Pcu W | Rdt % | cases IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 3700 | 230EC3700/IRC | 11536 | 230V-245V | 230V+N | 2,1 | 42 | 78 | 96,9 | K20EC/030 |
| 7400 | 230EC7400/IRC | 11537 | 230V-245V | 230V+N | 2,1 | 45 | 152 | 97,4 | K20EC/035 |
| 11000 | 230EC11000/IRC | 11580 | 230V-245V | 230V+N | 1,7 | 40 | 190 | 98,0 | K20EC/045 |

## Dimensioning

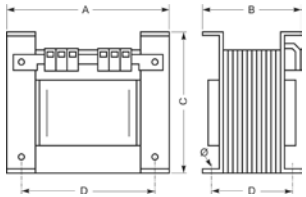


fig. 1

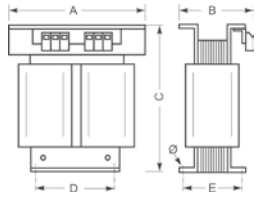


fig. 2

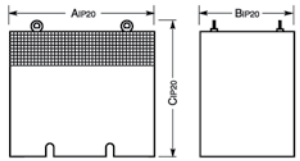


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3700 | 230EC3700/IRC | 1 | 240 | 200 | 225 | 200 | 177 | 11,0 | 47 | 10 | 270 | 250 | 240 | 50,3 |
| 7400 | 230EC7400/IRC | 2 | 280 | 230 | 365 | 180 | 178 | 11,5 | 76 | 10 | 307 | 268 | 420 | 81,6 |
| 11000 | 230EC11000/IRC | 2 | 320 | 260 | 415 | 210 | 220 | 11,5 | 107 | 10 | 350 | 355 | 470 | 115,6 |

## Quick product selection card – Charging of electric vehicles EC / ECT

See pages: 16 – 19

## Vibration damper

For EC series 3700VA – 11.000VA: use Silentblock 20 – 50

See Chapter 10: Vibration damper

# 7.2 Three phase Isolating transformers Limited Inrush Current – Energy efficient

## 11 – 22 – 44 kVA

PRI 3x 230V Δ / 400V Y+N // SEC 3x 400V Y+N

## Common properties

for industrial applications - in particular for:

- creation of neutral for charging stations (16A, 32A or 63A)
- situations that require a limited inrush current transformer

**characteristics**

- power adjusted to charging current charging station (16A - 32A - 63A)
- limited inrush current: Io <8x Inominal
- separated windings with reinforced insulation between the primary and secondary windings
- vacuum-and pressure- varnish impregnated
- natural convection cooling
- on the primary side: 3 X 230V Δ or 400V Y+N
- provided with a ground terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strenght 4500 $V_{AC}$
- dielectric strenght referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40°C
- **IP20, IP23, IP65 – Protection cases: Ch 9**
- **vibration damper: Silentblock: Ch 10**

**connections**

- screw terminals or nut fixing

**fixing**

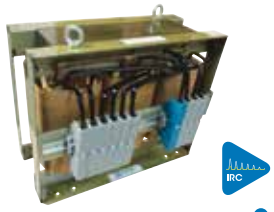
- supports or angles with fixing holes

**standards**

EN 61558-2-4

## Product presentation

ECT11000/IRC



ECT44000/IRC

K20ECT/040

## Technical parameters

| Ps VA | type | code | UPRI 50-60 Hz V | USEC V | dU % | Po W | Pcu W | Rdt % | cases IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 11000 | ECT11000/IRC | 11538 | 230 Δ/400 Y+N | 400V Y+N | 2,0 | 58 | 222 | 97,5 | K20ECT/040 |
| 22000 | ECT22000/IRC | 11539 | 230 Δ/400 Y+N | 400V Y+N | 2,6 | 75 | 578 | 97,2 | K20ECT/050 |
| 44000 | ECT44000/IRC | 11582 | 230 Δ/400 Y+N | 400V Y+N | 2,0 | 114 | 858 | 97,8 | K20ECT/060 |

## Dimensioning

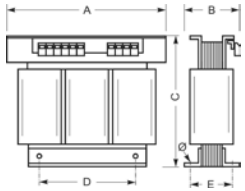



fig. 1

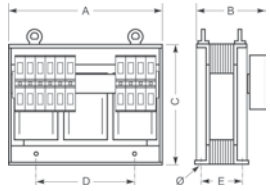



fig. 2

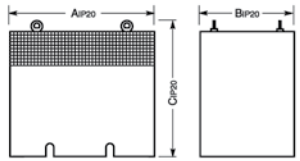



fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11000 | ECT11000/IRC | 1 | 420 | 270 | 365 | 280 | 223 | 11,0 | 121 | 10 | 460 | 320 | 420 | 129,3 |
| 22000 | ECT22000/IRC | 1 | 480 | 270 | 415 | 320 | 240 | 11,0 | 168 | 10 | 530 | 320 | 470 | 177,0 |
| 44000 | ECT44000/IRC | 2 | 640 | 390 | 500 | 400 | 245 | 11,0 | 314 | M8 | 660 | 470 | 560 | 329,2 |

## Quick product selection card – Charging of electric vehicles EC / ECT

See pages: 16 – 19

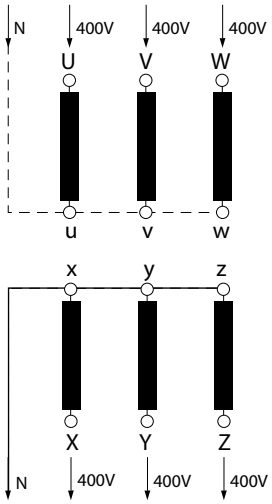
## Vibration damper

For ECT series 3700VA – 11.000VA: use Silentblock 20 – 50

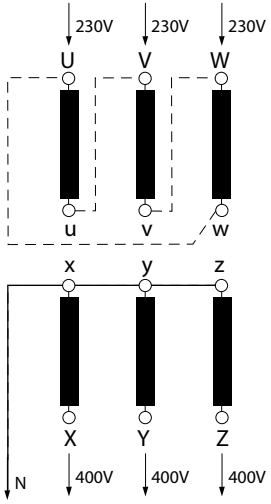
See Chapter 10: Vibration damper

## Connection sets for three-phase transformers ECT and PVT

**Vector Group Yy0**
**Input 3 x 400V + N**
**Output 3 x 400V + N**




**Vector Group Dy11**
**Input 3 x 230V**
**Output 3 x 400V + N**




Remark: de dotted lines indicate the connections you should carry out yourself! (----)



8

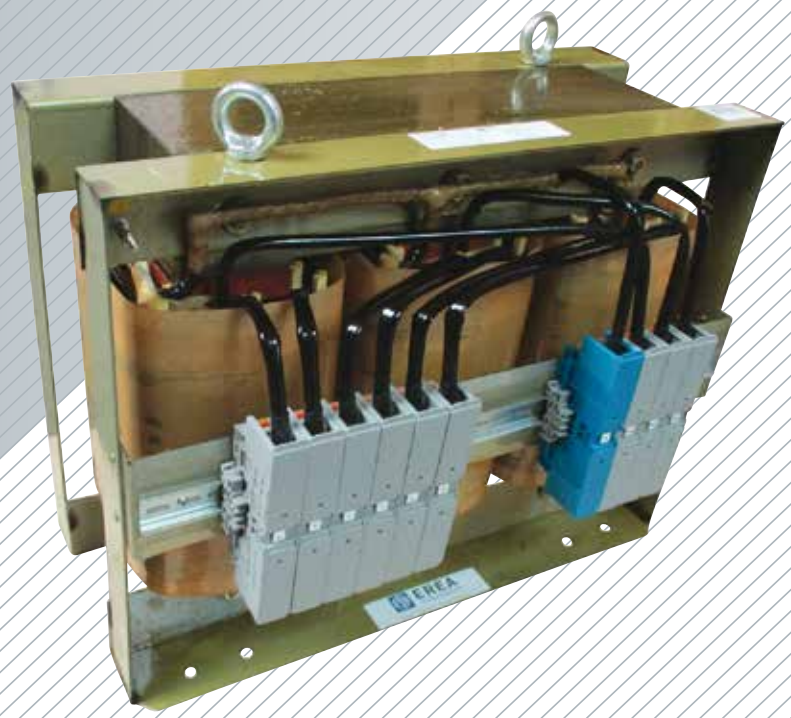
NEW!

EN

DE

# Isolating transformers for solar inverters

- Limited inrush current (IRC) and
- Energy efficient (BTE)



blue e3 easy start low inrush current IRC

# 8. Three phase protection transformers for solar inverters
## Limited inrush current – Energy efficient
**6kVA to 50kVA** PRI 3x 230V Δ / 400V Y+N // SEC 3x 400V Y+N

## Common properties

for industrial applications – in particular for:
- creation of neutral for solar inverters
- situations that require a limited inrush current transformer

**characteristics**
- power adjusted to power of the inverters
- limited inrush current: Io <8x Inominal
- separated windings with reinforced insulation between the primary and secondary windings
- vacuum-and pressure- varnish impregnated
- natural convection cooling
- on the primary side: 3 x 230V Δ of 3 x 400V Y+N
- provided with a ground terminal
- prepared for protection class I (open execution for flush mounting)
- protection class I (enclosed execution with sheet metal case)
- degree of protection IP00 (open execution for flush mounting)
- degree of protection IP20 (enclosed execution with sheet metal case)
- dielectric strenght 4500 $V_{AC}$
- dielectric strenght referred to frame 2500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 40°C
- **IP20, IP23, IP65 – Protection cases: Ch 9**
- **vibration damper: Silentblock: Ch 10**

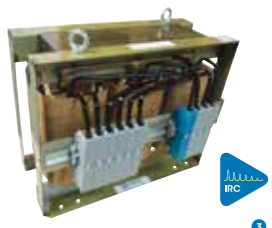
**connections**
- screw terminals or nut fixing

**fixing**
- supports or angles with fixing holes

**standards**
EN 61558-2-4

## Product presentation


PVT15000/IRC blue e3


PVT40000/IRC blue e3


K20PVT/015

## Technical parameters

blue e3 easy start low inrush current

| Ps VA | type | code | UPRI 50-60 Hz V | USEC V | dU % | Po W | Pcu W | Rdt % | cases IP20 |
|---|---|---|---|---|---|---|---|---|---|
| 6000 | PVT6000/IRC | 11846 | 230 Δ/400 Y | 400 Y+N | 2,1 | 30 | 140 | 97,2 | K20PVT/006 |
| 8000 | PVT8000/IRC | 11847 | 230 Δ/400 Y | 400 Y+N | 2,1 | 40 | 170 | 97,4 | K20PVT/010 |
| 10000 | PVT10000/IRC | 11848 | 230 Δ/400 Y | 400 Y+N | 2,1 | 45 | 220 | 97,4 | K20PVT/010 |
| 15000 | PVT15000/IRC | 11849 | 230 Δ/400 Y | 400 Y+N | 2,9 | 55 | 440 | 96,8 | K20PVT/015 |
| 20000 | PVT20000/IRC | 11850 | 230 Δ/400 Y | 400 Y+N | 2,5 | 60 | 500 | 97,3 | K20PVT/020 |
| 25000 | PVT25000/IRC | 11851 | 230 Δ/400 Y | 400 Y+N | 2,6 | 65 | 660 | 97,2 | K20PVT/025 |
| 40000 | PVT40000/IRC | 11852 | 230 Δ/400 Y | 400 Y+N | 1,8 | 110 | 730 | 97,9 | K20PVT/040 |
| 50000 | PVT50000/IRC | 11853 | 230 Δ/400 Y | 400 Y+N | 1,9 | 130 | 940 | 97,9 | K20PVT/050 |

## Dimensioning

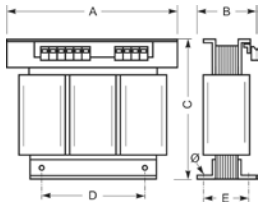


fig. 1

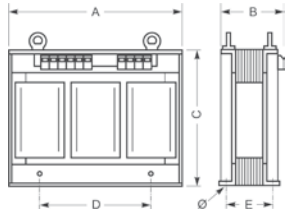


fig. 2

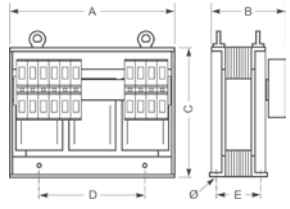


fig. 3

| Ps VA | type | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg | conn. mm² | $A_{IP20}$ mm | $B_{IP20}$ mm | $C_{IP20}$ mm | $M_{IP20}$ kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6000 | PVT6000/IRC | 1 | 420 | 210 | 365 | 280 | 163 | 11 | 85 | 4 | 460 | 260 | 420 | 92,5 |
| 8000 | PVT8000/IRC | 1 | 420 | 240 | 365 | 280 | 193 | 11 | 100 | 10 | 460 | 290 | 420 | 108 |
| 10000 | PVT10000/IRC | 1 | 420 | 240 | 365 | 280 | 193 | 11 | 110 | 10 | 460 | 290 | 420 | 118 |
| 15000 | PVT15000/IRC | 1 | 480 | 370 | 415 | 320 | 210 | 11 | 140 | 10 | 530 | 390 | 470 | 155 |
| 20000 | PVT20000/IRC | 1 | 480 | 400 | 415 | 320 | 240 | 11 | 185 | 10 | 530 | 420 | 470 | 200 |
| 25000 | PVT25000/IRC | 2 | 640 | 360 | 500 | 400 | 180 | 11 | 215 | 10 | 660 | 400 | 560 | 234 |
| 40000 | PVT40000/IRC | 3 | 640 | 430 | 500 | 400 | 245 | 11 | 320 | M8 | 660 | 470 | 560 | 339 |
| 50000 | PVT50000/IRC | 3 | 640 | 460 | 500 | 400 | 275 | 11 | 360 | M8 | 660 | 500 | 560 | 380 |

A-IP20; B-IP20, C-IP20: chapter 9 – Cases – Dimensioning

## Quick product selection card – Photovoltaic installations – PVT

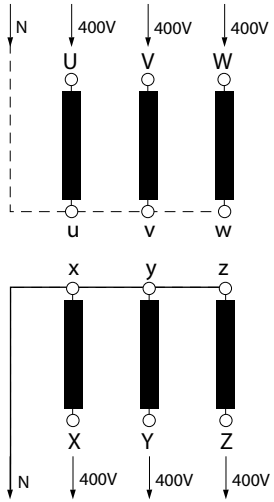
See pages: 20 – 23

## Vibration damper

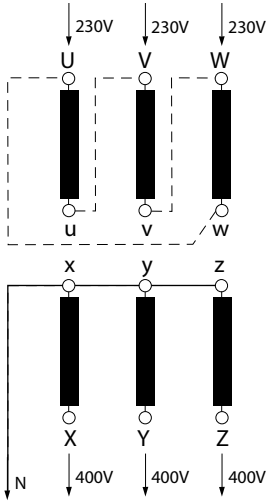
For PVT series: use Silentblock 50 – 75 – 120
See Chapter 10: Vibration damper

## Connection sets for three-phase transformers ECT and PVT

**Vector Group Yy0**
**Input 3 x 400V + N**
**Output 3 x 400V + N**




**Vector Group Dy11**
**Input 3 x 230V**
**Output 3 x 400V + N**

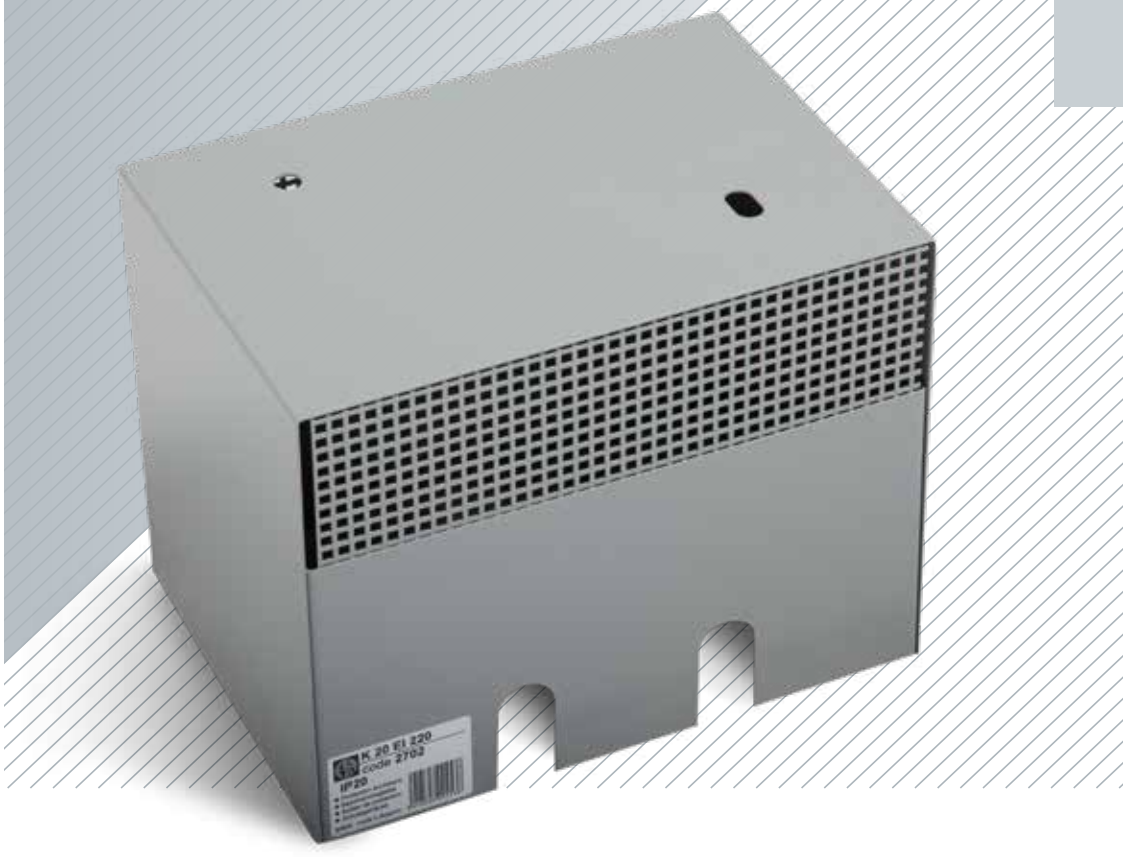



Remark: de dotted lines indicate the connections you should carry out yourself! (----)

# 9

# Metal sheet protection cases

EN
DE



# 9.1 IP20 – Metal sheet protection cases



| transfo type | transfo code | IP20 type | IP20 code | dimensions case (mm) $A_{IP20}$ | $B_{IP20}$ | $C_{IP20}$ | IP20 kg | chapter |
|---|---|---|---|---|---|---|---|---|
| 224TC1000 | 2227 | U 22763 | 2149 | 203 | 160 | 180 | 1,8 | 1.4 |
| 224TC1600 | 2228 | U 22757 | 2150 | 273 | 210 | 231 | 3,0 | 3.2 |
| 224TC2500 | 2229 | U 22757 | 2150 | 273 | 210 | 231 | 3,0 | |
| 230TC1000 | 2207 | U 22763 | 2149 | 203 | 160 | 180 | 1,8 | 2.4 |
| 230TC1600 | 2208 | U 22757 | 2150 | 273 | 210 | 231 | 3,0 | 3.4 |
| 230TC2500 | 2209 | U 22757 | 2150 | 273 | 210 | 231 | 3,0 | |
| 230TC4000 | 2210 | U 222751 | 2151 | 268 | 225 | 360 | 4,0 | |
| 230TC6300 | 2211 | U 222748 | 2155 | 348 | 305 | 465 | 7,4 | |
| 230TC10000 | 2212 | U 222748 | 2155 | 348 | 305 | 465 | 7,4 | |
| TAB1600 | 2027 | U 22763 | 2149 | 203 | 160 | 180 | 1,8 | 4.2 |
| TAB2500 | 2028 | U 22763 | 2149 | 203 | 160 | 180 | 1,8 | |
| TAB4000 | 2029 | U 22757 | 2150 | 273 | 210 | 231 | 3,0 | |
| SPT1000 | 2704 | K20EI150 | 2700 | 203 | 160 | 180 | 1,8 | 6.1.1 |
| SPT1600 | 2706 | K20EI190 | 2701 | 263 | 180 | 229 | 2,7 | |
| SPT2500 | 2709 | K20EI220 | 2702 | 303 | 210 | 253 | 3,4 | |
| SPT4000 | 2712 | U 222752 | 2156 | 388 | 225 | 360 | 5,2 | |
| SPT6300 | 2715 | U 222752 | 2156 | 388 | 225 | 360 | 5,2 | |
| SPT10000 | 2705 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | |
| SPT1000/D | 1730 | K20EI150 | 2700 | 203 | 160 | 180 | 1,8 | 6.1.2 |
| SPT1600/D | 1731 | K20EI190 | 2701 | 263 | 180 | 229 | 2,7 | |
| SPT2500/D | 1732 | K20EI220 | 2702 | 303 | 210 | 253 | 3,4 | |
| SPT4000/D | 1733 | U 222752 | 2156 | 388 | 225 | 360 | 5,2 | |
| SPT6300/D | 1734 | U 222752 | 2156 | 388 | 225 | 360 | 5,2 | |
| SPT10000/D | 1735 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | |
| SPT16000 | 2707 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | 6.2.1 |
| SPT20000 | 2708 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | |
| SPT25000 | 2710 | U 2222720 | 2160 | 533 | 370 | 470 | 11,1 | |
| SPT31500 | 2711 | U 2222722 | 2161 | 533 | 420 | 470 | 12,0 | |
| SPT40000 | 2713 | U 2222722 | 2161 | 533 | 420 | 470 | 12,0 | |
| SPT50000 | 2714 | U 2222723 | 2162 | 663 | 450 | 560 | 16,8 | |
| SPT63000 | 2716 | U 2222723 | 2162 | 663 | 450 | 560 | 16,8 | |
| SPT80000 | 9246 | K20EI500/004 | 3951 | 660 | 470 | 560 | 17,9 | |
| SPT100000 | 2914 | K20EI500/003 | 3950 | 660 | 500 | 560 | 18,6 | |
| SPT16000/D | 1736 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | 6.2.2 |
| SPT20000/D | 1737 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | |
| SPT25000/D | 1738 | U 2222720 | 2160 | 533 | 370 | 470 | 11,1 | |
| SPT31500/D | 1739 | U 2222722 | 2161 | 533 | 420 | 470 | 12,0 | |
| SPT40000/D | 1740 | U 2222722 | 2161 | 533 | 420 | 470 | 12,0 | |
| SPT50000/D | 1741 | U 2222723 | 2162 | 663 | 450 | 560 | 16,8 | |
| SPT63000/D | 1742 | U 2222723 | 2162 | 663 | 450 | 560 | 16,8 | |
| SPT80000/D | 1743 | K20EI500/004 | 3951 | 660 | 470 | 560 | 17,9 | 6.2.2 |
| SPT100000/D | 1744 | K20EI500/003 | 3950 | 660 | 500 | 560 | 18,6 | |
| SPT1000/BTE | 1707 | K20BTE/005 | 1749 | 203 | 160 | 180 | 1,8 | 6.3.1 |
| SPT1600/BTE | 1708 | K20BTE/010 | 1750 | 263 | 180 | 229 | 2,7 | |
| SPT2500/BTE | 1709 | K20BTE/020 | 1751 | 303 | 210 | 253 | 3,4 | |
| SPT4000/BTE | 1710 | K20BTE/030 | 1752 | 388 | 225 | 360 | 5,2 | |
| SPT6300/BTE | 1711 | K20BTE/030 | 1752 | 388 | 225 | 360 | 5,2 | |
| SPT10000/BTE | 1713 | K20BTE/040 | 1753 | 533 | 272 | 470 | 9,4 | 6.3.1 |
| SPT16000/BTE | 1715 | K20BTE/040 | 1753 | 533 | 272 | 470 | 9,4 | |
| SPT20000/BTE | 1716 | K20BTE/050 | 1754 | 533 | 320 | 470 | 10,0 | |
| SPT25000/BTE | 1717 | K20BTE/050 | 1754 | 533 | 320 | 470 | 10,0 | |
| SPT31500/BTE | 1718 | K20BTE/060 | 1755 | 533 | 445 | 470 | 12,0 | |
| SPT1000/D/BTE | 1765 | K20BTE/005 | 1749 | 203 | 160 | 180 | 1,8 | 6.3.2 |
| SPT1600/D/BTE | 1766 | K20BTE/010 | 1750 | 263 | 180 | 229 | 2,7 | |
| SPT2500/D/BTE | 1767 | K20BTE/020 | 1751 | 303 | 210 | 253 | 3,4 | |
| SPT4000/D/BTE | 1768 | K20BTE/030 | 1752 | 388 | 225 | 360 | 5,2 | |
| SPT6300/D/BTE | 1769 | K20BTE/030 | 1752 | 388 | 225 | 360 | 5,2 | |
| SPT10000/D/BTE | 1770 | K20BTE/040 | 1753 | 533 | 272 | 470 | 9,4 | 6.3.2 |
| SPT16000/D/BTE | 1771 | K20BTE/040 | 1753 | 533 | 272 | 470 | 9,4 | |
| SPT20000/D/BTE | 1772 | K20BTE/050 | 1754 | 533 | 320 | 470 | 10,0 | |
| SPT25000/D/BTE | 1773 | K20BTE/050 | 1754 | 533 | 320 | 470 | 10,0 | |
| SPT31500/D/BTE | 1774 | K20BTE/060 | 1755 | 533 | 445 | 470 | 12,0 | |
| ATT 2750 | 2515 | K20EI190 | 2701 | 263 | 180 | 229 | 2,7 | 6.4 |
| ATT 4400 | 2517 | K20EI190 | 2701 | 263 | 180 | 229 | 2,7 | |
| ATT 6800 | 2519 | K20EI220 | 2702 | 303 | 210 | 253 | 3,4 | |
| ATT 11000 | 2512 | U 222752 | 2156 | 388 | 225 | 360 | 5,2 | |
| ATT 17500 | 2513 | U 222752 | 2156 | 388 | 225 | 360 | 5,2 | |
| ATT 25000 | 2514 | U 2222720 | 2159 | 533 | 272 | 470 | 9,4 | |
| ATT 40000 | 2516 | U 2222721 | 2160 | 533 | 370 | 470 | 11,1 | |
| ATT 50000 | 9242 | U 2222721 | 2160 | 533 | 370 | 470 | 11,1 | |
| ATT 63000 | 2518 | U 2222721 | 2160 | 533 | 370 | 470 | 11,1 | |
| ATT 95000 | 2520 | U 2222722 | 2161 | 533 | 420 | 470 | 12,0 | |
| ATT 120000 | 9243 | U 2222723 | 2162 | 663 | 450 | 560 | 16,8 | |
| ATT 145000 | 9244 | U 2222723 | 2162 | 663 | 450 | 560 | 16,8 | |

| transfo type | transfo code | IP20 type | IP20 code | dimensions case (mm) $A_{IP20}$ | $B_{IP20}$ | $C_{IP20}$ | IP20 kg | chapter |
|---|---|---|---|---|---|---|---|---|
| 230EC3700/IRC | 11536 | K20EC/030 | 11540 | 270 | 250 | 240 | 3,3 | 7.1 |
| 230EC7400/IRC | 11537 | K20EC/035 | 11541 | 307 | 268 | 420 | 5,6 | |
| 230EC11000/IRC | 11580 | K20EC/045 | 11581 | 350 | 355 | 470 | 8,6 | |
| ECT11000/IRC | 11538 | K20ECT/040 | 11542 | 460 | 320 | 420 | 8,6 | 7.2 |
| ECT22000/IRC | 11539 | K20ECT/050 | 11543 | 530 | 320 | 470 | 9,0 | |
| ECT44000/IRC | 11582 | K20ECT/060 | 11583 | 660 | 470 | 560 | 15,2 | |
| PVT6000/IRC | 11846 | K20PVT/006 | 11854 | 460 | 260 | 420 | 7,5 | 8 |
| PVT8000/IRC | 11847 | K20PVT/010 | 11856 | 460 | 290 | 420 | 7,9 | |
| PVT10000/IRC | 11848 | K20PVT/010 | 11856 | 460 | 290 | 420 | 7,9 | |
| PVT15000/IRC | 11849 | K20PVT/015 | 11858 | 530 | 390 | 470 | 14,5 | |
| PVT20000/IRC | 11850 | K20PVT/020 | 11862 | 530 | 420 | 470 | 15,0 | |
| PVT25000/IRC | 11851 | K20PVT/025 | 11864 | 660 | 400 | 560 | 18,8 | |
| PVT40000/IRC | 11852 | K20PVT/040 | 11866 | 660 | 470 | 560 | 19,4 | |
| PVT50000/IRC | 11853 | K20PVT/050 | 11868 | 660 | 500 | 560 | 20,0 | |



## 9.2 IP23 – Metal sheet protection cases



| transfo type | transfo code | IP23 type | IP23 code | dimensions case (mm) $A_{IP23}$ | $B_{IP23}$ | $C_{IP23}$ | IP23 kg | chapter |
|---|---|---|---|---|---|---|---|---|
| 224TC1000 | 2227 | K23EI180/002 | 4051 | 223 | 260 | 180 | 3,3 | 1.4 |
| 224TC1600 | 2228 | K23EI240/003 | 5723 | 293 | 260 | 231 | 5,2 | 3.2 |
| 224TC2500 | 2229 | K23EI240/004 | 3509 | 293 | 260 | 231 | 5,2 | |
| 230TC1000 | 2207 | K23EI180/002 | 4051 | 223 | 260 | 180 | 3,3 | 2.4 |
| 230TC1600 | 2208 | K23EI240/003 | 5723 | 293 | 260 | 231 | 5,2 | 3.4 |
| 230TC2500 | 2209 | K23EI240/004 | 3509 | 293 | 260 | 231 | 5,2 | |
| 230TC4000 | 2210 | K23UI180/001 | 6800 | 288 | 325 | 360 | 6,6 | |
| 230TC6300 | 2211 | K23UI240/001 | 1650 | 368 | 405 | 465 | 11,5 | |
| 230TC10000 | 2212 | K23UI240/002 | 1651 | 368 | 405 | 465 | 11,5 | |
| TAB1600 | 2027 | K23EI180/004 | 1652 | 223 | 260 | 180 | 3,3 | 4.2 |
| TAB2500 | 2028 | K23EI180/003 | 1653 | 223 | 260 | 180 | 3,3 | |
| TAB4000 | 2029 | K23EI240/005 | 6799 | 293 | 260 | 231 | 5,2 | |
| SPT1000 | 2704 | K23EI150/001 | 3953 | 223 | 260 | 180 | 3,5 | 6.1.1 |
| SPT1600 | 2706 | K23EI190/002 | 4833 | 283 | 280 | 229 | 4,7 | |
| SPT2500 | 2709 | K23EI220/002 | 3508 | 323 | 260 | 293 | 5,7 | |
| SPT4000 | 2712 | K23EI300/004 | 3954 | 408 | 325 | 360 | 8,5 | |
| SPT6300 | 2715 | K23EI300/005 | 5776 | 408 | 325 | 360 | 8,5 | |
| SPT10000 | 2705 | K23EI400/001 | 5065 | 553 | 372 | 470 | 14,3 | |
| SPT1000/D | 1730 | K23EI150/001 | 3953 | 223 | 260 | 180 | 3,5 | 6.1.2 |
| SPT1600/D | 1731 | K23EI190/002 | 4833 | 283 | 280 | 229 | 4,7 | |
| SPT2500/D | 1732 | K23EI220/002 | 3508 | 323 | 260 | 293 | 5,7 | |
| SPT4000/D | 1733 | K23EI300/004 | 3954 | 408 | 325 | 360 | 8,5 | |
| SPT6300/D | 1734 | K23EI300/005 | 5776 | 408 | 325 | 360 | 8,5 | |
| SPT10000/D | 1735 | K23EI400/001 | 5065 | 553 | 372 | 470 | 14,3 | |
| SPT16000 | 2707 | K23EI400/005 | 4146 | 553 | 372 | 470 | 14,3 | 6.2.1 |
| SPT20000 | 2708 | K23EI400/006 | 3955 | 553 | 372 | 470 | 14,3 | |
| SPT25000 | 2710 | K23EI400/003 | 1654 | 553 | 372 | 470 | 14,3 | |
| SPT31500 | 2711 | K23EI400/008 | 1655 | 553 | 520 | 470 | 18,3 | |
| SPT40000 | 2713 | K23EI400/004 | 1656 | 553 | 520 | 470 | 18,3 | |
| SPT50000 | 2714 | K23EI500/001 | 6865 | 683 | 550 | 560 | 24,7 | |
| SPT63000 | 2716 | K23EI500/002 | 9998 | 683 | 550 | 560 | 24,7 | |
| SPT80000 | 9246 | K23EI500/004 | 4065 | 680 | 640 | 560 | 27,0 | |
| SPT100000 | 2914 | K23EI500/006 | 1657 | 680 | 600 | 560 | 25,8 | |

| transfo type | transfo code | IP23 type | IP23 code | dimensions case (mm) $A_{IP23}$ | $B_{IP23}$ | $C_{IP23}$ | IP23 kg | chapter |
|---|---|---|---|---|---|---|---|---|
| SPT16000/D | 1736 | K23EI400/005 | 4146 | 553 | 372 | 470 | 14,3 | 6.2.2 |
| SPT20000/D | 1737 | K23EI400/006 | 3955 | 553 | 372 | 470 | 14,3 | |
| SPT25000/D | 1738 | K23EI400/003 | 1654 | 553 | 372 | 470 | 14,3 | |
| SPT31500/D | 1739 | K23EI400/008 | 1655 | 553 | 520 | 470 | 18,3 | |
| SPT40000/D | 1740 | K23EI400/004 | 1656 | 553 | 520 | 470 | 18,3 | 6.2.2 |
| SPT50000/D | 1741 | K23EI500/001 | 6865 | 683 | 550 | 560 | 24,7 | |
| SPT63000/D | 1742 | K23EI500/002 | 9998 | 683 | 550 | 560 | 24,7 | |
| SPT80000/D | 1743 | K23EI500/004 | 4065 | 680 | 640 | 560 | 27,0 | |
| SPT100000/D | 1744 | K23EI500/006 | 1657 | 680 | 600 | 560 | 25,8 | |
| SPT1000/BTE | 1707 | K23BTE/005 | 1658 | 223 | 260 | 180 | 3,5 | 6.3.1 |
| SPT1600/BTE | 1708 | K23BTE/010 | 1659 | 283 | 280 | 229 | 4,7 | |
| SPT2500/BTE | 1709 | K23BTE/020 | 1660 | 323 | 260 | 293 | 5,7 | |
| SPT4000/BTE | 1710 | K23BTE/030 | 1661 | 408 | 325 | 360 | 8,5 | |
| SPT6300/BTE | 1711 | K23BTE/035 | 1662 | 408 | 325 | 360 | 8,5 | |
| SPT10000/BTE | 1713 | K23BTE/040 | 1663 | 553 | 372 | 470 | 14,3 | 6.3.1 |
| SPT16000/BTE | 1715 | K23BTE/045 | 1664 | 553 | 372 | 470 | 14,3 | |
| SPT20000/BTE | 1716 | K23BTE/050 | 1665 | 553 | 420 | 470 | 15,5 | |
| SPT25000/BTE | 1717 | K23BTE/055 | 1666 | 553 | 420 | 470 | 15,5 | |
| SPT31500/BTE | 1718 | K23BTE/060 | 1667 | 553 | 545 | 470 | 18,3 | |
| SPT1000/D/BTE | 1765 | K23BTE/005 | 1658 | 223 | 260 | 180 | 3,5 | 6.3.2 |
| SPT1600/D/BTE | 1766 | K23BTE/010 | 1659 | 283 | 280 | 229 | 4,7 | |
| SPT2500/D/BTE | 1767 | K23BTE/020 | 1660 | 323 | 260 | 293 | 5,7 | |
| SPT4000/D/BTE | 1768 | K23BTE/030 | 1661 | 408 | 325 | 360 | 8,5 | |
| SPT6300/D/BTE | 1769 | K23BTE/035 | 1662 | 408 | 325 | 360 | 8,5 | |
| SPT10000/D/BTE | 1770 | K23BTE/040 | 1663 | 553 | 372 | 470 | 14,3 | 6.3.2 |
| SPT16000/D/BTE | 1771 | K23BTE/045 | 1664 | 553 | 372 | 470 | 14,3 | |
| SPT20000/D/BTE | 1772 | K23BTE/050 | 1665 | 553 | 420 | 470 | 15,5 | |
| SPT25000/D/BTE | 1773 | K23BTE/055 | 1666 | 553 | 420 | 470 | 15,5 | |
| SPT31500/D/BTE | 1774 | K23BTE/060 | 1667 | 553 | 545 | 470 | 18,3 | |

| transfo type | transfo code | IP23 type | IP23 code | dimensions case (mm) $A_{IP23}$ | $B_{IP23}$ | $C_{IP23}$ | IP23 kg | chapter |
|---|---|---|---|---|---|---|---|---|
| ATT 2750 | 2515 | K23EI190/001 | 1668 | 283 | 280 | 229 | 4,7 | 6.4 |
| ATT 4400 | 2517 | K23EI190/002 | 4833 | 283 | 280 | 229 | 4,7 | |
| ATT 6800 | 2519 | K23EI220/001 | 5759 | 323 | 310 | 253 | 5,7 | |
| ATT 11000 | 2512 | K23EI300/004 | 3954 | 408 | 325 | 360 | 8,5 | |
| ATT 17500 | 2513 | K23EI300/005 | 5776 | 408 | 325 | 360 | 8,5 | |
| ATT 25000 | 2514 | K23EI400/001 | 5065 | 553 | 372 | 470 | 14,3 | |
| ATT 40000 | 2516 | K23EI400/010 | 11899 | 553 | 470 | 470 | 17,0 | |
| ATT 50000 | 9242 | K23EI400/002 | 11900 | 553 | 470 | 470 | 17,0 | |
| ATT 63000 | 2518 | K23EI400/003 | 1654 | 553 | 470 | 470 | 17,0 | |
| ATT 95000 | 2520 | K23EI400/004 | 1656 | 553 | 520 | 470 | 18,3 | |
| ATT 120000 | 9243 | K23EI500/001 | 6865 | 683 | 550 | 560 | 24,7 | |
| ATT 145000 | 9244 | K23EI500/002 | 9998 | 683 | 550 | 560 | 24,7 | |
| 230EC3700/IRC | 11536 | K23EC/030 | 11544 | 290 | 353 | 240 | 5,7 | 7.1 |
| 230EC7400/IRC | 11537 | K23EC/035 | 11545 | 325 | 370 | 420 | 8,4 | |
| 230EC11000/IRC | 11580 | K23EC/045 | 11603 | 370 | 460 | 470 | 12,5 | |
| ECT11000/IRC | 11538 | K23ECT/040 | 11546 | 480 | 435 | 420 | 12,7 | 7.2 |
| ECT22000/IRC | 11539 | K23ECT/050 | 11547 | 550 | 420 | 470 | 14,0 | |
| ECT44000/IRC | 11582 | K23ECT/060 | 11604 | 680 | 570 | 560 | 20,0 | |
| PVT6000/IRC | 11846 | K23PVT/006 | 11855 | 480 | 375 | 420 | 11,7 | 8.2 |
| PVT8000/IRC | 11847 | K23PVT/010 | 11857 | 480 | 405 | 420 | 12,2 | |
| PVT10000/IRC | 11848 | K23PVT/010 | 11857 | 480 | 405 | 420 | 12,2 | |
| PVT15000/IRC | 11849 | K23PVT/015 | 11859 | 550 | 490 | 470 | 17,5 | |
| PVT20000/IRC | 11850 | K23PVT/020 | 11863 | 550 | 520 | 470 | 18,3 | |
| PVT25000/IRC | 11851 | K23PVT/025 | 11865 | 680 | 500 | 560 | 24,3 | |
| PVT40000/IRC | 11852 | K23PVT/040 | 11867 | 680 | 570 | 560 | 25,2 | |
| PVT50000/IRC | 11853 | K23PVT/050 | 11869 | 680 | 600 | 560 | 25,8 | |

## 9.3 IP65 – Metal sheet protection cases

IP65 = on request
Other IP classes on request

## 9.4 General

### Product presentation

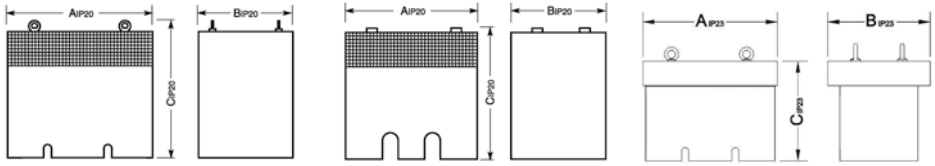
IP20 protection case (K20EI220)

IP20/BTE protection case (K20BTE/040)

IP23 protection case (K23EI400/003)

IP65 protection case (K65EI210/001)

### Dimensioning






# 10

## Silent Block for transformers

NEW!

EN

DE

# 10. Silent Block for transformers

## Common properties

The alternating magnetic field in a transformer causes a mechanical vibration that can be heard, especially with larger transformers. Because the vibrations are transferred to the floor via the feet of the transformer, a resonance effect can occur that further amplifies the sound, so that the buzz can also be heard in neighboring rooms.

The rubber Silent Blocks ensure that the vibrations, through the construction around the transformer, are strongly suppressed.

## Product presentation

SILENT BLOCK 20

SILENT BLOCK 50

SILENT BLOCK 75

SILENT BLOCK 120

## Technical parameters

| type | code | A mm | B mm | C mm | D mm | Ø mm | M kg | bolt | max. weight transformer kg |
|---|---|---|---|---|---|---|---|---|---|
| SILENT BLOCK 20 | 12143 | 85 | 56,5 | 25 | 66 | 8 | 0,08 | M8 | 80 kg per 4 pieces |
| SILENT BLOCK 50 | 11483 | 85 | 56,5 | 25 | 66 | 8 | 0,08 | M8 | 200 kg per 4 pieces |
| SILENT BLOCK 75 | 11459 | 114 | 76,0 | 35 | 92 | 10 | 0,20 | M10 | 300 kg per 4 pieces |
| SILENT BLOCK 120 | 11484 | 136 | 96,0 | 40 | 110 | 12 | 0,32 | M10 | 480 kg per 4 pieces |

## Dimensioning

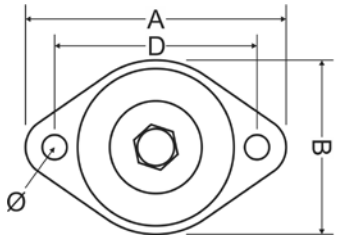



fig. 1

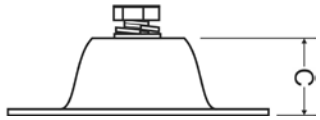



fig. 2

EN

DE

## Relation between Transformer and Type Silent Block

| transfo type | transfo code | silent block type | silent block code |
|---|---|---|---|
| 224TC1000 | 2227 | Silent Block 20 | 11483 |
| 224TC1600 | 2228 | Silent Block 20 | 11483 |
| 224TC2500 | 2229 | Silent Block 20 | 11483 |
| 230TC1000 | 2207 | Silent Block 20 | 11483 |
| 230TC1600 | 2208 | Silent Block 20 | 11483 |
| 230TC2500 | 2209 | Silent Block 20 | 11483 |
| 230TC4000 | 2210 | Silent Block 20 | 11483 |
| 230TC6300 | 2211 | Silent Block 20 | 11483 |
| 230TC10000 | 2212 | Silent Block 20 | 11483 |
| SPT1000 | 2704 | Silent Block 20 | 11483 |
| SPT1600 | 2706 | Silent Block 20 | 11483 |
| SPT2500 | 2709 | Silent Block 20 | 11483 |
| SPT4000 | 2712 | Silent Block 20 | 11483 |
| SPT6300 | 2715 | Silent Block 20 | 11483 |
| SPT10000 | 2705 | Silent Block 20 | 11483 |
| SPT1000/D | 1730 | Silent Block 20 | 11483 |
| SPT1600/D | 1731 | Silent Block 20 | 11483 |
| SPT2500/D | 1732 | Silent Block 20 | 11483 |
| SPT4000/D | 1733 | Silent Block 20 | 11483 |
| SPT6300/D | 1734 | Silent Block 20 | 11483 |
| SPT10000/D | 1735 | Silent Block 20 | 11483 |
| SPT16000 | 2707 | Silent Block 50 | 11483 |
| SPT20000 | 2708 | Silent Block 50 | 11483 |
| SPT25000 | 2710 | Silent Block 50 | 11483 |
| SPT31500 | 2711 | Silent Block 50 | 11483 |
| SPT40000 | 2713 | Silent Block 75 | 11459 |
| SPT50000 | 2714 | Silent Block 75 | 11459 |
| SPT63000 | 2716 | Silent Block 75 | 11459 |
| SPT80000 | 9246 | Silent Block 120 | 11484 |
| SPT100000 | 2914 | Silent Block 120 | 11484 |
| SPT16000/D | 1736 | Silent Block 50 | 11483 |
| SPT20000/D | 1737 | Silent Block 50 | 11483 |
| SPT25000/D | 1738 | Silent Block 50 | 11483 |
| SPT31500/D | 1739 | Silent Block 50 | 11483 |
| SPT40000/D | 1740 | Silent Block 75 | 11459 |
| SPT50000/D | 1741 | Silent Block 75 | 11459 |
| SPT63000/D | 1742 | Silent Block 75 | 11459 |
| SPT80000/D | 1743 | Silent Block 120 | 11484 |
| SPT100000/D | 1744 | Silent Block 120 | 11484 |
| SPT1000/BTE | 1707 | Silent Block 20 | 11483 |
| SPT1600/BTE | 1708 | Silent Block 20 | 11483 |
| SPT2500/BTE | 1709 | Silent Block 20 | 11483 |
| SPT4000/BTE | 1710 | Silent Block 20 | 11483 |
| SPT6300/BTE | 1711 | Silent Block 20 | 11483 |
| SPT10000/BTE | 1713 | Silent Block 50 | 11483 |
| SPT16000/BTE | 1715 | Silent Block 50 | 11483 |
| SPT20000/BTE | 1716 | Silent Block 50 | 11483 |
| SPT25000/BTE | 1717 | Silent Block 50 | 11483 |
| SPT31500/BTE | 1718 | Silent Block 75 | 11459 |
| SPT1000/D/BTE | 1765 | Silent Block 20 | 11483 |
| SPT1600/D/BTE | 1766 | Silent Block 20 | 11483 |
| SPT2500/D/BTE | 1767 | Silent Block 20 | 11483 |
| SPT4000/D/BTE | 1768 | Silent Block 20 | 11483 |
| SPT6300/D/BTE | 1769 | Silent Block 20 | 11483 |
| SPT10000/D/BTE | 1770 | Silent Block 50 | 11483 |
| SPT16000/D/BTE | 1771 | Silent Block 50 | 11483 |
| SPT20000/D/BTE | 1772 | Silent Block 50 | 11483 |
| SPT25000/D/BTE | 1773 | Silent Block 50 | 11483 |
| SPT31500/D/BTE | 1774 | Silent Block 75 | 11459 |
| ATT 2750 | 2515 | Silent Block 20 | 11483 |
| ATT 4400 | 2517 | Silent Block 20 | 11483 |
| ATT 6800 | 2519 | Silent Block 20 | 11483 |
| ATT 11000 | 2512 | Silent Block 20 | 11483 |
| ATT 17500 | 2513 | Silent Block 20 | 11483 |
| ATT 25000 | 2514 | Silent Block 50 | 11483 |
| ATT 40000 | 2516 | Silent Block 50 | 11483 |
| ATT 50000 | 9242 | Silent Block 50 | 11483 |
| ATT 63000 | 2518 | Silent Block 50 | 11483 |
| ATT 95000 | 2520 | Silent Block 75 | 11459 |
| ATT 120000 | 9243 | Silent Block 75 | 11459 |
| ATT 145000 | 9244 | Silent Block 75 | 11459 |
| 230EC3700/IRC | 11536 | Silent Block 20 | 11483 |
| 230EC7400/IRC | 11537 | Silent Block 50 | 11483 |
| 230EC11000/IRC | 11580 | Silent Block 50 | 11483 |
| ECT11000/IRC | 11538 | Silent Block 50 | 11483 |
| ECT22000/IRC | 11539 | Silent Block 50 | 11483 |
| ECT44000/IRC | 11582 | Silent Block 75 | 11459 |
| PVT6000/IRC | 11846 | Silent Block 50 | 11483 |
| PVT8000/IRC | 11847 | Silent Block 50 | 11483 |
| PVT10000/IRC | 11848 | Silent Block 50 | 11483 |
| PVT15000/IRC | 11849 | Silent Block 50 | 11483 |
| PVT20000/IRC | 11850 | Silent Block 50 | 11483 |
| PVT25000/IRC | 11851 | Silent Block 75 | 11459 |
| PVT40000/IRC | 11852 | Silent Block 120 | 11484 |
| PVT50000/IRC | 11853 | Silent Block 120 | 11484 |

EN

DE

# 11

## Inrush current limiters

EN

DE

easy start
low inrush current

# 11. Inrush current limiters

**IRC 230 / 400 V – 8 A** code 2031
**IRC 230 / 400 V – 16 A** code 2032
**IRC 230 / 400 V – 25 A** code 2170

## 11.1 Individual modules – 8A – 16A – 25A

### Common properties

Limit the inrush current of single- and three- phase transformers

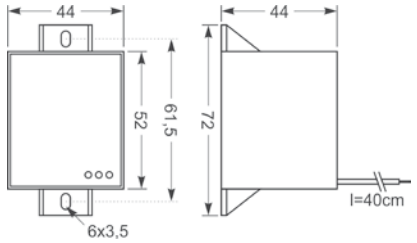
**characteristics**
- vacuum-encapsulated with synthetic resin
- in plastic case
- temperature class E
- maximum ambient temperature $t_a$ 50 °C

**technical data**
- voltage 230 V – 400 V
- frequency 50-60 Hz
- current max 8 A or max 16 A or max 25 A
- weight 180 g – 200 g – 325 g

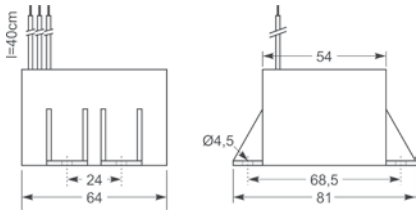
**connections**
- flexible connecting wires 1,5 mm² – 2,5 mm² – 4,0 mm²
  l = 40 cm

**fixing**
- provided with two fixing lugs
- on 35 mm rail DIN 46277 with accessory part U 4174 (78 x 65 mm) (to be ordered separately)

### Dimensioning



IRC 230/400V-8A
IRC 230/400V-16A



IRC 230/400V-25A

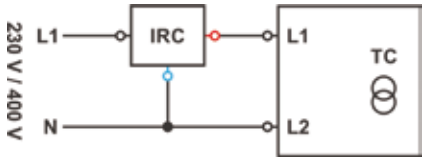


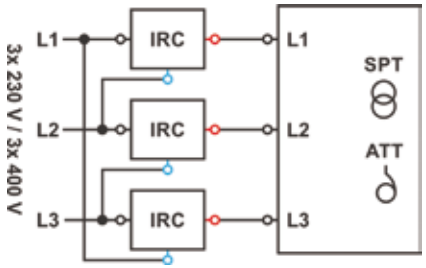
### Product presentation

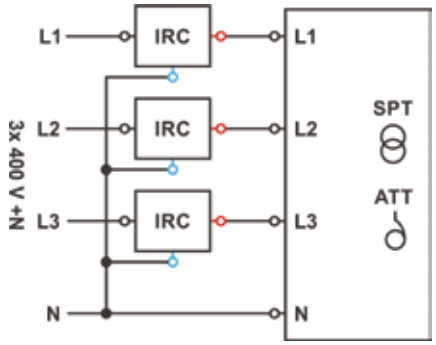

IRC 230/400V-16A


IRC 230/400V-25A

### Connection sets



## 11.2 Transformers with low inrush current: See chapters:



# 12

EN

DE

NEW!

# Isolating transformers for application in medical purpose rooms

According to HD 60364-7-710

easy start
low inrush current
IRC

# 12. Isolating transformers (for application in medical purpose rooms) – **1,6 kVA to 10 kVA**

## Common properties

**characteristics**

- vacuum and pressure- varnish impregnated
- separate windings
- provided with earthing terminal block
- open executions for flush mounting
- dielectric strength 3550 $V_{AC}$ (4500 $V_{AC}$ for the types 230TMTHD)
- dielectric strength referred to frame 3550 $V_{AC}$ (4500 $V_{AC}$ for the types 230TMTHD)
- high insulation resistance 200 MΩ
- temperature class B
- maximum ambient temperature $t_a$ 50 °C
- with electrostatic screens
- temperature class windings H

**standards**

to standard

- EN 61558-2-15

to installation requirements

- T 013 (2nd edition)
- HD 60364-7-710

**special executions on request**

## Product presentation

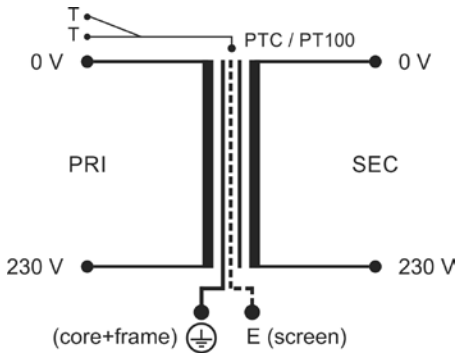
230TMHD3300/BTE

230TMHD3300

## Technical specifications

Technical specifications following product standard and installation requirements

| | Product standard EN 61558-2-15 | Installation requirements T 013 (2nd edition) | HD 60364-7-710 | EREA 230TMHD |
|---|---|---|---|---|
| Power | min. 0,5 kVA max. 10 kVA | min. 0,5 kVA max. 10 kVA | min. 0,5 kVA max. 10 kVA | 1,6 kVA–10 kVA |
| Output-voltage (protection) | max. 250 V | max. 250 V | max. 250 V | 230 V |
| Output-voltage (safety) | | max. 25 V | max. 25 V | on demand |
| Leakage current transformer - earth | max. 500 µA | | max. 500 µA | < 500 µA |
| Leakage current transformer + circuit | | max. 5 mA | | |
| Temperature control | not mandatory | obligatory | obligatory | standard |
| Metallic screen between pri and sec | not mandatory | not mandatory | not mandatory | standard |
| Inrush current | max. 12 x In | | | < 8 x In |




electrical drawing

## Technical parameters

easy start low inrush current IRC

| Classic Range | 230TMHD 1600 | 230TMHD 2200 | 230TMHD 3300 | 230TMHD 5000 | 230TMHD 6300 | 230TMHD 8000 | 230TMHD 10000 | 230TMTHD 10000 |
|---|---|---|---|---|---|---|---|---|
| Code | 11982 | 11983 | 11984 | 11986 | 11987 | 11988 | 11989 | 11993 |
| Power – P (VA) | 1.600 | 2.200 | 3.300 | 5.000 | 6.300 | 8.000 | 10.000 | 10.000 |
| Phase – (1ph-3ph) | 1ph | 1ph | 1ph | 1ph | 1ph | 1ph | 1ph | 3ph |
| U prim – (v) | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 3x400V Y+N |
| U sec – (v) | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 3x230V Y+N |
| No-load Loss – $P_{Fe}$ (W) | 28 | 32 | 37 | 51 | 57 | 71 | 89 | 85 |
| Full-load Los – $P_{Cu}$ (W) No-load | 53 | 70 | 90 | 131 | 142 | 162 | 174 | 300 |
| Full-load Los – $P_{Cu}$ (W) 20°C | 42 | 56 | 73 | 104 | 112 | 125 | 135 | 236 |
| Efficiency – η (%) No-load | 95,2 | 95,6 | 96,3 | 96,5 | 96,9 | 97,2 | 97,4 | 96,3 |
| Efficiency – η (%) 20°C | 95,8 | 96,1 | 96,8 | 97,0 | 97,4 | 97,6 | 97,8 | 96,9 |
| Voltage drop – dU (%) | 3,0 | 3,0 | 2,8 | 2,7 | 2,4 | 2,2 | 2,0 | 3,0 |
| Weight – (kg) | 24 | 34 | 39 | 52 | 64 | 74 | 90 | 115 |
| Dimensions – A (mm) | 192 | 240 | 240 | 280 | 280 | 280 | 280 | 480 |
| Dimensions – B (mm) | 160 | 160 | 200 | 220 | 235 | 250 | 280 | 225 |
| Dimensions – C (mm) | 185 | 225 | 310 | 365 | 365 | 365 | 365 | 415 |
| Dimensions – D (mm) | 160 | 200 | 150 | 180 | 180 | 180 | 180 | 320 |
| Dimensions – E (mm) | 139 | 137 | 158 | 163 | 178 | 193 | 223 | 185 |
| Ø (mm) | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| Figure | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 |
| Protection primary | 10A type D | 16A type D | 20A type D | 32A type D | 40A type D | 50A type D | 63A type D | 25A type D |
| Protection secondary | 10A type C | 16A type C | 20A type C | 32A type C | 40A type C | 50A type C | 63A type C | 40A type C |

## Dimensioning

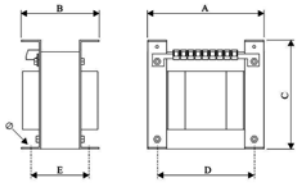


fig. 1

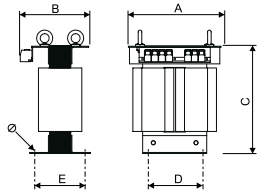


fig. 2

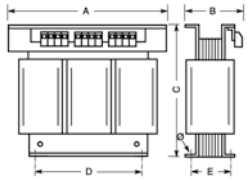


fig. 3



## Technical parameters

blue e³ easy start low inrush current IRC

| blue e³ range Energy efficient | 230TMHD 1600/BTE | 230TMHD 2200/BTE | 230TMHD 3300/BTE | 230TMHD 5000/BTE | 230TMHD 6300/BTE | 230TMHD 8000/BTE | 230TMHD 10000/BTE | 230TMTHD 10000/BTE |
|---|---|---|---|---|---|---|---|---|
| Code | 11994 | 11995 | 11996 | 11998 | 11999 | 12000 | 12001 | 12005 |
| Power – P (VA) | 1.600 | 2.200 | 3.300 | 5.000 | 6.300 | 8.000 | 10.000 | 10.000 |
| Phase – (1ph-3ph) | 1ph | 1ph | 1ph | 1ph | 1ph | 1ph | 1ph | 3ph |
| U prim – (v) | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 3x400V Y+N |
| U sec – (v) | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 3x230V Y+N |
| No-load Loss – $P_{Fe}$ (W) | 9,1 | 11 | 14 | 19 | 22 | 26 | 35 | 44 |
| Full-load Los – $P_{Cu}$ (W) No-load | 44 | 56 | 70 | 107 | 129 | 150 | 160 | 244 |
| Full-load Los – $P_{Cu}$ (W) 20°C | 38 | 48 | 60 | 90 | 105 | 122 | 129 | 202 |
| Efficiency– η (%) No-load | 96,8 | 97,0 | 97,5 | 97,5 | 97,6 | 97,8 | 98,1 | 97,2 |
| Efficiency – η (%) 20°C | 97,1 | 97,4 | 97,8 | 97,9 | 98,0 | 98,2 | 98,4 | 97,6 |
| Voltage drop – dU (%) | 2,8 | 2,7 | 2,2 | 2,3 | 2,2 | 2,0 | 1,8 | 2,5 |
| Weight – (kg) | 32 | 38 | 45 | 56 | 62 | 77 | 87 | 120 |
| Dimensions – A (mm) | 240 | 240 | 240 | 280 | 280 | 280 | 280 | 480 |
| Dimensions – B (mm) | 150 | 180 | 200 | 200 | 210 | 235 | 250 | 230 |
| Dimensions – C (mm) | 225 | 225 | 310 | 365 | 365 | 365 | 365 | 415 |
| Dimensions – D (mm) | 200 | 200 | 150 | 180 | 180 | 180 | 180 | 320 |
| Dimensions – E (mm) | 127 | 157 | 158 | 143 | 153 | 178 | 193 | 190 |
| Ø (mm) | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| Figure | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 |
| Protection primary | 10A type D | 16A type D | 20A type D | 32A type D | 40A type D | 50A type D | 63A type D | 25A type D |
| Protection secondary | 10A type C | 16A type C | 20A type C | 32A type C | 40A type C | 50A type C | 63A type C | 40A type C |

# EREA Isolating transformers for application in medical purpose rooms – Specification

EN

DE

## Background

Due to security reasons Medical Protection Transformers are used in medical environments for adapter sockets and engines.
The installation of a medical protection transformer provides a separate mains supply (IT mains supply or floating).

Safety is guaranteed by separation of the electric circuits and a low leakage current. Thus, the leakage current towards the earth will be restricted in case of accidental touch of one of the secondaries. The safety of both patient and medical personnel is guaranteed on this way.

## Norms / Installation prescriptions

- Medical Installation
  HD 60364-7-710
- Medical Protection Transformer
  T 013 (2nd edition)
  HD 60364-7-710

## Execution

- The transformers are impregnated under vacuum and under pressure with syntactical varnish.
- The transformers are executed with separated windings.
- The transformers have an earth screen.
- The earth screen is connected on a separate earth clamp.
- The transformer windings and the screen dispose of strengthening isolation.
- The transformers are set up in a way that the switching current is restricted without the use of a separate switching current limiter.
- The transformers have an encapsulated temperature probe PTC (PT100 on demand).
- The use of condensers is not allowed.
- The transformers mention on their individual label $I_o$ – $I_{lek}$

## Characteristics

| | |
|---|---|
| • Power | 1,6kVA to 10 kVA |
| • Output continuously to be delivered at an ambient temperature of | $T_a$ = + 50°C |
| • Primary tension | $U_{prim}$ = 230 V 50/60 Hz |
| • Secondary tension | $U_{sec\ nominal}$ = 230 V 50/60 Hz – Nominal |
| • Secondary tension | $U_{0\ sec\ (idling)}$ ≤ 250 V 50/60 Hz – Idling |
| • Switching current | $I_{switching\ current}$ < 8 x $I_{nominal}$ |
| • Open-Circuit current | $I_o$ < 3% $I_{nominal}$ |
| • Leakage current | $I_{lek}$ ≤500 µA |
| • Isolation resistance | $R_{isol}$ > 200MΩ |
| • Temperature class | B |
| • Temperature class windings | H |
| • Dielectrical strength | 3550$V_{AC}$ |
| • Dielectrical strength | 3550$V_{AC}$ = relative to ground |
| • Open execution | IP00 with connection screws IP20 |

## Efficiency

See table – Technical parameters

# 13

EN

DE

## Direct current power supply units

NEW!

# 13.1 Single-phase and three phase rectifiers
## 12 V – 24 V

## Common properties

for all applications

**characteristics**
- bridge rectifier
- protection with varistor
- degree of protection IP00
- ambient temperature $t_a$ 40 °C
- synthetic resin vacuum encapsulated or vacuum- and pressure- varnish impregnated
- separate windings
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E

**connections**
- screw terminals

**technical data**
- input voltages 230 V – 400 V (with additional terminal block, to be used for 240 or 410 V)
- input voltages 3 x 230 V / 400 V (types TGT)
- frequency 48-65 Hz
- output voltage 12 V ⎓ or 24 V ⎓
- residual ripple < 5 %

**fixing**
- provided with four fixing lugs
- sections with fixing holes (TGT)

**standards**
EN 61558-2-6 (EN 60742)

**special executions on request**

## Product presentation


TG24V-3A


TG12V-20A


TGT24V-30A

## Dimensioning

| type | code | $U_{IN}$ V | $U_{OUT}$ V | $I_{OUT}$ A | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TG 12V-3A | 2728 | 230-400 | 12 | 3 | 1 | 120 | 100 | 105 | 62 | 86 | 4,5 | 1,5 |
| TG 12V-5A | 2729 | 230-400 | 12 | 5 | 1 | 148 | 100 | 110 | 62 | 86 | 4,5 | 2,0 |
| TG 12V-7A | 2730 | 230-400 | 12 | 7 | 1 | 158 | 105 | 125 | 70 | 92 | 4,5 | 3,1 |
| TG 12V-13A | 2725 | 230-400 | 12 | 13 | 1 | 180 | 115 | 146 | 80 | 100 | 4,5 | 4,3 |
| TG 12V-20A | 2726 | 230-400 | 12 | 20 | 2 | 225 | 175 | 175 | 91 | 154 | 7,0 | 7,5 |
| TG 24V-3A | 2733 | 230-400 | 24 | 3 | 1 | 120 | 100 | 105 | 62 | 86 | 4,5 | 2,0 |
| TG 24V-5A | 2734 | 230-400 | 24 | 5 | 1 | 155 | 105 | 120 | 70 | 92 | 4,5 | 3,0 |
| TG 24V-7A | 2735 | 230-400 | 24 | 7 | 1 | 165 | 115 | 130 | 80 | 100 | 4,5 | 4,2 |
| TG 24V-13A | 2731 | 230-400 | 24 | 13 | 2 | 195 | 155 | 160 | 105 | 142 | 7,0 | 7,0 |
| TG 24V-20A | 2732 | 230-400 | 24 | 20 | 2 | 265 | 165 | 170 | 130 | 147 | 7,0 | 10,1 |
| TGT 24V-30A | 2737 | 3 x 230-400 | 24 | 30 | 3 | 250 | 225 | 174 | 155 | 105 | 9,0 | 11,7 |
| TGT 24V-50A | 2738 | 3 x 230-400 | 24 | 50 | 3 | 250 | 250 | 174 | 155 | 130 | 9,0 | 16,6 |
| TGT 24V-100A | 2736 | 3 x 230-400 | 24 | 100 | 3 | 300 | 290 | 224 | 205 | 144 | 11,0 | 30,6 |

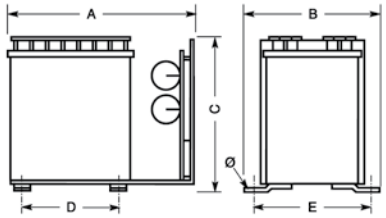


fig. 1

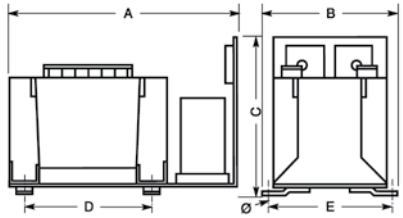


fig. 2

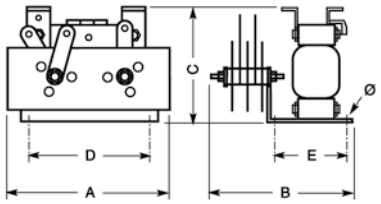


fig.3

EN

DE

# 13.2 Direct current stabilized power supply units
## 12 V – 24 V

## Common properties

for all applications

**characteristics**
- stabilized output voltage
- open executions on printed circuit (GV 12-1 PC and GV 24-1 PC)
- enclosed executions (types GV 12-1 and GV 24-1)
- maximum ambient temperature $t_a$ 40 °C
- relative humidity 95 % (not condensed)
- synthetic resin vacuum encapsulated
- separate windings
- dielectric strength 3550 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E

**connections**
- screw terminal blocks for wire sections up to 2,5 mm²

**technical data**
- input voltage 230 V –10 % + 10 %
- frequency 48-65 Hz
- output voltages 12V ⎓ or 24 V ⎓
- stability < 0,5 %
- response time 20µsec
- output current 1 A
- residual ripple < 5 mV
- temperature coefficient 0,02 % / °C

**protection**
- provided with fuse on primary circuit
- short-circuit and overheating resistant (automatic resetting)

**fixing**
- provided with four nylon fixing lugs (types GV 12-1 PC and GV 24-1 PC)
- provided with four fixing lugs (types GV 12-1 and GV 24-1)
- on 35 mm rail DIN 46277 (types GV 12-1 and GV 24-1) with accessory part U 4174 (78 x 65 mm) (to be ordered separately)

**standards**
EN 61558-2-6 (EN 60742)

**special executions on request**

## Product presentation

GV12-1PC

GV24-1

## Dimensioning

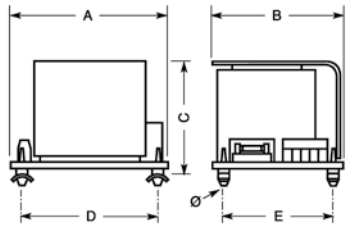



fig. 1

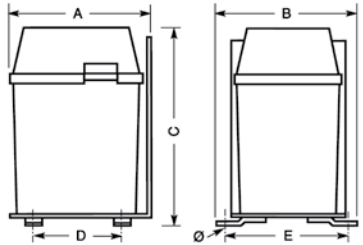



fig. 2

| type | code | $U_{IN}$ V | $U_{OUT}$ V | $I_{OUT}$ A | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GV 12-1PC | 2697 | 230 | 12 | 1 | 1 | 100 | 85 | 70 | 90 | 75 | 4,5 | 0,9 |
| GV 24-1PC | 2699 | 230 | 24 | 1 | 1 | 100 | 85 | 70 | 90 | 75 | 4,5 | 1,1 |
| GV 12-1 | 2696 | 230 | 12 | 1 | 2 | 90 | 100 | 110 | 62 | 86 | 4,5 | 1,4 |
| GV 24-1 | 2698 | 230 | 24 | 1 | 2 | 90 | 100 | 110 | 62 | 86 | 4,5 | 1,5 |

EN
DE

# 13.3 Direct current stabilized power supply units
## 12 V – 24 V adjustable – including battery charging

## Common properties

for all applications including battery charging

**characteristics**

- output voltage adjustable with 10-turn potentiometer
- for battery charging, with option of two charging rates, provided with commutor on printed circuit or with external switch (connections provided)
- base and fast charging rates are separately adjustable
- output LED indicator
- enclosed executions with metal cover
- natural convection cooling
- maximum ambient temperature ta 40 °C
- relative humidity 95 % (not condensed)
- synthetic resin vacuum encapsulated or vacuum- and pressure- varnish impregnated
- separate windings
- dielectric strength 4500 $V_{AC}$
- high insulation resistance 200 MΩ
- temperature class E

**connections**

- screw terminal blocks for wire sections up to 2,5 mm²
- from output 3 A double terminal blocks

**technical data**

- input voltages 230 V - 400 V -10 % + 10 %
- frequency 48-65 Hz
- output voltages
  12 V ⎓ adjustable up to 14,4 V ⎓
  24 V ⎓ adjustable up to 28,8 V ⎓
- stability < 0,1 %
- response time 15µsec
- output current limitation 105 %
- residual ripple < 3 mV
- temperature coefficient 0,01 % / °C

**protection**

- provided with fuse on primary circuit
- provided with fuse on output circuit
- short-circuit and overload resistant (automatic resetting), the output current dropping back to a safety value (regression characteristic)

**fixing**

- provided with four fixing holes

**standards**

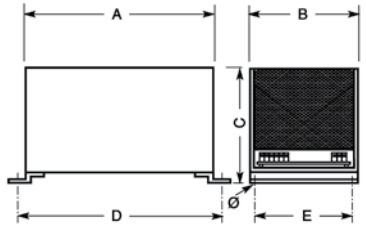
EN 61558-2-6 (EN 60742)

**special executions on request**

## Product presentation

GV 12V-10A

## Dimensioning




| type | code | $U_{IN}$ V | $U_{OUT}$ V | $I_{OUT}$ A | fig | A mm | B mm | C mm | D mm | E mm | Ø mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GV 12V-3A | 2684 | 230-400 | 12 | 3,0 | 1 | 275 | 135 | 140 | 260 | 115 | 5,0 | 3,0 |
| GV 12V-5A | 2685 | 230-400 | 12 | 5,0 | 1 | 275 | 135 | 140 | 260 | 115 | 5,0 | 4,2 |
| GV 12V-10A | 2681 | 230-400 | 12 | 10,0 | 1 | 380 | 150 | 155 | 365 | 125 | 5,0 | 5,8 |
| GV 24V-3A | 2690 | 230-400 | 24 | 3,0 | 1 | 275 | 135 | 140 | 260 | 115 | 5,0 | 4,0 |
| GV 24V-5A | 2692 | 230-400 | 24 | 5,0 | 1 | 275 | 135 | 140 | 260 | 115 | 5,0 | 5,2 |
| GV 24V-10A | 2686 | 230-400 | 24 | 10,0 | 1 | 380 | 150 | 155 | 365 | 125 | 5,0 | 9,7 |

EN
DE

# 13.4 Stabilized single-phase switching power supplies for DIN-rail mounting (adjustable) – **12 V – 24 V**

## Common properties

Single-phase power supplies for all applications

**main features**

- universal applications thanks to wide input range:
  - 85 – 550 $V_{AC}$ ; 47 – 63 Hz frequency
  - 120 - 370 $V_{DC}$
- uniform and compact construction in robust metal casing (Classic Series and Broad Series).
- stable output voltage with close tolerance, limited ripple and high efficiency
- output voltage can be increased up to 14 or 28V to compensate for voltage drops
- for the construction of a redundant installation or for the extension of the power, the output of several power supplies of the same type can be put in parallel, provided the right diodes are used
- built-in 'Power Factor Corrector' for higher power ratings and filters for lower power ratings
- 3 years of guarantee
- 48V can be obtained by connecting two power supplies of 24V in series

**4 ranges of stabilised switching power supplies – 4 specific applications**

- The power supplies in the **M-series (Modular)** are suitable for flush-mounting in modular electrical cabinets in which the typical **T-shape** is used. Furthermore, this M-series distinguishes itself by a **very low no-load power consumption**.
- The **N-series (Narrow)** has the advantage of a **small flush-mounting width**. This means a lot of space can be saved. This N-series also distinguishes itself by **very low no-load power consumption**.
- The **B-series (Broad)** can handle **input voltages up to 550 $V_{AC}$** and as a result is extremely well suited to creating a stabilised direct-current in supply systems with 400 $V_{AC}$ (three-phase system with or without neutral-line).
- The **E-series (Evolution)** is characterized by its proven reliability, and it is **available at various power ranges and has a very high efficiency.**.

**safety**

- protection system after overloading, overvoltage, overheating and short-circuit
- SELV – safety extra-low voltage

**connection**

- screw block

**mounting**

- mounting on DIN-Rail without tools thanks to a rail hook with circlip

**standards**

According to safety norms

- EN 60 950
- UL 508 tested

EMC norms

- EN 55022 Class B
- EN 61000-6-2
- EN 61000-3-2 Class D

**Building-in in IP55 non-ventilated enclosures**

The table below shows the percentage of the rated power, the power supply may be charged with, when built-in in a IP55 non-ventilated enclosure at the ambient temperatures indicated.

| DR-SPS | min. volume enclosure | T ambient 25 °C | T ambient 35 °C |
|---|---|---|---|
| 40 W | 8,5 dm³ | 100 % | 100 % |
| 60 W | 8,5 dm³ | 100 % | 85 % |
| 75 W | 8,5 dm³ | 100 % | 70 % |
| 75 W | 13 dm³ | 100 % | 90 % |
| 100 W | 8,5 dm³ | 90 % | 70 % |
| 100 W | 13 dm³ | 100 % | 90 % |
| 120 W | 13 dm³ | 80 % | 55 % |
| 120 W | 17 dm³ | 100 % | 80 % |
| 240 W | 17 dm³ | 90 % | 70 % |
| 240 W | 26 dm³ | 100 % | 90 % |
| 480 W | 17 dm³ | 55 % | 45 % |
| 480 W | 26 dm³ | 85 % | 65 % |
| 480 W | 35 dm³ | 100 % | 85 % |

EN

DE

Available in stock
Warranty 3 years

| | DR-SPS 75W12V/BTE | DR-SPS 75W24V/BTE | DR-SPS 120W12V/BTE | DR-SPS 120W24V/BTE | DR-SPS 240W24V/BTE | DR-SPS 480W24V/BTE | DR-SPS-B 120W24V | DR-SPS-B 240W24V |
|---|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |  |
| Type | DR-SPS 75W12V/BTE | DR-SPS 75W24V/BTE | DR-SPS 120W12V/BTE | DR-SPS 120W24V/BTE | DR-SPS 240W24V/BTE | DR-SPS 480W24V/BTE | DR-SPS-B 120W24V | DR-SPS-B 240W24V |
| Code | 11810 | 11809 | 11808 | 11807 | 11806 | 11805 | 9859 | 9860 |
| Power (W) | 75 W | 75 W | 120 W | 120 W | 240 W | 480 W | 120 W | 240 W |
| $V_{AC}$ Input ($V_{AC}$) | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 90-264 $V_{AC}$ | 180-550 $V_{AC}$ | 180-550 $V_{AC}$ |
| $V_{DC}$ Input ($V_{DC}$) | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 127-370 $V_{DC}$ | 254-780 $V_{DC}$ | 254-780 $V_{DC}$ |
| $V_{DC}$ Out ($V_{DC}$) | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ | 24 $V_{DC}$ |
| $V_{DC}$ Out: Adjustable ($V_{DC}$) | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ | 24-28 $V_{DC}$ |
| $I_{DC}$ Nominal current out (A) | 6,3 A | 3,2 A | 10,0 A | 5,0 A | 10,0 A | 20,0 A | 5,0 A | 10,0 A |
| Input Current (A) | 1,45 A/115 V<br>0,9 A/230 V | 1,45 A/115 V<br>0,9 A/230 V | 2,25 A/115 V<br>1,3 A/230 V | 2,25 A/115 V<br>1,3 A/230 V | 2,5 A/115 V<br>1,3 A/230 V | 4,8 A/115 V<br>2,4 A/230 V | 0,55 A/400 V<br>1,2 A/230 V | 1,0 A/400 V<br>2,0 A/230 V |
| Inrush Current (A) | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 20 A/115 V<br>35 A/230 V | 50 A | 50 A |
| Ripple (mV) | 80 mVp-p | 120 mVp-p | 100 mVp-p | 120 mVp-p | 150 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p |
| Efficiency (%) | 85,5% | 88% | 85,5% | 88% | 88,5% | 92,5% | 91% | 90% |
| Protection – Overload (%) (1) | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% | 105-130% |
| Protection – Overvoltage ($V_{DC}$) | 14-17 $V_{DC}$ | 29-33 $V_{DC}$ | 14-17 $V_{DC}$ | 29-33 $V_{DC}$ | 29-33 $V_{DC}$ | 29-33 $V_{DC}$ | 130-150% | 130-150% |
| DC OK | Led | Led | Led | Led | Led | Led | Relay Contact | Relay Contact |
| Operating temperature range (°C) | -20 +70 °C | -20 +70 °C | -20 +70 °C | -20 +70 °C | -20 +70 °C | -20 +70 °C | -25 +70 °C | -30 +70 °C |
| $t_a$ ambient temperature (°C) | 45 °C | 45 °C | 50 °C | 50 °C | 50 °C | 50 °C | 60 °C | 50 °C |
| Dimensions (w x h x d) (mm) | 32 x 125,2 x 102 | 32 x 125,2 x 102 | 40 x 125,2 x 113,5 | 40 x 125,2 x 113,5 | 63 x 125,2 x 113,5 | 85,5 x 125,2 x 128,5 | 40 x 126 x 114 | 63 x 126 x 114 |
| Weight (kg) | 0,51 kg | 0,51 kg | 0,60 kg | 0,60 kg | 1,00 kg | 1,50 kg | 0,70 kg | 1,12 kg |

(1) Overload: constant current limiting - Autorecovery / Overtemperature: Power Shut Down - Autorecovery

**NEW** **Evolution – BTE – Energy efficient** blue e³ CE

**Broad** CE UL

Available in stock
Warranty 3 years

| Type | DR-SPS-M 60W12V/BTE | DR-SPS-M 60W24V/BTE | DR-SPS-M 100W12V/BTE | DR-SPS-M 100W24V/BTE | DR-SPS-N 40W12V | DR-SPS-N 40W24V | DR-SPS-N 100W12V | DR-SPS-N 100W24V |
|---|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |  |
| Code | 11812 | 11811 | 11826 | 11827 | 9857 | 9858 | 9855 | 9856 |
| Power (W) | 60 W | 60 W | 100 W | 100 W | 40 W | 40 W | 100 W | 100 W |
| $V_{AC}$ Input ($V_{AC}$) | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ | 85-264 $V_{AC}$ |
| $V_{DC}$ Input ($V_{DC}$) | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ | 120-370 $V_{DC}$ |
| $V_{DC}$ Out ($V_{DC}$) | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ | 12 $V_{DC}$ | 24 $V_{DC}$ |
| $V_{DC}$ Out: Adjustable ($V_{DC}$) | 11-13 $V_{DC}$ | 22-26 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ | 12-14 $V_{DC}$ | 24-28 $V_{DC}$ |
| $I_{DC}$ Nominal current out (A) | 5,0 A | 2,5 A | 8,4 A | 4,2 A | 3,3 A | 1,7 A | 7,5 A | 4,0 A |
| Input Current (A) | 1,2 A/115 V<br>0,8 A/230 V | 1,2 A/115 V<br>0,8 A/230 V | 3 A/115 V<br>1,6 A/230 V | 3 A/115 V<br>1,6 A/230 V | 1,1A/115 V<br>0,7A/230 V | 1,1 A/115 V<br>0,7 A/230 V | 1,3 A/115 V<br>0,8 A/230 V | 1,3 A 115 V<br>0,8 A/230 V |
| Inrush Current (A) | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>50 A/230 V | 30 A/115 V<br>50 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V | 30 A/115 V<br>60 A/230 V |
| Ripple (mV) | 120 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p | 120 mVp-p | 150 mVp-p |
| Efficiency (%) | 88% | 90% | 88% | 90% | 86% | 88% | 85% | 86% |
| Protection – Overload (%) (1) | 105-160% | 105-160% | 102-110% | 102-110% | 105-150% | 105-150% | 105-150% | 105-150% |
| Protection – Overvoltage ($V_{DC}$) | 14,2-16,2% | 30-36% | 14,2-16,2% | 30-36% | 125-150% | 125-150% | 125-150% | 125-150% |
| DC OK | Led | Led | Led | Led | Relay Contact | Relay Contact | Relay Contact | Relay Contact |
| Operating temperature range (°C) | -30 +70 °C | -30 +70 °C | -30 +70 °C | -30 +70 °C | -20 +70 °C | -20 +70 °C | -20 +60 °C | -20 +60 °C |
| $t_a$ ambient temperature (°C) | 45 °C | 45 °C | 40 °C | 40 °C | 60 °C | 60 °C | 40 °C | 40 °C |
| Dimensions (w x h x d) (mm) | 52 x 90 x 54,5 | 52 x 90 x 54,5 | 70 x 90 x 54,5 | 70 x 90 x 54,5 | 40 x 90 x 100 | 40 x 90 x 100 | 55 x 90 x 100 | 55 x 90 x 100 |
| Weight (kg) | 0,19 kg | 0,19 kg | 0,27 kg | 0,27 kg | 0,32 kg | 0,32 kg | 0,45 kg | 0,45 kg |

(1) Overload: constant current limiting - Autorecovery / Overtemperature: Power Shut Down - Autorecovery

NEW **Modular – BTE – Energy efficient** blue e3 CE

**Narrow** CE UL

# 14

## AC Voltage Stabilizers

NEW!

EN

DE

# 14.1 Single Phase AC Voltage Stabilizers

## IP20 – 300VA to 6 kVA Pri 230V +-15% // Sec 230V+-1%

## Common properties

For all applications that require a stable supply
The AC voltage stabilizers eliminate fluctuations in the mains voltage. They provide a very stable 230V output voltage when the input voltage is in between 195 and 265V.

**characteristics**

- adjustment by microprocessor controlled servo-motor
- no harmonic distortion
- degree of protection IP20
- digital voltmeter (output voltage)
- relative humidity 95% (non condensing)
- maximum ambient temperature $t_{a\ max}$ = 45 °C
- maximum xx dBA at the moment the servomotor works

**connections**

- input: mains cable
- output: socket

**technical data**

- input voltage 230 V
  - adjustment margin +/- 15%
  - input voltage range 195 V to 265 V
- output voltage 230 V
  - output voltage accuracy < 1%
- frequency 45-65 Hz
- speed of response to fluctuations 20 V/sec
- efficiency > 97%

**protection**

- provided with circuit breaker in primary circuit

**standards**

EN 61558-2-14

## How to choose the power of the voltage stabilizer

The rule of thumb to get a quick estimate:

- for ordinary household appliances, increase the declared power by 20%.
- for industrial applications – where the power factor plays a role – we recommend increasing the power by 35%

## Product presentation

STAB 1000

## Dimensioning

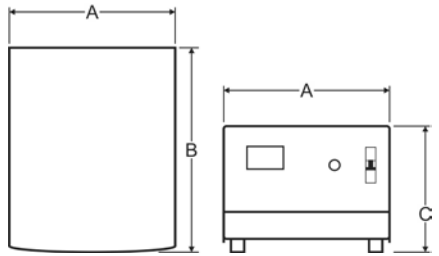



fig. 1

| PS VA | type | code | $U_{IN}$ V | $U_{IN}$ V | $U_{OUT}$ V | Rdt % | A mm | B mm | C mm | M kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 300 | STAB 300 | 11624 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 205 | 290 | 150 | 10 |
| 500 | STAB 500 | 11625 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 205 | 290 | 150 | 10 |
| 1000 | STAB 1000 | 11626 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 205 | 290 | 150 | 11 |
| 2000 | STAB 2000 | 11627 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 255 | 310 | 170 | 17 |
| 3000 | STAB 3000 | 11628 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 255 | 310 | 170 | 22 |
| 5000 | STAB 5000 | 11629 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 310 | 430 | 230 | 37 |
| 6000 | STAB 6000 | 11630 | 230 -15% +15% | 195 – 265 | 230 -1% +1% | >97 | 310 | 430 | 230 | 37 |

EN
DE

## 14.2 Tri Phase AC Voltage Stabilizers

For all applications that require a stable supply
The AC voltage stabilizers eliminate fluctuations in the mains voltage.

On demand

# 15

# Voltage measurement transformers

EN

DE

# Single-phase voltage measurement transformers
# 1 VA to 100 VA

## Common properties

Voltage  transformers are used to adjust the voltage to the input voltage of the measuring instrument and for the creation of a galvanic isolation. They are intended to transmit a voltage signal to measuring devices, energy meters, relays and other analog or digital devices. The voltage transformer charges the measured circuit only in very small way.

These transformers are characterized by their high accuracy in the voltage conversion of primary to secondary over the full range from no-load to rated power. The secondary voltage is almost perfectly proportional to the primary voltage and the phase shift between primary and secondary is just about zero degrees.

**characteristics**

- insulation levels:
  - highest voltage for equipment: Um = 720 $V_{AC}$
  - For primary and secondary terminals: 3kV
- accuracy class: cl 0,5 – cl 1,0 – cl 3,0
- ambient temperature: $t_a$ = min - 25 °C – max +40°C
- temperature class: B
- frequency: 50-60Hz
- overvoltage factor: 1,2 continuous – 1,5 for 30 sec
- degree of protection: IP20
- in plastic case
- separate windings
- mechanically vibration-free
- humidity and corrosion resistant
- vacuum-encapsulated with synthetic resin
- prepared for protection class II

**connections**

screw terminal block

**fixing**

support with fixing holes

**standards**

- EN 61869-1
- EN 61869-3
- EN 60044-2 (old standard)

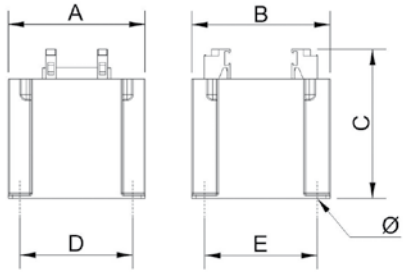
**special executions on request**

- primary voltage: max 690 $V_{AC}$
- secondary voltage: max 690 $V_{AC}$
- rated output: up to 100 VA
- accuracy class:  cl 0,1 – cl 0,2

## Product presentation

400-VT10/05

## Dimensioning




A, B, C, D, E: next page

## Technical parameters

| 11.1 Voltage measurement transformer 400V // 400V | | | | | | |
|---|---|---|---|---|---|---|
| 400//400 | cl 0,5 | | cl 1,0 | | cl 3,0 | |
| VA | Type | Code | Type | Code | Type | Code |
| 1,0 | on request | | on request | | on request | |
| 2,5 | on request | | on request | | on request | |
| 5,0 | E 400-VT5/05 | 1901 | E 400-VT5/1 | 1906 | E 400-VT5/3 | 1911 |
| 10 | E 400-VT10/05 | 1902 | E 400-VT10/1 | 1907 | E 400-VT10/3 | 1912 |
| 25 | E 400-VT25/05 | 1903 | E 400-VT25/1 | 1908 | E 400-VT25/3 | 1913 |
| 50 | E 400-VT50/05 | 1904 | E 400-VT50/1 | 1909 | E 400-VT50/3 | 1914 |
| 100 | E 400-VT100/05 | 1905 | E 400-VT100/1 | 1910 | E 400-VT100/3 | 1915 |
| > 250 | on request | | on request | | on request | |

| 11.2 Voltage measurement transformer 231V // 231V | | | | | | |
|---|---|---|---|---|---|---|
| 231//231 | cl 0,5 | | cl 1,0 | | cl 3,0 | |
| VA | Type | Code | Type | Code | Type | Code |
| 1,0 | on request | | on request | | on request | |
| 2,5 | on request | | on request | | on request | |
| 5,0 | E 231-VT5/05 | 1916 | E 231-VT5/1 | 1921 | E 231-VT5/3 | 1926 |
| 10 | E 231-VT10/05 | 1917 | E 231-VT10/1 | 1922 | E 231-VT10/3 | 1927 |
| 25 | E 231-VT25/05 | 1918 | E 231-VT25/1 | 1923 | E 231-VT25/3 | 1928 |
| 50 | E 231-VT50/05 | 1919 | E 231-VT50/1 | 1924 | E 231-VT50/3 | 1929 |
| 100 | E 231-VT100/05 | 1920 | E 231-VT100/1 | 1925 | E 231-VT100/3 | 1930 |
| > 250 | on request | | on request | | on request | |





## Technical parameters

| 11.3 Voltage measurement transformer 231V // 100√3V | | | | | | |
|---|---|---|---|---|---|---|
| 231//100/V3 | cl 0,5 | | cl 1,0 | | cl 3,0 | |
| VA | Type | Code | Type | Code | Type | Code |
| 1,0 | on request | | on request | | on request | |
| 2,5 | on request | | on request | | on request | |
| 5,0 | E 100V3-VT5/05 | 1931 | E 100V3-VT5/1 | 1936 | E 100V3-VT5/3 | 1941 |
| 10 | E 100V3-VT10/05 | 1932 | E 100V3-VT10/1 | 1937 | E 100V3-VT10/3 | 1942 |
| 25 | E 100V3-VT25/05 | 1933 | E 100V3-VT25/1 | 1938 | E 100V3-VT25/3 | 1943 |
| 50 | E 100V3-VT50/05 | 1934 | E 100V3-VT50/1 | 1939 | E 100V3-VT50/3 | 1944 |
| 100 | E 100V3-VT100/05 | 1935 | E 100V3-VT100/1 | 1940 | E 100V3-VT100/3 | 1945 |
| > 250 | on request | | on request | | on request | |

| 11.4 Voltage measurement transformer 231V // 110√3V | | | | | | |
|---|---|---|---|---|---|---|
| 231//110/V3 | cl 0,5 | | cl 1,0 | | cl 3,0 | |
| VA | Type | Code | Type | Code | Type | Code |
| 1,0 | on request | | on request | | on request | |
| 2,5 | on request | | on request | | on request | |
| 5,0 | E 110V3-VT5/05 | 1946 | E 110V3-VT5/1 | 1951 | E 110V3-VT5/3 | 1956 |
| 10 | E 110V3-VT10/05 | 1947 | E 110V3-VT10/1 | 1952 | E 110V3-VT10/3 | 1957 |
| 25 | E 110V3-VT25/05 | 1948 | E 110V3-VT25/1 | 1953 | E 110V3-VT25/3 | 1958 |
| 50 | E 110V3-VT50/05 | 1949 | E 110V3-VT50/1 | 1954 | E 110V3-VT50/3 | 1959 |
| 100 | E 110V3-VT100/05 | 1950 | E 110V3-VT100/1 | 1955 | E 110V3-VT100/3 | 1960 |
| > 250 | on request | | on request | | on request | |

## Dimensioning

| | cl 0,5 | | | | cl 1,0 | | | | cl 3,0 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VA | axbxc (mm) | dxe | Ø | M(kg) | axbxc (mm) | dxe | Ø | M(kg) | axbxc (mm) | dxe | Ø | M(kg) |
| 5,0 | 89x72x102 | 75x58 | 4,5 | 1,9 | 80x70x96 | 67x56 | 4,5 | 1,5 | 81x65x81 | 68x24 | 4,5 | 0,9 |
| 10 | 102x102x110 | 84x86 | 5,5 | 3,8 | 89x72x102 | 75x58 | 4,5 | 1,9 | 80x70x96 | 67x56 | 4,5 | 1,5 |
| 25 | 130x110x132 | 105x90 | 6 | 6,4 | 102x102x110 | 84x86 | 5,5 | 3,8 | 89x72x102 | 75x58 | 4,5 | 1,9 |
| 50 | 160x116x157 | 130x95 | 6 | 8,7 | 130x110x132 | 105x90 | 6 | 6,4 | 102x102x110 | 84x86 | 5,5 | 3,8 |
| 100 | 160x116x157 | 130x95 | 6 | 8,7 | 130x110x132 | 105x90 | 6 | 6,4 | 102x102x110 | 84x86 | 5,5 | 3,8 |

# 16

## Reactors

EN

DE

# 16.1 Three phase line reactors for electrical motors

## Common properties

For Industrial applications
Three phase line reactors for electric motors are used to reduce voltage distortion and harmonics. They also protect the control electronics and reduce the starting currents.

**characteristics**
- impedance: 4%
- vacuum-and pressure- varnish impregnated
- dielectric strength referred to frame 3000 $V_{AC}$
- provided with earthing terminal
- prepared for protection class I – open execution for flush mounting
- protection class I – enclosed execution with sheet metal case
- degree of protection IP00 – open execution for flush mounting
- degree of protection IP20 – enclosed execution with sheet metal case
- temperature class B
- maximum ambient temperature $t_a$ 40 °C

**IP20, IP23, IP65 – protection cases**
on request

**connections**
screw terminals or nut fixing

**fixing**
angles with fixing holes

**standards**
EN 61 558-2-20
IEC 60 989

**special executions on request**
other voltages U (volt), inductances L (Henri) and currents A (Ampere)
degree of protection IP23 and IP65 (watertight)

## Product presentation


400LRT30000

## Technical parameters

| | for motors 3 x 230V – line reactor impedance: 4% | | | | for motors 3 x 400V – line reactor impedance: 4% | | | |
|---|---|---|---|---|---|---|---|---|
| motor power kW | type | code | current A | inductance mH | type | code | current A | inductance mH |
| 2,2 | 230LRT2200 | 2075 | 9 | 1,88 | 400LRT2200 | 2084 | 5 | 5,88 |
| 3 | 230LRT3000 | 2076 | 12 | 1,41 | 400LRT3000 | 2085 | 7 | 4,20 |
| 5,5 | 230LRT5500 | 2077 | 21 | 0,81 | 400LRT5500 | 2086 | 12 | 2,45 |
| 7,5 | 230LRT7500 | 2078 | 28 | 0,60 | 400LRT7500 | 2087 | 16 | 1,84 |
| 11 | 230LRT11000 | 2079 | 40 | 0,42 | 400LRT11000 | 2088 | 22 | 1,34 |
| 15 | 230LRT15000 | 2080 | 53 | 0,32 | 400LRT15000 | 2089 | 30 | 0,98 |
| 18,5 | 230LRT18500 | 2081 | 65 | 0,26 | 400LRT18500 | 2090 | 37 | 0,79 |
| 22 | 230LRT22000 | 2082 | 75 | 0,23 | 400LRT22000 | 2091 | 45 | 0,65 |
| 30 | 230LRT30000 | 2083 | 101 | 0,17 | 400LRT30000 | 2092 | 60 | 0,49 |
| 37 | | | | | 400LRT37000 | 2093 | 70 | 0,42 |
| 45 | | | | | 400LRT45000 | 2094 | 85 | 0,35 |

| | for motors 3 x 500V – line reactor impedance: 4% | | | | for motors 3 x 690V – line reactor impedance: 4% | | | |
|---|---|---|---|---|---|---|---|---|
| motor power kW | type | code | current A | inductance mH | type | code | current A | inductance mH |
| 2,2 | 500LRT2200 | 2095 | 4 | 9,19 | 690LRT2200 | 2108 | 3 | 16,91 |
| 3 | 500LRT3000 | 2096 | 6 | 6,13 | 690LRT3000 | 2109 | 4 | 12,68 |
| 5,5 | 500LRT5500 | 2097 | 9 | 4,08 | 690LRT5500 | 2110 | 7 | 7,25 |
| 7,5 | 500LRT7500 | 2098 | 12 | 3,06 | 690LRT17500 | 2111 | 9 | 5,64 |
| 11 | 500LRT11000 | 2099 | 18 | 2,04 | 690LRT11000 | 2112 | 13 | 3,90 |
| 15 | 500LRT15000 | 2100 | 24 | 1,53 | 690LRT15000 | 2113 | 18 | 2,82 |
| 18,5 | 500LRT18500 | 2101 | 29 | 1,27 | 690LRT18500 | 2114 | 21 | 2,42 |
| 22 | 500LRT22000 | 2102 | 33 | 1,11 | 690LRT22000 | 2115 | 25 | 2,03 |
| 30 | 500LRT30000 | 2103 | 44 | 0,84 | 690LRT30000 | 2116 | 33 | 1,54 |
| 37 | 500LRT37000 | 2104 | 54 | 0,68 | 690LRT37000 | 2117 | 42 | 1,21 |
| 45 | 500LRT45000 | 2105 | 65 | 0,57 | 690LRT45000 | 2118 | 49 | 1,04 |
| 55 | 500LRT55000 | 2106 | 79 | 0,47 | 690LRT55000 | 2119 | 60 | 0,85 |
| 75 | | | | | 690LRT75000 | 2120 | 82 | 0,62 |
| 90 | | | | | 690LRT90000 | 2121 | 98 | 0,52 |

# 16.2 Reactors – Specials

Special executions on request – Mono phase and three phase reactors

# 17

EN

DE

## Customized transformers

# 17. Customized transformers

In addition to the wide range of standard transformers shown in this catalog, EREA offers the possibility to build transformers according to the needs of your project.

In many cases it is possible to start from the design of an existing standard transformer, but also a completely new design is possible.

Requesting a tailor-made transformer can be done by sending the mail to **sales@erea.be**.

For a smooth processing of your application, we need at least the following information:

- **Type of transformer**
- Single-phase of three-phase
- Transformer with separate windings or autotransformer

- **Primary**
- Line voltage
- If three-phase: vector group (star or triangle)
- Are taps needed? (multiple supply voltages)

- **Secondary**
- Number of secondaries?
- Voltage (for each secondary)
- Current and/or power (for each secondary)
- If three-phase: vector group (star or triangle)
- Are taps needed?
  - On which secondaries?
  - Which voltages?

Optionally, you can also provide the following data:

- On which standard transformer (or series) we can base this customization?
- Other:
- IP **Protection degree**
- **Mechanical options** (wheels, din-rail, …)
- **Electrical protections** (PTC, fuse, …)
- Additional **standards**
- **Energy efficient**
- **IRC** – Limited inrush current

EN

DE

# Request form for customized transformers

→ **Copy and complete where possible** → **Add all drawings and information**
→ **Fax +32 (0)3 355 16 01 or e-mail sales@erea.be clearly stating 'Quotation request'**
→ **https://www.erea.be/nl/contact-us**

## Product

**Application:** _____

_____

_____

**Type of transformer**

- O Separating transformer
- O Isolating transformer
- O Safety transformer
- O Autotransformer
- O Transformer rectifier (filtered / not filtered)
- O Stabilised power supply (linear / switching)
- O Other: _____

**Standards**

- ☐ EN61558-2-1 (separating transformers)
- ☐ EN61558-2-2 (control transformers)
- ☐ EN61558-2-4 (isolating transformers)
- ☐ EN61558-2-6 (safety transformers)
- ☐ EN61558-2-8 (bell transformers)
- ☐ EN61558-2-13 (autotransformers)
- ☐ EN61558-2-15 (transformers for medical locations)
- ☐ EN60076-11 (power transformers)
- ☐ Other: _____
- ☐ Specific quality labels: _____

**Features**

- ☐ Short-circuit resistant: Yes / No
- ☐ Protection degree: I / II
- ☐ IP code:
  - O Unprotected: IP00
  - O Protected: IP20 / IP21 / IP23
  - O Dustproof and waterproof: IP44/ IP54 / IP55 / IP65 / IP67 / IP68
- ☐ Temperature detection: Yes / No
- ☐ Shield: Yes / No
- ☐ Operational conditions:
  - O Continuous
  - O Intermittent: _____ (operating / stand-by times)
- ☐ Maximum ambient temperature: _____ °C
- ☐ Reversibility: Yes / No

**Electrical characteristics**

Power: _____

Primary:

- ☐ Voltage: _____
- ☐ Circuit:
  - O 1 phase
  - O 3 phase – star
  - O 3 phase – triangle
  - O 3 phase – non-coupled

Secondary:

- ☐ Voltage: _____
- ☐ Circuit:
  - O 1 phase
  - O 3 phase – star
  - O 3 phase – triangle
  - O 3 phase – non-coupled
  - O Other: _____

Frequency:

- ☐ 50-60Hz
- ☐ Other: _____

Vector group: _____

Losses at zero load (max.): _____ W

Losses at full load (max.): _____ W

Short-circuit voltage: _____ %

Isolation voltage: _____ kV

Switching current (max.): _____ x Înom

Power factor of the load: _____ cos ϕ



## Your data

Date _____

Company: _____ Contact person: _____

Address: _____ Position: _____

_____ Telephone: _____

VAT: _____ Fax: _____

E-mail: _____

## Your distributor

Company: _____ Contact person: _____

Address: _____ Telephone: _____

_____ Fax: _____

VAT: _____ E-mail: _____

## Product

**Connection options**

- ☐ Primary:
  - O Clamps
  - O Bolts
  - O Wires
  - O Plugs
  - O Socket outlets
  - O Pins
- ☐ Secondary:
  - O Clamps
  - O Bolts
  - O Wires
  - O Plugs
  - O Socket outlets
  - O Pins

**Options**

- ☐ Portable: Yes / No
- ☐ Wheels: Yes / No
- ☐ DIN rail mounting: Yes / No
- ☐ Tropicalisation: Yes / No
- ☐ Other: _____

**Protection devices**

- ☐ Primary protection:
  - O Safety fuse
  - O PTC
  - O Circuit breaker
  - O Bimetal
    - Manually resettable
    - Automatic self-resetting
- ☐ Secondary protection:
  - O Safety fuse
  - O PTC
  - O Circuit breaker
  - O Bimetal
    - Manually resettable
    - Automatic self-resetting

## Commercial

- ☐ Required quantities: _____
- ☐ Expected delivery date: _____
- ☐ Other: _____

_____

_____

EN

DE

# General Sales Terms

**1. General**

1.1. These General Sales Terms apply unless agreed otherwise in writing by the parties.

1.2. By concluding a purchasing contract the buyer renounces the application of any of its provisions under its general or special terms, even if they claim to be the only ones valid.

**2. Drawings and descriptions**

Weights, dimensions, design, quality, capacity and other details, listed in catalogues, prospectuses, circulars, advertisements, images, websites and price lists are an approximate indication only. These details are only binding insofar as the contract specifically refers to them and expressly describes them as binding.

**3. Orders**

3.1. An order is only valid after written confirmation by the seller.

3.2. For orders by the buyer only references listed in the seller's catalogues shall be taken into account. In the event of errors in the order no returned goods will be accepted without prior written permission of the seller. This applies to all returns. In addition a contribution to expenses will be charged at the equivalent of twenty per cent (20%) of the sales price. In addition, the return must be made within 8 weeks after invoicing.

3.3. The seller reserves the right to apply minimum quantities to orders at least equal to the smallest packaging unit.

**4. Packaging**

4.1. Unless agreed otherwise in writing between the parties, the prices are deemed to apply to goods packaged in standard packaging.

4.2. Additional packaging (sea-proof, etc.) will be provided at the express written request of the buyer and shall be invoiced to the buyer.

**5. Transfer of risk**

5.1. Unless otherwise agreed in writing delivery shall take place "ex works Wijnegem" (EXW) in compliance with Incoterms 2010. The goods are sold in the seller's plant and permanently accepted there, even if they must be shipped FOB. Subject to Article 6, property and risk shall be transferred then.

5.2. In the event the seller has acted at the request of the buyer to arrange for transport or customs formalities, he may not be held liable. All resulting costs will be invoiced to the buyer.

5.3. The goods shall be shipped at the buyer's risk. In the event the goods must be insured at the buyer's express request, for storage and shipping, the seller shall make arrangements and invoice the resulting costs to the buyer without any liability.

**6. Reservation of title**

6.1. Without prejudice to the provisions under Article 5, the goods shall remain the property of the seller until full payment of the sales price. The seller reserves the right to reclaim the goods, wherever they may be.

6.2. Any advances, partial payments of the sales price, made by the buyer, may be used as compensation for losses suffered by the seller as a result of default or other sums owed to the seller.

**7. Claim transfer clause**

In the event of the resale of goods, which are still the property of the seller under Article 6.1, to a third party, the buyer shall transfer his claims against this third party to the seller, without prejudice to the seller's right to claim payment from the buyer, who shall remain liable.

**8. Lead times**

8.1. Unless otherwise agreed in writing between the parties, the lead time shall take effect from the date of receipt and acceptance of the order by the seller.

8.2. Lead times do not run during the seller's collective leave periods, or when delivery is prevented as a result of force majeure.

8.3. Unless otherwise agreed in writing between the parties, the lead time provided in the agreement is only an estimate. Delays may never lead to termination of the agreement, cancellation of an order or compensation.

8.4. In the event that the buyer does not accept the goods when they are made available or delivered by the seller, the seller is nevertheless authorised to claim payment of the invoice and in the above case reimbursement of all expenses, including those for storage and safekeeping, as well as compensation from the buyer. The seller provides the storage of the goods for the account and risk of the buyer.
8.5. The seller is authorised to deliver partial shipments without the buyer being able to refuse delivery.

**9. Payment**

9.1. All payments shall be made in euros unless agreed otherwise in writing between the parties.
9.2. Unless agreed otherwise in writing between the parties or except for any mention to the contrary on the front of the invoice, invoices become due immediately upon receipt. After their due date, they shall legally yield interest as provided in the law on late payments of 2 August 2002. The buyer may under no circumstances invoke set-off.
9.3. Any protest regarding the invoiced amounts shall be made by registered letter within 8 days of delivery or receipt of the invoice respectively.
9.4. All current and future taxes, levies and duties, of any nature whatsoever, linked to the sale of the goods delivered by the seller shall be borne by the buyer.
9.5. In the event of non-payment of the invoice on its due date, the seller shall also have the right, without prior reminder, to supplementary compensation of ten per cent (10%) of the sales price or a minimum of twenty-five euros (EUR 25). Non-payment of a single invoice on the due date shall make the balances due from the other invoices immediately payable, even if they have not yet fallen due for payment.
9.6. Prices are net, not including VAT.
9.7. Sales prices are those valid on the date of delivery to the buyer.

**10. Financial guarantees**

10.1. In the event that the seller believes that the buyer's credit has been affected, for example when legal measures are taken against the buyer and/or when matters occur that make the correct performance of the agreed obligations difficult or impossible, the seller has the right, even upon partial or full shipment of the goods, to suspend the order in whole or in part and to demand additional guarantees.
10.2. In the event of refusal by the buyer the seller has the right to cancel the order in full or in part, without it affecting the seller's rights to claim compensation.

**11. Annulment clause**

11.1. In the event of gross misconduct on the part of the buyer such as, among others, late payment or non-acceptance of ordered goods, the seller may annul the agreement without prior formal notice, without legal intervention and without harming the seller's rights to claim compensation. The seller shall indicate his desire to annul simply by sending a registered letter referring to this fact.
11.2. In all other cases besides late payment to which Articles 9.2 and 9.4 apply, the seller is entitled to compensation of fifteen per cent (15%) of the purchase price, with a minimum of one hundred and twenty-five euros (EUR 125), without prejudice to the seller's right to prove greater losses.

**12. Hidden defects – liability**

12.1. Without prejudice to the application of common law with respect to hidden and visible defects, the seller shall remedy any undisputed hidden defects or lack of correspondence upon delivery of the goods, which are not the result of overwhelming ignorance on the part of the seller or faulty intervention on the part of the buyer or third parties, by replacement by the same or an equivalent item (at the end of production or stock), or repair, as preferred by the seller.
12.2. The seller shall become the owner of the replaced parts.
12.3. The seller shall not be held liable for any other guarantee or compensation except for what is described under Article 12.1, except in the event of intent on the part of the seller.
12.4. Subject to any other rights, the seller is under no circumstances liable for compensation if:
it cannot be demonstrated that the defects were present at the time of the entry into service of the goods;
the seller, given the available science and technology, could not be aware of the presence of the defects;
the defects are due to the design of the device in which the goods are incorporated, installed or mounted;
the damage is due to faults on the part of the buyer, or any third party, among which faulty instructions or manoeuvres, incorrect operation, transformations;
the defects are the result of the compliance of the goods with mandatory government specifications;
the damage is due to a lack of maintenance or maintenance in violation of the maintenance manual or the maintenance specifications drawn up by the seller or manufacturer;
the damage is due to the intervention of a third party not approved by the manufacturer.
12.5. The buyer shall safeguard the seller against any demands or claims that could be directed at him on the basis of any defect or damage resulting from circumstances as summed up under Article 12.4.
12.6. In general the seller shall not be held liable for any indirect compensation, such as for example damage to other buyer goods, loss of opportunity or losses connected to the buyer's professional activity, loss of revenue, decrease in turnover and loss of customers or data, except in the event of intent.

**13. Assembly and installation**

13.1. Unless agreed otherwise in writing between the parties assembly and installation are never part of the agreement. The seller may, however, at the buyer's request agree in writing to, under specific circumstances, ask specialised workers, fitters or assemblers to carry out this assembly and installation. In this case the services provided by said workers, fitters, or assemblers will be carried out at the expense and under the responsibility of the buyer.
13.2. The buyer shall make available all assistance, equipment and materials required for assembly at his expense.

**14. Intellectual Property Rights**

The buyer shall have the right to use or market the products separately or incorporated in his own products.
The buyer shall have no intellectual property rights in the broadest sense licensed from the seller and shall not infringe those intellectual property rights or alter them, take actions that affect the value of those intellectual property rights, or interfere in any other way with said intellectual property rights.
The buyer shall not, without the consent of the seller, copy the products or parts thereof, engage in reverse engineering or decompiling, analyze the products or parts thereof, or alter the products or parts thereof to make them suitable for other uses.

**15. Force majeure**

15.1. Force majeure is understood to mean any circumstances beyond the control of one of the parties and occurring after the conclusion of the agreement, which may not be attributed to them and prevent the performance of the agreement, such as natural disasters, terrorism, political unrest or war, fire, mobilisation, confiscation, embargo, shortage of transport, general shortage of raw materials, shortage of suppliers, limitation in energy consumption, etc.
15.2. The party claiming the aforementioned circumstances shall immediately inform the other party in writing of their starting and end dates.
15.3. In the event that a situation of force majeure for one of the parties lasts longer than forty (40) days, the agreement may be ended by the other party by registered letter without any compensation being owed.
15.4. The existence of any such circumstances removes any liability with respect to the non-performance of the agreement during incidents of force majeure, from the seller as well as from the buyer.

**16. Applicable law**

The agreement shall be exclusively governed and is drawn up according to Belgian law, with the exception of the United Nations Convention for the International Sale of Goods of 11 April 1980.

**17. Competent courts**

In the event of disputes, the courts of the district where the registered office of the seller is located shall have sole jurisdiction, without prejudice to the seller's right to bring any dispute before another competent court.

**18. Language**

The Dutch-language General Sales Terms shall be decisive in any interpretation of the terminology used. Translations into French, English, German or any other language are only drawn up by the seller for the buyer's information.

**19. Personal details**

The personal details provided by the buyer will be electronically processed by EREA Energy Engineering bv, Ruggeveldstraat 1, 2110 Wijnegem (RPR 0543.482.783, Commercial Court of Antwerp) in the framework of the management of customer files. The details may also be processed for promotion and prospecting purposes and to inform the buyer about the seller's company, products and services. If the buyer does not wish to participate, he can oppose any further processing of his personal details for direct marketing reasons at no extra cost by addressing a simple request to the seller via letter.

The buyer's personal details may be shared with other federations and related enterprises, of which the buyer may obtain a list upon simple request via letter. The buyer may at any time ask to consult and update his personal details. To this effect it is also sufficient to contact EREA via letter. A public list is kept by the Commission for the Protection of Privacy, 139 rue Haute, 1000 Brussels, with all electronic processes used with personal details. In the event that the buyer requires further information on the way in which EREA processes data, he may consult this list.





For more than 80 years, EREA has been one of the largest transformer manufacturers in Europe. Our products are manufactured wholly in Wijnegem – Belgium. Over the years, we have built up unmatched expertise in transformers. All our products, every device we deliver, stands for quality, reliability and safety.

Made-to-Measure solutions are our main strength, but we also deliver standard products. Our motivated and experienced staff are pleased to help you work out your project. We offer answers to all specific questions. Together with you, we search for the most suitable solution. We work closely with a fixed network of distributors, thereby securing our presence in the industrial market, allowing us to guarantee the best possible service. After all, customer satisfaction is our most important priority.

More information? Contact EREA Energy Engineering bv:

**tel. BE +32 (0)3 355 16 00 – tel. FR +33 (0)4 81 68 08 12 – tel. NL +31 (0)183 788 108**

**sales@erea.be**

EREA TRANSFORMERS

erea · energy · engineering

**EREA Energy Engineering bv**
Ruggeveldstraat 1
BE 2110 Wijnegem – Belgium
tel. BE +32 (0)3 355 16 00
tel. FR +33 (0)4 81 68 08 12
tel. NL +31 (0)183 788 108
fax +32 (0)3 355 16 01
sales@erea.be
**www.erea.be**

Edition 2020

Realized with the support of FIT:

**EREA Energy Engineering bv**
Ruggeveldstraat 1
BE-2110 Wijnegem
E-mail sales@erea.be
Tel. BE +32 (0)3 355 16 00
Tel. NL +31 (0)183 78 81 08
Tél. FR +33 (0)4 81 68 08 12
Fax +32 (0)3 355 16 01
**www.erea.be**