



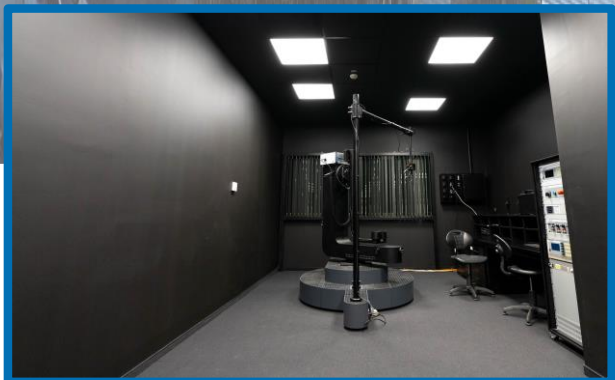
# COMPONENTS

TESTING & CERTIFICATION

In BUDAPEST

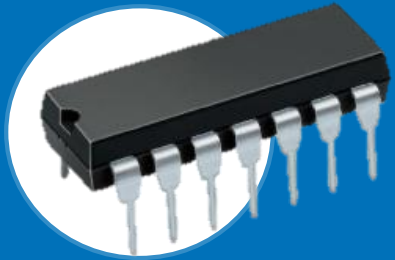
5000 m<sup>2</sup>





# New laboratories in Hungary

## Components testing



High current  
Cable  
Installation material  
LI-battery  
ELVH components

## Machinery safety



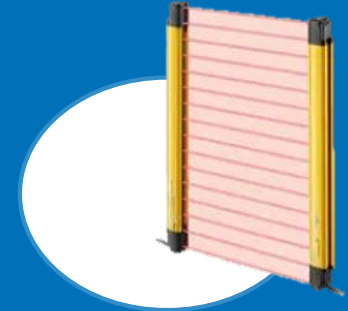
Manufacturing line  
Packaging line  
Robot  
Press machine

## Power Transmission



ELVH chargers

## Functional safety



Safety software  
evaluation





TÜVRheinland®

SHORT CIRCUIT LAB

### SCOPE

Short circuit test  
Endurance tests  
Making and Breaking test

### SERVICES

Safety tests  
CB certification  
TUV Mark  
ENEC

### Area & FTE

4 FTE experts  
130 m2 Test lab  
Max. 2m x 2m EUT

### LIMITS

Sort Circuit cap 15kA  
max. test voltage:722VAC  
Max test voltage:950VDC

# TOP 3 Products – HC laboratory

**Product: Contactor, motor starter**

Keywords: electromechanical contactor, starter, star-delta starter, two direction starter, overload relay, jam relay, stall relay  
 Standard: IEC/EN 60947-4-1  
 CB category: POW

Lead time, typical: 5 weeks  
 Samples needed: 5-6 pcs (for one type, one utilisation category, one coil voltage)  
 EMC test needed: in case of electronic coil control or electronic overload relays

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Type of contactor	direct on-line, electromechanical
Insulation voltage	Ui <= 690 Vac
Rated operational voltage	Ue <= 400 Vac
Rated operational current(s)	Ie <= 63 A (AC-1 ... AC-3)
Utilization category(ies)	AC-1 ... AC-4
Conventional thermal current	Ith <= 100 A
Short-circuit parameters	<= 6 kA
IP protection	IP00 ... IP44



**Product: Auxiliary Contactor**

Keywords: auxiliary contactor, auxiliary relay, control relay  
 Standard: IEC/EN 60947-5-1  
 CB category: POW

Lead time, typical: 5 weeks  
 Samples needed: 6 pcs (for one type, one utilisation category, one coil voltage)  
 EMC test needed: generally not

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Type of contactor	electromechanical
Insulation voltage	Ui <= 690 Vac
Rated operational voltage	Ue <= 400 Vac
Rated operational current(s)	Ie <= 16 A
Utilization category(ies)	AC-12 ... AC-15, DC-12
Conventional thermal current	Ith <= 32 A
Short-circuit parameters	<= 5 kA
IP protection	IP00 ... IP44



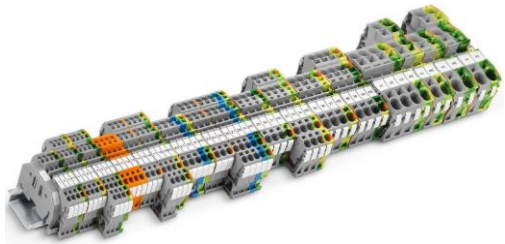
**Product: Miniature Circuit Breaker**

Keywords: miniature circuit breaker, circuit breaker, MCB  
 Standard: IEC/EN 60898-1  
 CB category: PROT

Lead time, typical: 5 weeks  
 Samples needed: 35+ (for one type)  
 EMC test needed: not

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Insulation voltage	Ui <= 690 Vac
Rated operational voltage	Ue <= 400 Vac
Rated current	Ie <= 63 A
Suitable for AC and/or DC	AC
Number of poles	1 ... 4
Short-circuit parameters	<= 6 kA
Tripping characteristic	B / C / D





IEC/EN 60947-7-1,  
60947-7-2

**Terminal block**



IEC/EN 61439-3

**Distribution board (DBO)**



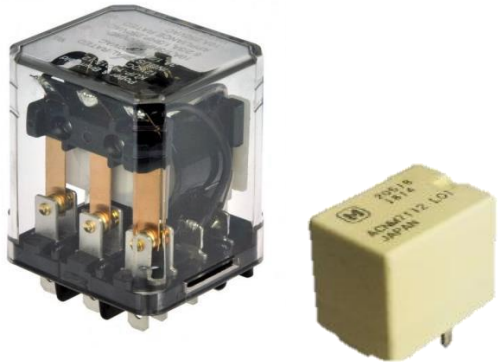
IEC/EN 61095

**Contactor for household**



IEC/EN 60947-5-1

**Push-button switch**



IEC/EN 61810-1

**Electromechanical relay**



IEC/EN 62314

**Solid-state relay**



IEC/EN 60127-2, 60127-7

**Miniature fuse-link**



**TÜVRheinland®**

## CABLE LAB

### SCOPE

Cable and Cord testing  
HAR  
CPR  
PV cables

### SERVICES

Safety tests  
CB certification  
TUV Mark  
HAR mark  
CPR

### Area & FTE

2 FTE experts  
80 m2 Test lab  
6 heating chambers



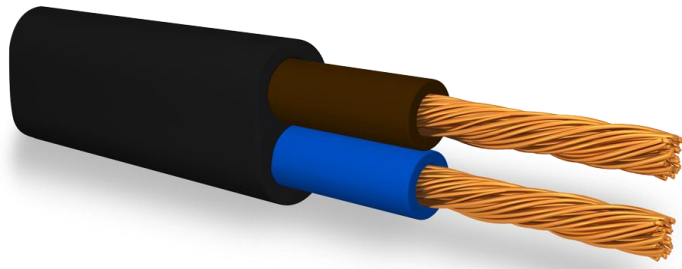
# TOP 3 Products – Cable laboratory

Product: **Low voltage energy cables (up to and including 450/750 V (U<sub>0</sub>/U))**

Keywords: Low voltage, cable, wire, HAR, rubber, PVC  
 Standard: **EN 50525 series**  
 CB category: CABL

Lead time, typical: 6 weeks  
 Samples needed: 25 - 50 m (for one type)

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Code designation	H05V-U, -R, -K; H07V-U, -R, -K; H05V2-U, -R, -K; H07V2-U, -R, -K; H03VV(H2)-F; H05VV(H2)-F; H05V2V2-F; H05VV5-F; H05VVC4V5-K H05RR-F; H05RN-F; H07RN-F; etc.
Rated voltage (U <sub>0</sub> /U)	100/100 V, 300/300 V, 300/500 V, 450/750 V
Conductor material	Copper
Conductor classification	Class 1, Class 2, Class 5, Class 6
Conductor shape	Circular, sector shaped
Cross sections	0,5 mm <sup>2</sup> - 1000 mm <sup>2</sup>
Number of cores	1 - 60
Max. Conductor operating temperature	60 °C, 90 °C, 110 °C, 180 °C
Insulation material	acc. to EN 50363 series
Sheath material	acc. to EN 50363 series



Product: **PVC insulated low voltage energy cables (up to and including 450/750 V (U<sub>0</sub>/U))**

Keywords: Low voltage, cable, wire, PVC  
 Standard: **IEC 60227 series**  
 CB category: CABL

Lead time, typical: 6 weeks  
 Samples needed: 25 - 50 m (for one type)

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Code designation	60227 IEC 01, 02, 05, 06, 07, 08; 60227 IEC 10; 60227 IEC 41, 43, 52, 53, 56, 57; 60227 IEC 71c, 71f; 60227 IEC 74, 75
Rated voltage (U <sub>0</sub> /U)	300/300 V, 300/500 V, 450/750 V
Conductor material	Copper
Conductor classification	Class 1, Class 2, Class 5, Class 6
Conductor shape	Circular, sector shaped
Cross sections	0,5 mm <sup>2</sup> - 400 mm <sup>2</sup>
Number of cores	1 - 60
Max. Conductor operating temperature	60 °C, 90 °C
Insulation material	acc. to IEC 60227-1
Sheath material	acc. to IEC 60227-1



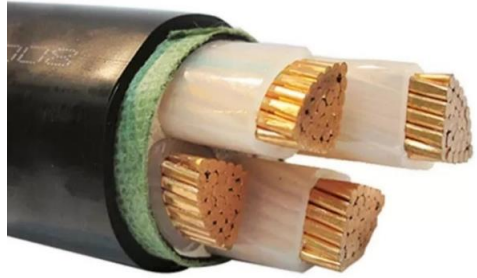
Product: **Rubber insulated low voltage energy cables (up to and including 450/750 V (U<sub>0</sub>/U))**

Keywords: Low voltage, cable, wire, rubber  
 Standard: **IEC 60245 series**  
 CB category: CABL  
 Typical type test price: Multicore rubber: min. 5600 EUR (56h \* 100 EUR/h) + subcontractor  
 Lead time, typical: 6 weeks  
 Samples needed: 25 - 50 m (for one type)

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Code designation	60245 IEC 03; 60245 IEC 04, 05, 07; 60245 IEC 53, 57, 66, 58, 58f; 60245 IEC 70, 74, 75; 60245 IEC 81, 82; 60245 IEC 89;
Rated voltage (U <sub>0</sub> /U)	300/300 V, 300/500 V, 450/750 V
Conductor material	Copper
Conductor classification	Class 1, Class 2, Class 5, Class 6
Conductor shape	Circular, sector shaped
Cross sections	0,5 mm <sup>2</sup> - 400 mm <sup>2</sup>
Number of cores	1 - 60
Max. Conductor operating temperature	110 °C, 180 °C
Insulation material	acc. to IEC 60245-1
Sheath material	acc. to IEC 60245-1



Precisely Right.



IEC 60502-1

**Power cables with  
extruded insulation**



EN 50618, IEC 62930

**Electric cables for  
photovoltaic**



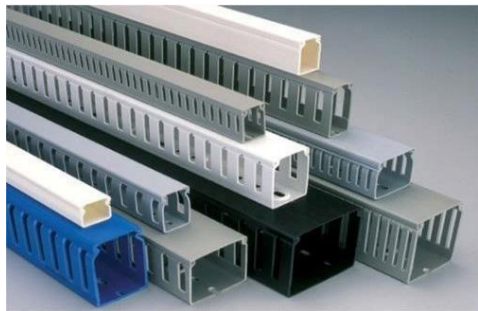
EN 50620, IEC 62893

**Charging cables for  
electric vehicles**



IEC/EN 61537

**Cable tray systems and  
cable ladder systems**



EN 50085

**Cable trunking and  
cable ducting systems**



IEC/EN 60670

**Boxes and enclosures**



IEC/EN 61386

**Conduit systems for  
cable**



**TÜVRheinland®**

**INSTALLATION LAB**

### SCOPE

Durability tests  
Temperature rise tests  
Contacting tests  
Glow wire tests

### SERVICES

Safety tests  
CB certification  
TUV Mark  
ENEC; ENEC+

### Area & FTE

4 FTE experts  
100 m2 Test lab  
9 automatized test benches

### LIMITS

Max. test volt.: 1000VAC  
Electric load up to: 210kW  
Temp. rise until: 1000A

# TOP 3 Products – Household installation material

## Product: Plugs and socket-outlets for household uses

Keywords: plug, socket-outlet, household, schuko, french type  
 Standard: IEC 60884-1  
 Dimensions:  
 - IEC 60083:1975  
 - national standards  
 CB category: INST  
 Lead time, typical: 6 weeks  
 Samples needed: 6-15 pcs (depending on design: screw-type or screwless type terminals, degree of protection)  
 EMC test needed: not needed

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Type of connectors	fixed socket-outlet (flush or surface type), portable socket-outlet, plug
Rated voltage	130 V, 250 V, 440 V
Rated current(s)	2,5 A, 6 A, 10 A, 13 A, 16 A, 32 A
IP protection	IP20 ... IP65



## Product: Cord extension sets

Keywords: extension, portable, socket-outlet  
 Standard: IEC 60884-2-7 in conjunction IEC 60884-1  
 Dimensions:  
 - IEC 60083:1975  
 - national standards  
 CB category: INST  
 Typical type test price: 6000 EUR (68 hour\*88.-EUR) (for one type, including test of incorporated portable socket-outlet)  
 Lead time, typical: 6 weeks  
 Samples needed: 6 pcs (for one type)  
 EMC test needed: generally not but in case of some incorporated parts (e.g. USB charger) the EMC test is needed

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Type of cord extension set	rewirable, non-rewirable
Rated voltage	130 V, 250 V, 440 V
Rated current(s)	Ue <= 400 Vac
Rated current	The rated current of the cord extension set shall be the lowest value from a) the rated current of plug or b) the arithmetic sum of the highest rated currents of all plugs which can be inserted into the cord extension set or c) the rated current of the protective overcurrent device.
Cross-sectional of incorporated cord	min. 1,0 mm <sup>2</sup> (max. 2 m length) min. 1,5 mm <sup>2</sup> (max.30 m length)
Other	on socket-outlet applying of shutters is necessary
Short-circuit parameters	<= 5 kA
IP protection	IP20 ... IP56



## Product: Switch for appliances

Keywords: mechanical switch, push-button, rotary switch, foot switch, indicator light, electronic switch  
 Standard: IEC/EN 61058-1-1 (mechanical switches)  
 in conjunction with IEC 61058-1  
 IEC/EN 61058-1-2 (electronic switches)  
 in conjunction with IEC 61058-1  
 CB category: INST  
 Typical type test price: mechanical switch: 5600 EUR (63 hour\*88.-EUR) - (for one type)  
 electronic switch: 6200 EUR (70 hour\*88.-EUR) - (for one type) + EMC: cca. 4000.- EUR  
 Lead time, typical: mechanical switch: 6 weeks  
 electronic switch: 8 weeks  
 Samples needed: 20 pcs (for one type)  
 EMC test needed: mechanical switch: generally not  
 electronic switch: yes

Basic technical parameters needed for quoting:	Preferred range of the parameters for fast and effective project handling:
Type of switch	mechanical, electronic
Rated voltage	According to manufacturer
Rated current	According to manufacturer
Code of switch	Tab. 2 of IEC 61058-1
Ambient temperature (T)	According to manufacturer
Deegree of protection	IP00 ...
Terminals	screw-type, screwless, soldered, etc.



Precisely Right.



Switch for household



Appliance couplers for household



IEC 62196

Plugs, socket-outlets, connectors and inlets



IEC 62196

Plugs, socket-outlets, connectors and inlets



IEC 62196

Plugs, socket-outlets, connectors and inlets



**TÜVRheinland®**

**ENDURANCE LAB**

### SCOPE

Endurance tests  
Performance tests  
Abnormal operation  
Overload tests

### SERVICES

Safety tests  
CB certification  
TUV Mark  
(cTUVus)

### Area & FTE

2 FTE experts  
75 m2 Test lab  
2 parallel test benches

### LIMITS

Max. test volt.:1000VAC  
Max. test volt.:1200VDC  
Endurance up to: 400A



**TÜVRheinland®**

## BATTERY LAB



### SCOPE

Endurance tests  
Performance tests  
Abnormal operation  
Overload tests

### SERVICES

Safety tests  
CB certification  
TUV Mark

### Area & FTE

2 FTE experts  
80 m2 Test lab  
2 parallel test setup

### LIMITS

Max. test volt.:40V  
Max. test current.:63A  
Max LI-contents is: 300g



**TÜVRheinland®**

**ENVIRONMENTAL LAB**

### SCOPE

Heating / Cold tests  
Thermal shocks  
Thermal test during  
Electric loads  
Dust tests

### SERVICES

Safety tests  
Performance tests  
Environmental tests  
Cycle tests

### Area & FTE

140 m2 test lab  
2 walk-in chambers  
4 environmental  
chambers.  
27m2 dust chamber

### LIMITS

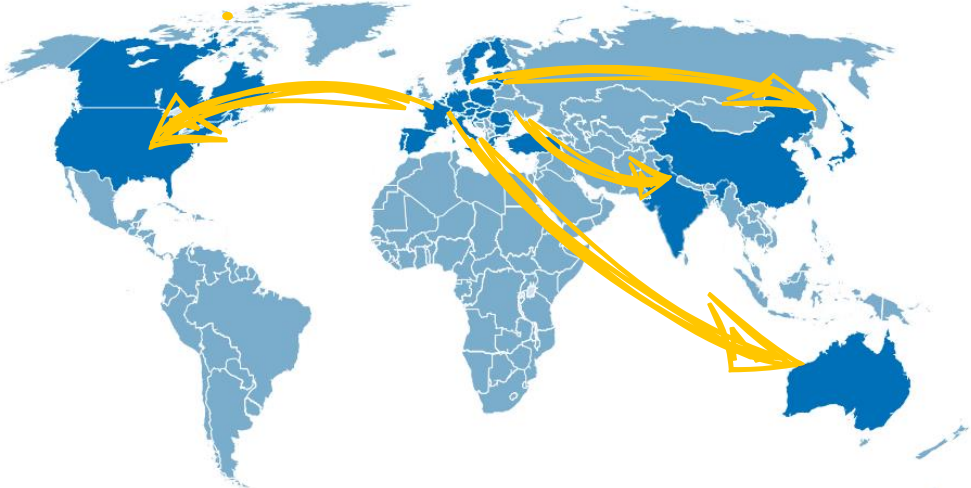
Heating test up to 100C°  
Cold test: -40C°  
Thermal shock: -50-120C°  
Thermal test during 150kW  
load



# Components testing - Certification roadmap

Cable lab			
Standards	CB	TUV Mark	MEEI mark
EN 50525		✓	✓
IEC 60227	✓	✓	✓
IEC 60245	✓	✓	✓
IEC 60502-1	✓	✓	✓
IEC 60502-2	✓	✓	✓
EN 50618		✓	✓
EN 50620		✓	✓
IEC/EN 61537	✓	✓	✓
EN 50085		✓	✓
IEC/EN 60670	✓	✓	✓
IEC/EN 61386	✓	✓	✓

Components Lab			
Standards	CB	TUV Mark	ENEC 18
IEC 60884-1	✓	✓	
IEC 60884-2-5	✓	✓	
IEC 60884-2-7	✓	✓	
IEC 60320-1	✓	✓	
EN 60320-1		✓	✓
IEC 61058-1			
IEC 61058-1-1	✓	✓	
IEC 61058-1-2			
EN 61058-1			
EN 61058-1-1		✓	✓
EN 61058-1-2			
IEC 60669-1	✓	✓	
IEC 60669-2-1	✓	✓	
EN 60669-1		✓	
EN 60669-2-1		✓	



# Hungary has capabilities you might not be aware of!



## ✓ Comprehensive components testing & certification service portfolio

TÜV Rheinland InterCert Ltd. has long time experience with Engineering and Components testing services for different schemes (CB, ENEC, HAR, TUVMark)



## ✓ Easy Market Access Service

We offer an efficient certification route and simplified acceptance for products by our IECEE report and certifications.



## ✓ Experienced technical experts of testing methods

Wide and deep technical knowledge of testing methods and standards, including endurance tests developed and recognized by manufacturers worldwide.

# Global labours, global benefits

- ✓ **Global project management with expert backup**

One expert will support you through the global certification route, maximizing convenience and efficiency in the entire process.

- ✓ **Wide scope of laboratory test and testing at Customer Testing Facilities**

We offer laboratory or CTF testing services, at your premises to help your global success.

- ✓ **Test results, Inspection report and Certification from one company**

Complete ranges of components testing services and deep knowledge in all related segments of components.  
(Safety -, EMC-, Environmental-, and Endurance tests)

# Contact

Get a contact with us:

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Get a personal contact:



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Local Field Manager



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+36 (30) 9840889

My main message is:

„ We have got a knowledge for an appropriate support! .  
Tell us, how we can support, what we can do better for your job.“

Thank you for your attention!

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