POLYLUX®

# Low inrush current
transformers (<=5In)

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# Single-phase isolation transformers with low inrush current (<=5In)

Our homes are equipped with energy-saving installations increasingly. Despite the fact that, according to the regulations, three-phase installations should have 400V with neutral and single-phase installations should have 230V F+N, in some areas we find three-phase or single-phase installations without neutral (two-phase installations).

The problem that arises because of these installations is that the SATs warn that, if the power supply is not carried out correctly via the neutral, equipment such as EV chargers, aerothermics, boilers and biomass equipment may lose their guarantee.

At POLYLUX we have our TK5IN series, made up of transformers to generate the necessary neutral in this type of installation in order to solve this problem. A range of single-phase isolation transformers with low inrush, low losses and low noise level designed to supply the electronics of equipment in residential installations such as EV electric vehicle chargers, aerothermal, boilers or biomass equipment, among others.

These transformers provide a correct power supply to the equipment ensuring that they maintain their warranty and function optimally.



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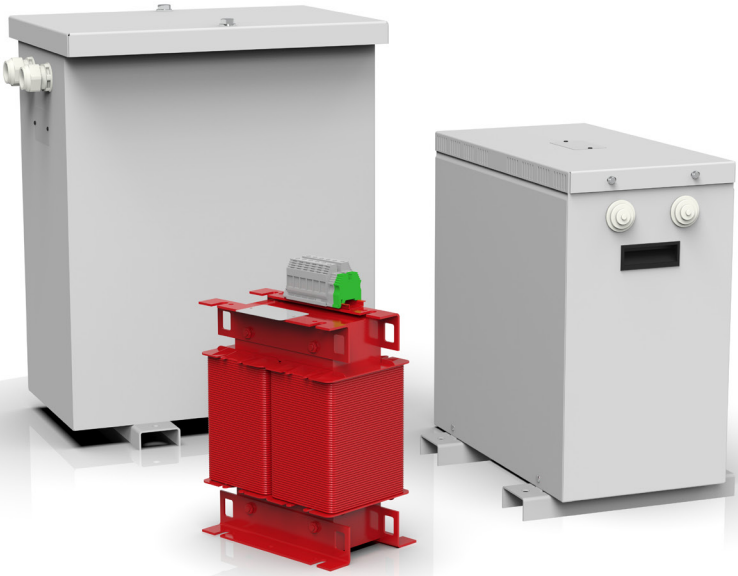
# Isolation transformers with **low inrush current** (<=5In)



Low inrush current
3 or 5In
to ensure
adequate protection

Performance
more than 95%

Low losses,
reducing the consumption
of the installation

Quiet operation
(noise level
<40dB)

Input protections
with B or C curves and
rated current

# TK5IN SERIES

**Isolation** · Input **230 V** · Output **230 V**

## Definition and applications

The TK5IN transformers are mainly used to isolate circuits and increase or reduce the output voltage if this is requested as a special assembly.
They are also used to change the installation neutral system for changing from a two-phase (PH + PH) to a single-phase network (PH + N) (this case means creating an artificial neural) or vice versa.
In installations with a certain amount of electrical noise, the TK5IN series helps improve the electrical network quality in secondary.
For example: Supplying the electronics of equipment such as EV chargers, boilers, aerothermal or biomass equipment, which require the generation of grounded neutral to supply the equipment with Phase + Neutral.

## Manufacturing characteristics

The TK5IN series are perfect for supplying continuous power to machinery residential installations or machinery. The transformers of this series are characterised by their low inrush (3 or 5In), low no-load losses >95%, quiet operation ((noise level <40dB) and input protections with B or C and rated current curves).
Equipment with three different finishes based on sealing.
All the versions have the following features in common:

- Anti-flash dip varnishing. Ensures greater compactation, insulation and noise elimination <40dB.
- Welded copper connection end sleeves inserted into the terminal block to prevent hazards caused by expansion that leads to poor connection.
- All the transformers are checked automatically one by one and the compliance test report is created in accordance with the corresponding standard.

### TK5INX

· IP00 protection rating.
· Power from 2 kVA to 40 kVA.
· Total impregnated in anti-flash varnish.
· Lifting elements included.

### TK5INW

· IP23 protection rating (IK08).
· Power from 2 kVA to 40 kVA.
· Metal box painted with RAL7035 polyester resin.
· High resistance to corrosion.
· Lifting elements included.
· Detachable top and front cover.
· Cable outlet with cable gland.

### TK5INZ

· IP54 protection rating / 65 (IK10).
· Power from 2 kVA to 40 kVA.
· Metal box painted with RAL7035 polyester resin.
· High resistance to corrosion.
· Lifting elements included.
· Detachable top cover.
· Stuffing box cover for cable input depending on installation needs.
· With silentblocks.



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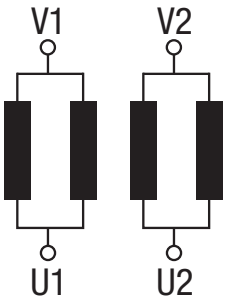
# TK5IN SERIES

**Isolation** · Input **230 V** · Output **230 V**

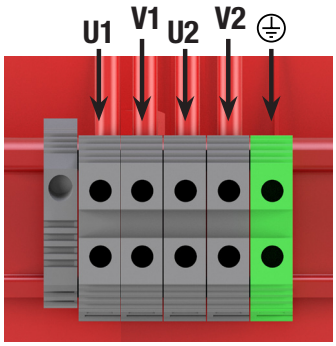
## Technical features - standard model

| | |
|---|---|
| Rating | **2 kVA to 40 kVA** |
| Standard voltage | **Input 230 V // Output 230 V** |
| Standard frequency | **50-60 Hz** |
| Noise | **≤ 40 dB** |
| Windings | **Class HC-200 ºC** |
| Insulators | **Class F - 155 ºC ≤ 16 kVA (TK5INX, TK5INW)**<br>**Class F - 155 ºC ≤ 12,5 kVA (TK5INZ)**<br>**Class H - 180 ºC ≥ 20 kVA (TK5INX, TK5INW)**<br>**Class H - 180 ºC ≥ 16 kVA (TK5INZ)**<br>*More information in Technical Appendix (T.A.1) |
| Class | **I** |
| Altitude | **1000 m** |
| Enclosure colour | **RAL 7035** |
| IP rating | **IP00 (TKX)**<br>**IP23 (TKW)**<br>**IP54 / 65 (TKZ)** |
| IK rating | **IK08 (TKW)**<br>**IK10 (TKZ)** |
| Paint class (ISO 12944) | **C3 (TKW)**<br>**C4 (TKZ)** |
| Room temperature | **45 ºC** |
| Standards | **IEC/EN 61558, CE up to 16 kVA**<br>**IEC/EN 60076, CE from 20 kVA** |
| Test voltage | **3 kV (1 min., 50 Hz)** |
| Inrush | **< 5 In** |
| Ucc | **≤ 4.7 %** |
| K factor | **4** |
| Operation | **Continuous** |
| Cooling | **AN (TKX / TKE) - ANAN (TKW / TKZ)** |
| Lifting accessories | Lifting **elements** |

## Electrical diagram

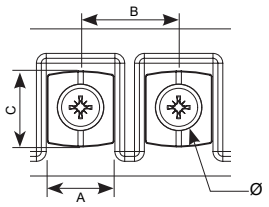



## Connection

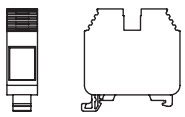


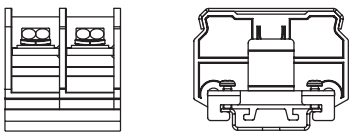

## Terminal types

| Terminals | | External mm | | | | Minimum conductor cross-section mm² | Maximum tightening torque | | TK5INX-TK5INW Rating kVA | | TK5INZ Rating kVA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | Ø | | N·m | Lb·In | From | To | From | To |
| Terminal M5 | | 15 | 18.5 | 14 | M5 | 16 | 1.1 | 9.7 | - | - | - | - |
| Power strip 1 | Terminal 16 | - | - | - | - | 25 | 1.2 | 10.6 | 3.15 | 6.3 | 3.15 | 4 |
| Power strip 1 | Terminal 35 | - | - | - | - | 50 | 2.5 | 22.1 | 8 | 8 | 5 | 6.3 |
| Power strip 2 | Terminal 60 | - | - | - | - | 25 | 4.5 | 40 | 10 | 12.5 | 8 | 10 |
| Power strip 2 | Terminal 100 | - | - | - | - | 35 | 6.7 | 60 | 16 | 20 | 12.5 | 16 |
| Power strip 2 | Terminal 200 | - | - | - | - | 95 | 9 | 80 | 25 | 40 | 20 | 31.5 |
| Power strip 2 | Terminal 300 | - | - | - | - | 150 | 9 | 80 | 50 | 50 | 40 | 50 |



Terminal M5


Power strip 1


Power strip 2

## TK5IN SERIES

Isolation · Input 230 V · Output 230 V

# Theoretical data - standard model

| Rating kVA | Reference | Insulation class | Current A | | Protections A | | Cable gland (TK5INW) / Stuffing boxes (TK5INZ) | |
|---|---|---|---|---|---|---|---|---|
| | | | Input | Output | Input | Output | ø max. (mm) | Quantity |
| **TK5INX** | | | | | | | | |
| 2 | **TK5INX2** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | - | - |
| 2,5 | **TK5INX2.5** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | - | - |
| 3,15 | **TK5INX3.15** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | - | - |
| 4 | **TK5INX4** | F | 17,4 | 17,4 | 16 (C/gG) | 16 (C/gG) | - | - |
| 5 | **TK5INX5** | F | 21,7 | 21,7 | 20 (C/gG) | 20 (C/gG) | - | - |
| 6.3 | **TK5INX6.3** | F | 27,4 | 27,4 | 25 (C/gG) | 25 (C/gG) | - | - |
| 8 | **TK5INX8** | F | 34,8 | 34,8 | 32 (C/gG) | 32 (C/gG) | - | - |
| 10 | **TK5INX10** | F | 43,5 | 43,5 | 40 (C/gG) | 40 (C/gG) | - | - |
| 12.5 | **TK5INX12.5** | F | 54,3 | 54,3 | 50 (C/gG) | 50 (C/gG) | - | - |
| 16 | **TK5INX16** | F | 69,6 | 69,6 | 63 (C/gG) | 63 (C/gG) | - | - |
| 20 | **TK5INX20** | H | 87,0 | 87,0 | 80 (C/gG) | 80 (C/gG) | - | - |
| 25 | **TK5INX25** | H | 108,7 | 108,7 | 100 (C/gG) | 100 (C/gG) | - | - |
| 31,5 | **TK5INX31.5** | H | 137,0 | 137,0 | 125 (C/gG) | 125 (C/gG) | - | - |
| 40 | **TK5INX40** | H | 173,9 | 173,9 | 160 (C/gG) | 160 (C/gG) | - | - |
| **TK5INW** | | | | | | | | |
| 2 | **TK5INW2** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | 18 | 2 |
| 2,5 | **TK5INW2.5** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | 25 | 4 |
| 3,15 | **TK5INW3.15** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | 25 | 4 |
| 4 | **TK5INW4** | F | 17,4 | 17,4 | 16 (C/gG) | 16 (C/gG) | 32 | 4 |
| 5 | **TK5INW5** | F | 21,7 | 21,7 | 20 (C/gG) | 20 (C/gG) | 32 | 4 |
| 6,3 | **TK5INW6.3** | F | 27,4 | 27,4 | 25 (C/gG) | 25 (C/gG) | 32 | 4 |
| 8 | **TK5INW8** | F | 34,8 | 34,8 | 32 (C/gG) | 32 (C/gG) | 32 | 4 |
| 10 | **TK5INW10** | F | 43,5 | 43,5 | 40 (C/gG) | 40 (C/gG) | 32 | 4 |
| 12,5 | **TK5INW12.5** | F | 54,3 | 54,3 | 50 (C/gG) | 50 (C/gG) | 32 | 4 |
| 16 | **TK5INW16** | F | 69,6 | 69,6 | 63 (C/gG) | 63 (C/gG) | 32 | 4 |
| 20 | **TK5INW20** | H | 87,0 | 87,0 | 80 (C/gG) | 80 (C/gG) | 32 | 8 |
| 25 | **TK5INW25** | H | 108,7 | 108,7 | 100 (C/gG) | 100 (C/gG) | 32 | 8 |
| 31,5 | **TK5INW31.5** | H | 137,0 | 137,0 | 125 (C/gG) | 125 (C/gG) | 32 | 8 |
| 40 | **TK5INW40** | H | 173,9 | 173,9 | 160 (C/gG) | 160 (C/gG) | 32 | 8 |
| **TK5INZ** | | | | | | | | |
| 2 | **TK5INZ2** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | 18 - 25 | 2 |
| 2,5 | **TK5INZ2.5** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | 18 - 25 | 2 |
| 3,15 | **TK5INZ3.15** | F | 13,7 | 13,7 | 12 (C/gG) | 12 (C/gG) | 18 - 25 | 2 |
| 4 | **TK5INZ4** | F | 17,4 | 17,4 | 16 (C/gG) | 16 (C/gG) | 22 - 32 | 2 |
| 5 | **TK5INZ5** | F | 21,7 | 21,7 | 20 (C/gG) | 20 (C/gG) | 22 - 32 | 2 |
| 6,3 | **TK5INZ6.3** | F | 27,4 | 27,4 | 25 (C/gG) | 25 (C/gG) | 22 - 32 | 2 |
| 8 | **TK5INZ8** | F | 34,8 | 34,8 | 32 (C/gG) | 32 (C/gG) | 22 - 32 | 2 |
| 10 | **TK5INZ10** | F | 43,5 | 43,5 | 40 (C/gG) | 40 (C/gG) | 22 - 32 | 2 |
| 12,5 | **TK5INZ12.5** | F | 54,3 | 54,3 | 50 (C/gG) | 50 (C/gG) | 22 - 32 | 2 |
| 16 | **TK5INZ16** | H | 69,6 | 69,6 | 63 (C/gG) | 63 (C/gG) | 22 - 32 | 2 |
| 20 | **TK5INZ20** | H | 87,0 | 87,0 | 80 (C/gG) | 80 (C/gG) | 22 - 32 | 2 |
| 25 | **TK5INZ25** | H | 108,7 | 108,7 | 100 (C/gG) | 100 (C/gG) | 22 - 32 | 2 |
| 31,5 | **TK5INZ31.5** | H | 137,0 | 137,0 | 125 (C/gG) | 125 (C/gG) | 22 - 32 | 2 |
| 40 | **TK5INZ40** | H | 173,9 | 173,9 | 160 (C/gG) | 160 (C/gG) | 22 - 32 | 2 |



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# TK5IN SERIES

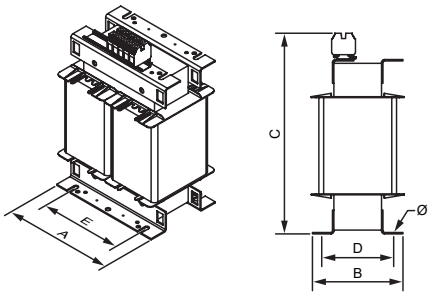
**Isolation** · Input **230 V** · Output **230 V**

## Measurements

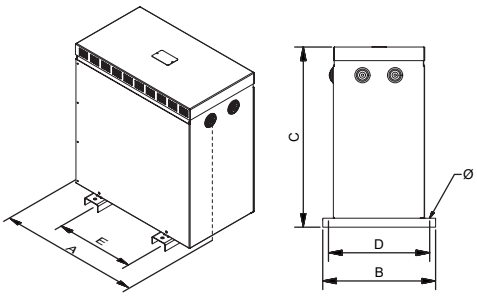
| Rating kVA | Dimensions mm | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Reference | A | B | C | D | E | Ø | Weight kg |
| **TK5INX** | | | | | | | | |
| 2 | **TK5INX2** | 240 | 144 | 355 | 122 | 180 | 9 | 27,8 |
| 2,5 | **TK5INX2.5** | 240 | 164 | 355 | 142 | 180 | 11 | 35,1 |
| 3,15 | **TK5INX3.15** | 240 | 174 | 355 | 152 | 180 | 11 | 38,5 |
| 4 | **TK5INX4** | 280 | 170 | 419 | 126 | 210 | 11 | 41,0 |
| 5 | **TK5INX5** | 280 | 190 | 419 | 146 | 210 | 11 | 51,3 |
| 6.3 | **TK5INX6.3** | 280 | 210 | 419 | 166 | 210 | 11 | 61,4 |
| 8 | **TK5INX8** | 280 | 220 | 419 | 176 | 210 | 11 | 66,0 |
| 10 | **TK5INX10** | 320 | 260 | 480 | 154 | 240 | 11 | 68,1 |
| 12.5 | **TK5INX12.5** | 320 | 280 | 480 | 174 | 240 | 11 | 80,4 |
| 16 | **TK5INX16** | 320 | 300 | 480 | 194 | 240 | 11 | 94,7 |
| 20 | **TK5INX20** | 400 | 230 | 615 | 160 | 250 | 11 | 119 |
| 25 | **TK5INX25** | 400 | 250 | 615 | 180 | 250 | 11 | 146 |
| 31,5 | **TK5INX31.5** | 400 | 270 | 615 | 200 | 250 | 11 | 169 |
| 40 | **TK5INX40** | 400 | 280 | 615 | 210 | 250 | 11 | 185 |
| **TK5INW** | | | | | | | | |
| 2 | **TK5INW2** | 458 | 340 | 500 | 300 | 300 | 12 | 32,8 |
| 2,5 | **TK5INW2.5** | 458 | 340 | 500 | 300 | 300 | 12 | 40,1 |
| 3,15 | **TK5INW3.15** | 458 | 340 | 500 | 300 | 300 | 12 | 43,5 |
| 4 | **TK5INW4** | 528 | 418 | 644 | 375 | 345 | 12 | 50,0 |
| 5 | **TK5INW5** | 528 | 418 | 644 | 375 | 345 | 12 | 60,3 |
| 6,3 | **TK5INW6.3** | 528 | 418 | 644 | 375 | 345 | 12 | 70,4 |
| 8 | **TK5INW8** | 528 | 418 | 644 | 375 | 345 | 12 | 75,0 |
| 10 | **TK5INW10** | 597 | 415 | 710 | 375 | 350 | 12 | 80,1 |
| 12,5 | **TK5INW12.5** | 597 | 415 | 710 | 375 | 350 | 12 | 92,4 |
| 16 | **TK5INW16** | 597 | 415 | 710 | 375 | 350 | 12 | 107 |
| 20 | **TK5INW20** | 795 | 550 | 970 | 500 | 415 | 12 | 135 |
| 25 | **TK5INW25** | 795 | 550 | 970 | 500 | 415 | 12 | 162 |
| 31,5 | **TK5INW31.5** | 795 | 550 | 970 | 500 | 415 | 12 | 185 |
| 40 | **TK5INW40** | 795 | 550 | 970 | 500 | 415 | 12 | 201 |

| Rating kVA | Dimensions mm | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Reference | A | B | C | D | E | Ø | Weight kg |
| **TK5INZ** | | | | | | | | |
| 2 | **TK5INZ2** | 510 | 362 | 689 | 320 | 250 | 11 | 57,8 |
| 2,5 | **TK5INZ2.5** | 510 | 362 | 689 | 320 | 250 | 11 | 65,1 |
| 3,15 | **TK5INZ3.15** | 694 | 413 | 764 | 370 | 350 | 11 | 78,5 |
| 4 | **TK5INZ4** | 694 | 413 | 764 | 370 | 350 | 11 | 81,0 |
| 5 | **TK5INZ5** | 694 | 413 | 764 | 370 | 350 | 11 | 91,3 |
| 6,3 | **TK5INZ6.3** | 694 | 413 | 764 | 370 | 350 | 11 | 101 |
| 8 | **TK5INZ8** | 694 | 413 | 764 | 370 | 350 | 11 | 106 |
| 10 | **TK5INZ10** | 694 | 413 | 764 | 370 | 350 | 11 | 108 |
| 12,5 | **TK5INZ12.5** | 694 | 413 | 764 | 370 | 350 | 11 | 120 |
| 16 | **TK5INZ16** | 890 | 625 | 1148 | 500 | 426 | 12 | 155 |
| 20 | **TK5INZ20** | 890 | 625 | 1148 | 500 | 426 | 12 | 179 |
| 25 | **TK5INZ25** | 890 | 625 | 1148 | 500 | 426 | 12 | 206 |
| 31,5 | **TK5INZ31.5** | 890 | 625 | 1148 | 500 | 426 | 12 | 229 |
| 40 | **TK5INZ40** | 890 | 625 | 1148 | 500 | 426 | 12 | 245 |

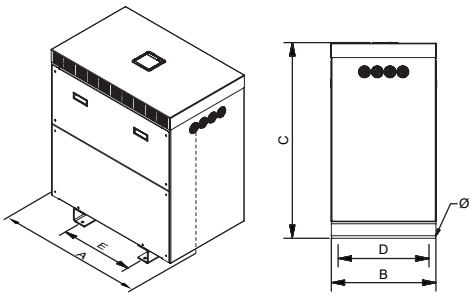
### **TK5INX** IP00




### **TK5INW** IP23



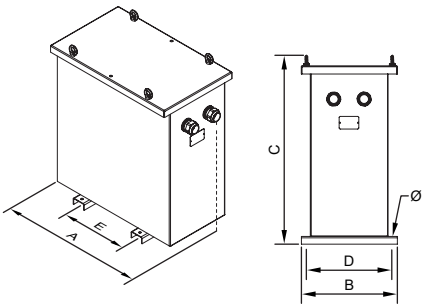

From 2 kVA up to 16 kVA




From 20 kVA

Sectioned

### **TK5INZ** IP54 / 65



## TK5IN SERIES

**Isolation** · Input **230 V** · Output **230 V**

# On-request manufacturing options (consult prices)

| | |
|---|---|
| Rating | **From 2 kVA to 100 kVA** |
| Windings | **Copper or aluminium** |
| Frequency | **From 50 Hz to 400 Hz** |
| IP rating | **IP00, IP20, IP23, IP31,IP33, IP42, IP54, IP55 and IP65** |
| IK rating | **IK08 and IK10** |
| Room temperature | **Up to 60 ºC** |
| Locks | **Screw, key** |
| Test voltage | **Up to 28 kV** |
| Short circuit voltage | **From 2% to 9%** |
| Operation | **Intermittent, continuous** |
| Cooling | **Natural, forced ventilation** |
| Electrostatic shield | **Up to three shields** |
| Class | **I, II** |
| Altitude | **Up to 4000 m** |
| Protections | **In both primary and secondary (figure 1)** |
| Temperature sensors | **PT100 (figure 2), PTC (figure 3) or bimetallic** |
| Temperature control | **Temperature control station (4xPT100) (figure 4), PTC thermal relays (3xPTC / 6xPTC)** |
| Network analyser | **(Figure 5)** |
| Anti condensation system | **Higrostat** |
| Heating system | **Heating elements** |
| External protection | **Anti-flash varnish, resin encapsulated, metal or stainless steel enclosure** |
| Transportation and hoisting | **Wheels (figure 6), lifting points** |
| Paint | **C3, C4, C5, different RAL** |
| Feature plate | **High generation polymer or stainless steel (figure 7)** |
| Anti vibration system | **Silentblocks** |
| Adjustment | **-10%; -7.5%; -5%; -2.5%; +2.5%; +5%; +7.5%; +10%**<br>**With bridges (figure 8) or selector (figure 9)** |
| Certified | **CE, DNV-GL, BV, UL (insulation) and POLYLUX laboratory** |
| Climate class / environment / fire | **Up to C2-E2-F1** |

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9



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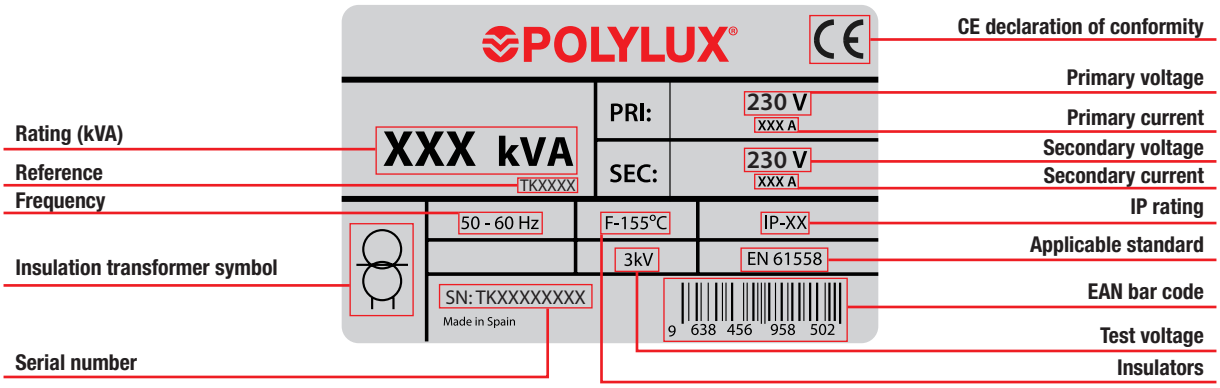
## TK5IN SERIES

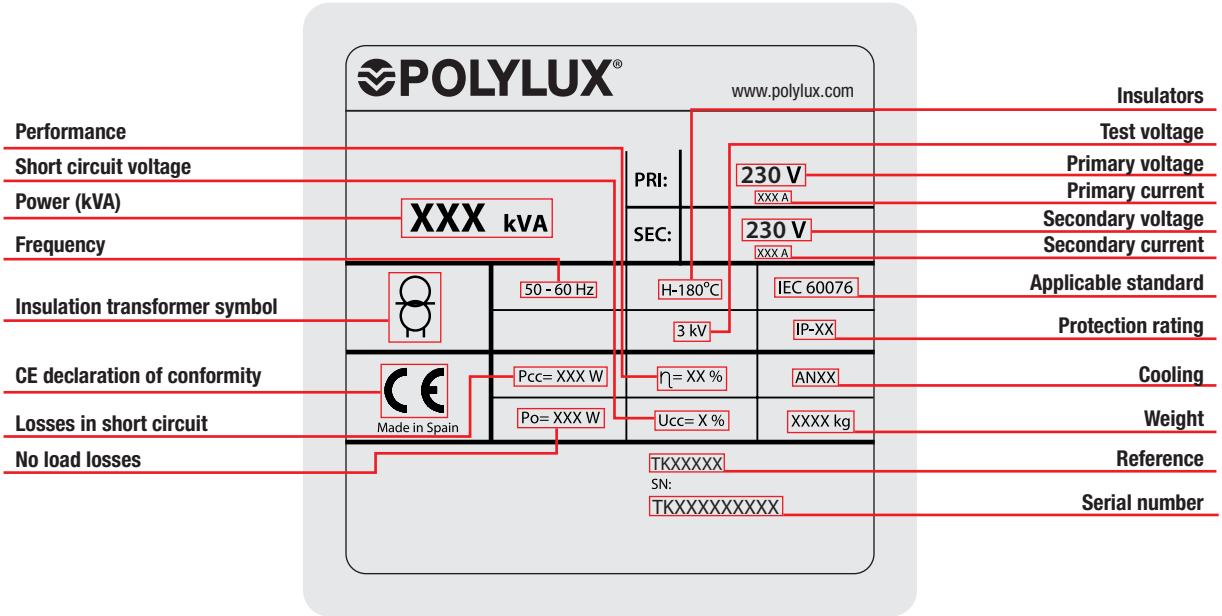
**Isolation** · Input **230 V** · Output **230 V**

## Feature plate structure

Plastic label upto 25 kVA:

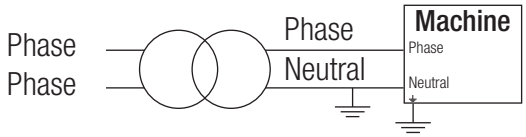



Stainless steel lable from 31.5 kVA:




## Creating neutral

To perform this procedure: use a single-phase transformer with the appropriate power and connect it to primary with both phases and create a bridge at the output between one of the output phases and ground. This line will act as neutral from this moment.



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