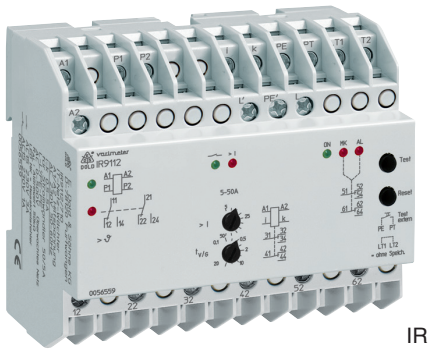
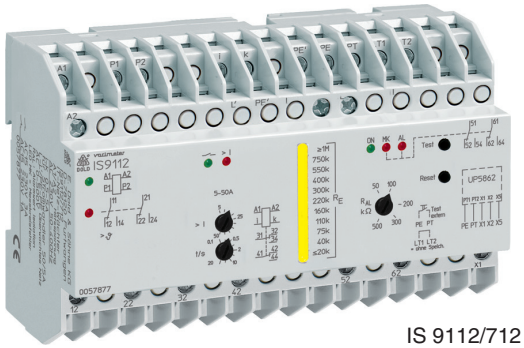
VARIMETER IMD
IT Line Monitor
IR 9112/710, IS 9112/711, IS 9112/712

0247382



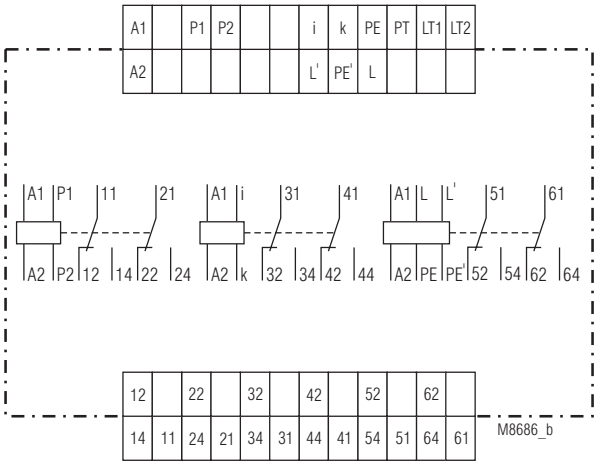
IR 9112/710



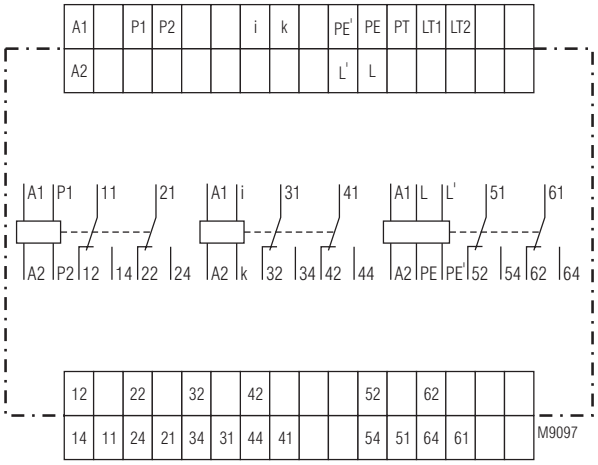
IS 9112/712

- According to IEC/EN 60 255, DIN VDE 0435-303, IEC/EN 61 557-8
- For rooms used for medical purposes according to IEC 60364-7-710, DIN VDE 0100-710
- Consisting of:
  * Current monitoring system
    - Measuring ranges of 5 … 50 A (with external converter 50 / 5 A)
    - Adjustable from 0.1 … 1 I_N
    - Hysteresis fixed at approx. 4%
    - Adjustable switching delay
    - LED indicators for correct status and overcurrent
    - 2 changeover contacts
  * Temperature monitoring system
    - Detection of temperature overrange
    - Deetection of wire breakage in the sensor circuit
    - Input P1 / P2 for 1 ... 6 thermistors
    - LED for auxiliary voltage and contact position
    - 2 changeover contacts
  * Insulation monitoring
    - for straight three-phase and A.C. power systems with 0 … 500 V and 10 … 1000 Hz
    - Fixed alarm threshold for ground fault R_{AL} of 50 kΩ
    - With line breakage monitoring function of the Measuring circuit
    - Optionally, programmable for storing or non-storing of errors
    - With reset and test key
    - Additional external reset and test keys can be connected
    - LED indicators for operability, insulation error, and interruption of Measuring circuit
    - 2 changeover contacts
- with LED chain do display the momentary status of insulation and/or connection of the test and indication panel UP 5862, as option (width 140 mm)
- 105 mm width

Circuit Diagrams



IR 9112/710



IS 9112/711

Approvals and Markings

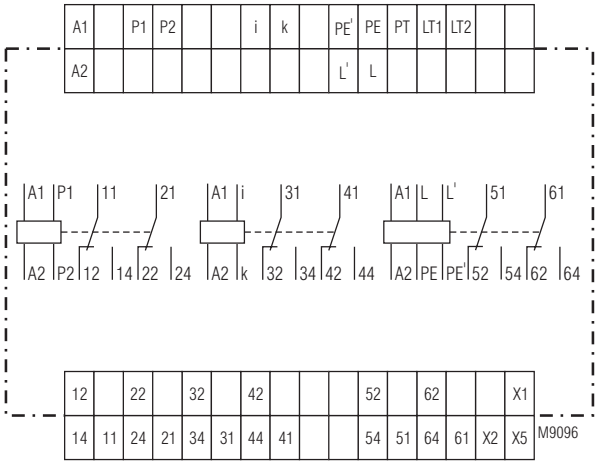
CE

Application

To monitor the IT system of rooms used for medical purposes according to VDE 0100-710:

- Overcurrent and temperature control of the IT isolating transformers
- Insulation monitoring of the IT power system

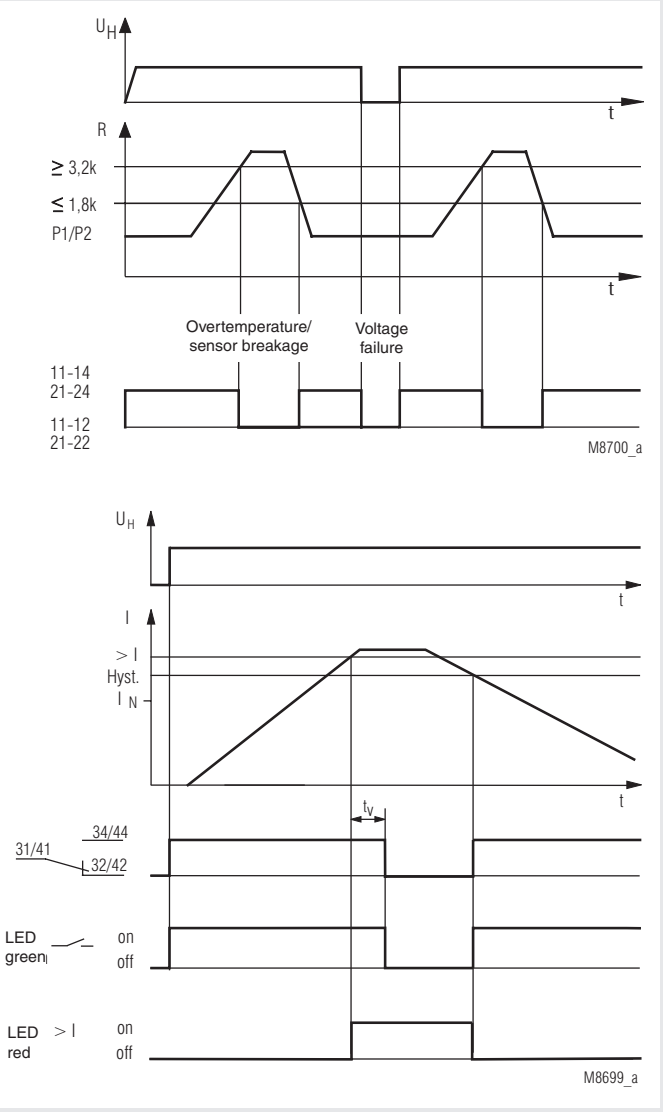
Circuit Diagram



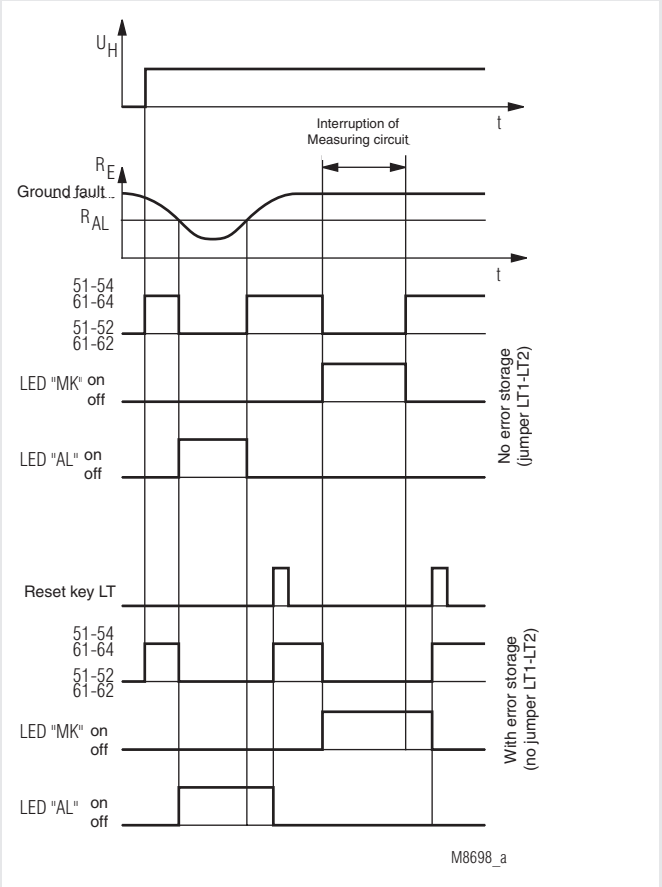
IS 9112/712

All data in this list are in correspondence with the technical equipment used at the time of this version. We reserve the right to implement technical improvements and changes at any time.

Function Diagram temperature / current monitoring system



Function Diagram insulation monitoring system



Design and Method of Functioning

Current monitoring system
The current monitoring path (i-k) of the IT line monitor is designed for connection of an external current transformer 50 / 50 A. This provides for overload monitoring of all isolation transformers (3, 15 to 8 kVA) for the IT power system in medical applications by setting the pickup value accordingly.
If the current value exceeds the set pickup value, the red LED "> I" is illuminated, and both respective changeover contacts (31-32-34, 41-42-44) fall back into normal position after the set delay time tv (0.1 – 20 s); the green LED stops lighting.

Temperature monitoring system
To monitor the transformer temperature, temperature sensors (1 … 6 PTC thermistors according to DIN 44081 / 44082 or NC contacts) are connected to the terminals P1 - P2. When the pick-up value of one of the sensors is exceeded or the sensor circuit is interrupted, both respective changeover contacts (11-12-14, 21-22-24) fall back into normal position, the red LED is illuminated.

Insulation monitoring system
The terminals L/L' and PE/PE' are connected to the respective lines of the IT power system. If the IT transformer has a centre tapping or a star point, the terminals L / L' are preferably connected to this point. The terminals L' and PE' should be connected with separate lines and possibly not in the same place (at least not at the same terminal) of the IT power system to allow for safe recognition of an interruption in the measuring circle.
The insulation resistance of the IT power system against ground is measured between the terminals L / L' and PE / PE'. If the ground fault resistance R_E falls below the pickup value R_{AL} of the line isolation monitor, the red LED "AL" will be illuminated, and the two respective changeover contacts (51-52-54, 61-62-64) fall back into normal position.

Design and Method of Functioning

On interruption of the Measuring circuit, the two respective changeover contacts will likewise fall back into normal position, and the red LED "MK" will be illuminated.
After correction of the error ($R_E > R_{AL}$, Measuring circuit connected) and jumpered terminals LT1 – LT2 (= error not stored), the changeover contacts will change into work position (correct status), and the red error LEDs will stop lighting.
If you wish to store errors, remove the jumper LT1 – LT2. In this way, also short-lived errors as e.g. a temporary deterioration of insulation, for example by touching of a line or unreliable contact making in the Measuring circuit may trigger a stored alarm: The output contacts remain open also after the error has been corrected. The type of the error can be seen in retrospect from the illuminated error LED "AL" or "MK".
The error memory can be reset by pressing the internal or external reset key, or by switching off the auxiliary voltage.

By pressing the internal or external "Test" key, a deterioration of insulation is simulated in the Measuring circuit (= R_E approx. 40 kΩ); thus, the correct response of the isolation monitor is checked.

The variant IR 9112/711 comprises an 11-stage LED chain for indication of the current insulation resistance of the power system. By means of differently colored LEDs, the insulation status in the range of 20 kΩ ... 1 MΩ is indicated. In this way, deterioration of insulation can be detected even before an alarm is triggered.

The variant IR 9112/712 includes a 11 step LED indicator to monitor the actual state of the insulation, an additional power supply and relays to connect a test and indicator unit UP 5862. The width is 70 mm.

Notes

General
Before checking insulation and voltage of the system, disconnect the monitoring device IR 9112 from the power source.

Current monitoring system
Recommended setting values of the pickup value "> I" in relation to the IT transformer:

Transformer (kVA)	**3.15**	**4**	**5**	**6.3**	**8**
Single-phase	14 A	18 A	22 A	28 A	35 A
3-phase	8 A	10 A	13 A	16 A	20 A

Insulation monitoring system
The isolation monitor is designed to monitor straight AC power systems. Any interfering direct voltages getting into the Measuring circuit will not damage the device but will falsify the conditions in the Measuring circuit while they are affecting it. As insulation measuring is performed via direct current, it will not be falsified by system capacitances against protective ground C_E. However, the pickup time may be longer in case of insulation failure, in the order of the time constant R_E times C_E.
In every IT circuit, only one isolation monitor must be connected.
This has to be observed when coupling voltage system.

Indicators

Current monitoring system

Green LED:	is illuminated when the current is in correct state (correct status)
Red LED "> I":	is illuminated when overcurrent is present

Temperature monitoring system:

Green LED:	is illuminated when auxiliary voltage has been applied
Red LED:	is illuminated when overtemperature or interruption in the sensor circuit is present

Insulation monitoring system:

Green LED "ON":	is illuminated when auxiliary voltage has been applied (operability)
Red LED "AL":	is illuminated when an insulation failure is present, $R_E < R_{AL}$ (value has fallen below alarm level)
Red LED "MK":	is illuminated when one of the lines of the Measuring circuit is interrupted (L, L', PE, PE')

Technical Data

Current Measuring Circuit

Pickup value	Adjustable from 5 … 50 A with external converter 50 / 5 A
Hysteresis:	approx. 4%
Nominal frequency of the measuring current:	50 / 60 Hz
Temperature effect:	≤ 0.05 % / K
Tiime delay t_v:	Adjustable from 0.1 … 20 s

Temperature Measuring Circuit

Temperature sensor:	PTC sensor according to DIN 44081/44082
Number of sensors:	1 ... 6 sensors in series
Pickup value:	3.2 ... 3.8 kΩ
Resetting value:	1.5 ... 1.8 kΩ
Measuring circuit load:	< 5 mW (with R = 1.5 kΩ)
Interruption in the Measuring circuit:	> 3.8 kΩ
Measuring voltage:	≤ 2 V (with R = 1.5 kΩ)
Measuring current:	≤ 1 mA (with R = 1.5 kΩ)
Voltage in case of Sensor breakage:	DC approx. 9 V
Current with shorted sensor circuit:	DC approx. 1.1 mA

Technical Data

Insulation Measuring Circuit

Nominal voltage U_N:	AC 0 ... 500 V
Voltage range:	0 ... 1.1 U_N
Frequency range:	10 ... 1000 Hz
Alarm value R_{AL}:	
IR 9112:	50 kΩ non-adjustable)
IS 9112:	adjustable, 50 ... 500 kΩ
Internal testing resistor:	corresponds to an R_E of approx. 40 kΩ
AC internal resistance:	> 250 kΩ
DC internal resistance:	> 250 kΩ
Measuring voltage:	approx. DC 15 V (generated internally)
Max. measuring current (R_E = 0):	< 50 µA
Max. permissible interfering direct voltage:	DC 500 V
Operate delay	
with R_{AL} = 50 kΩ, CE = 1 µF	
R_E of ∞ to 0.9 R_{AL}:	< 1.3 s
R_E of ∞ to 0 kΩ:	< 0.7 s
Hysteresis:	approx. 15 %

Auxiliary Circuit

Auxiliary voltage U_H:	AC 230 V
Voltage range:	0.9 ... 1.1 U_H
Nominal consumption:	7 VA
Nominal frequency:	50 / 60 Hz

Output

Number of contacts provided

for temperature monitoring:	2 changeover contacts (contacts 11-12-14, 21-22-24)
for current monitoring:	2 changeover contacts (contacts 31-32-34, 41-42-44)
for insulation monitoring:	2 changeover contacts (contacts 51-52-54, 61-62-64)

Thermal current I_{th}: 5 A
Switching capacity
acc. to AC 15

NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60 947-5-1
Contact life		
acc. to AC 15 with 1 A, AC 230V:	3 x 10^5 operat. cycles	IEC/EN 60 947-5-1
Short circuit strenght		
max. fuse rating:	4 A gL	IEC/EN 60 947-5-1
Mechanical life:	> 30 x 10^6 operating cycles	

General Data

Nominal operation:	Permanent operation	
Temperature range:	- 20 ... + 60°C	
Clearance and creepage distances		
rated rated impulse voltage voltage/ pollution degree:	4 kV / 2	IEC 60 664-1
EMC		
Static discharge (ESD):	8 kV (air discharge)	IEC/EN 61 000-4-2
HF irradiation:	10 V / m	IEC/EN 61 000-4-3
Fast transients:	4 kV	IEC/EN 61 000-4-4
Surges		
between supply lines:	1 kV	IEC/EN 61 000-4-5
between wire and ground:	2 kV	IEC/EN 61 000-4-5
Radio interference suppression:	Limit value class B	EN 55 011
Degree of protection		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
Housing:	Thermoplast with V0 behavior according to UL Subject 94	

Technical Data

Vibration resistance:	Amplitude 0.35 mm Frequency 10 ... 55 Hz	IEC/EN 60 068-2-6
Climate resistance:	20 / 060 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection:	2 x 2.5 mm² massive, or 2 x 1.5 mm² stranded wire with sleeve DIN 46 228-1/-2/-3	
Wire fixing:	Screw terminals with self-lifting clamping piece	IEC/EN 60 999-1
Mounting:	DIN rail	IEC/EN 60 715
Net weight:	430 g	
IR 9112/710:	approx. 430 g	
IS 9112/711:	approx. 510 g	
IS 9112/712:	approx. 570 g	

Dimensions

Width x height x depth	
R 9112/710:	105 x 90 x 59 mm
IS 9112/711, IS 9112/712:	140 x 90 x 59 mm

Standard Type

IR 9112/710 AC 230 V

Article number:	0056559
• Output:	2 changeover contacts each
• Auxiliary voltage U_H :	AC 230 V
• Overall width:	105 mm

Variants

IS 9112/711:	with 11-stage LED chain for indication of the current insulation value
IS 9112/712:	with 11-stage LED chain for indication of the current insulation value, and connection facility for a test and indicator unit UP 5862

Ordering Example

IR 9112/710 AC 230 V

- AC 230 V — Auxiliary voltage
- IR 9112/710 — Type

Accessories

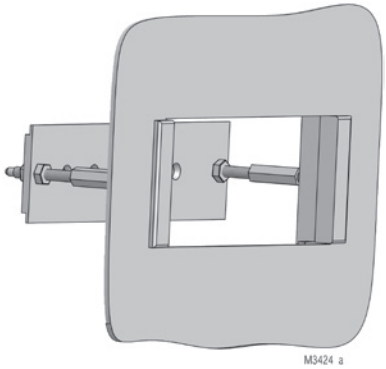
Test and indicator panel UP 5862
For insulation monitors in medically used rooms according to IEC 60 364-7-710, DIN VDE 0100-710

- to mount in flush device boxes ø 60 mm, 35 mm deep;
- test button to check the function of the device
- with green LED to indicate operation
- reset button for audible alarm
- with yellow LED to monitor insulation failure

Max. wire length to IR / IS 9112
at wire cross section A = 0.5 mm²: 500 m
at wire cross section A = 1.5 mm²: 1000 m

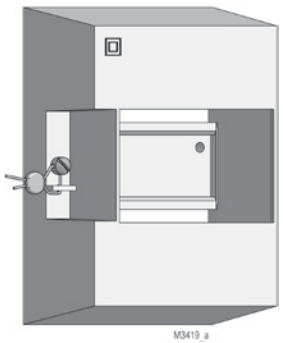
Dimensions (width x height): 80 x 80 mm
Article number: 0041706

Flush mounting kit
Order reference: KU 4087-150/005659



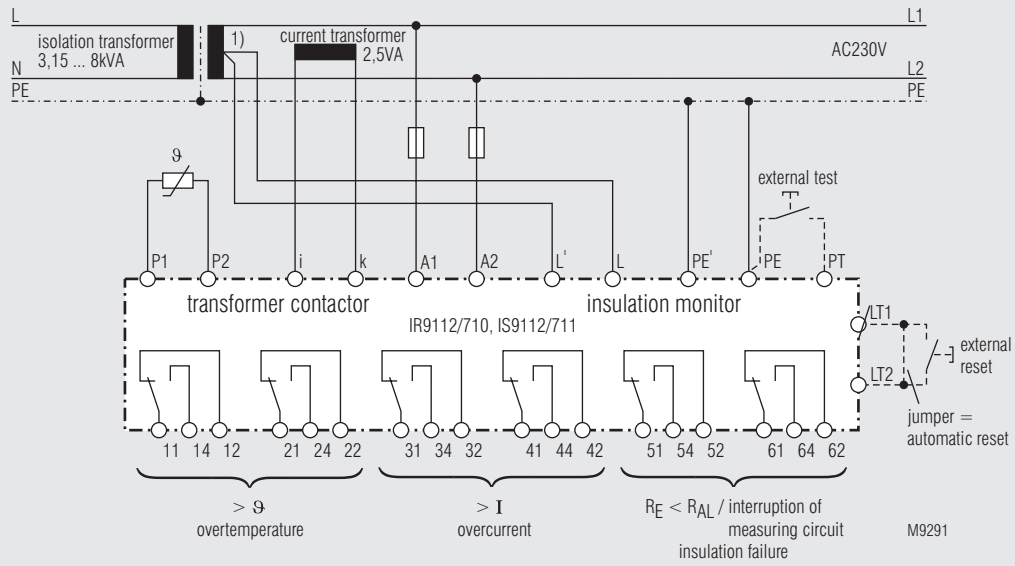
For universal use with:
- I-series devices of 17,5 to 105 mm width
- easy mounting

Mounting kit for surface mounting
KU 4087-100

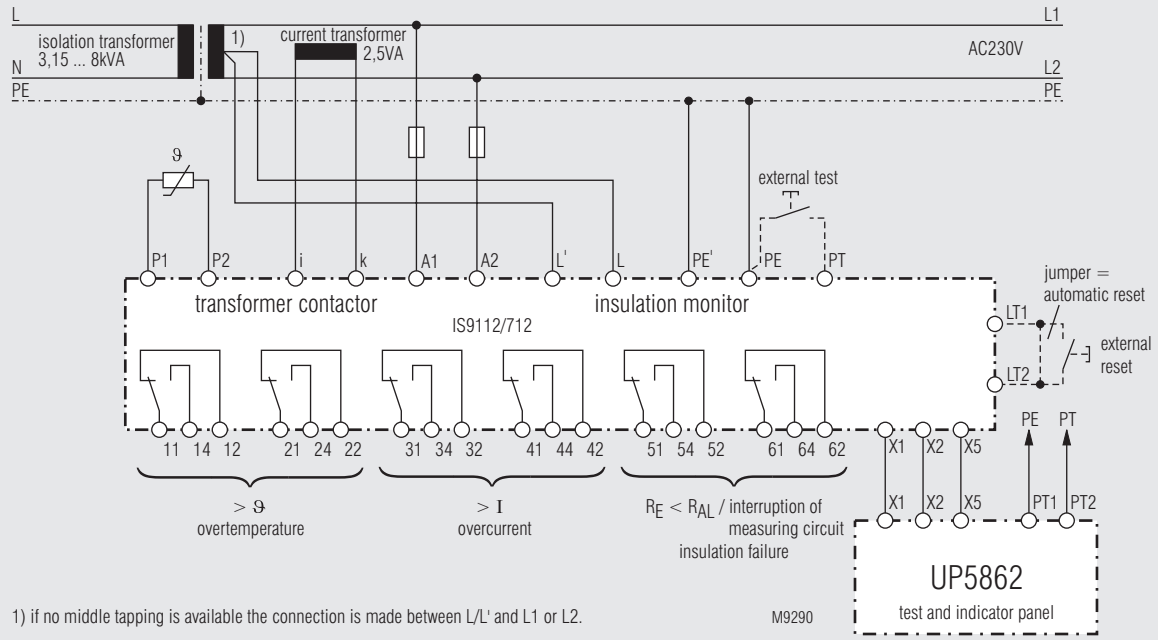


Device of I-series	Width (mm)	Order reference
IK	17.5	KU4087-100/56763
IL	35.0	KU4088-100/56764
IN	52.5	KU4084-100/56765
IP	70.0	KU4089-100/56766
IR	105.0	KU4090-100/56767

Connection Examples



1) if no middle tapping is available the connection is made between L/L' and L1 or L2.



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