Welcome to BOPLA City!

SYSTEM TECHNOLOGY

INPUT UNITS
ELECTRONICS
SERVICES

BOPLA

A Phoenix Mecano Company

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„ALIQUID STAT PRO ALIQUO!"

"Something stands for something"

**Symbols aid communication.
Today they are indispensable
in almost all fields of life.
This is because they overcome temporal,
cultural and language problems.
Our input units play an important part
in this communication.**

**However, without high-performance
electronics which carry out the commands
from the input unit, no communication
can take place.**

**Electronics form the basis for everything
that happens around us and in the world.**

System technology:

BOPLA's "full service" programme

Modern equipment needs professional input systems where human beings and machines meet! In order to be able to offer our customers a "full service" programme, at the start of the 1990s we were the first well-known manufacturer of enclosures to add input units to our comprehensive range of enclosures. Over the years we have become one of the most important suppliers of enclosure technology and membrane keypads – our products are indispensable in many sectors. Developing and implementing customer-specific electronic solutions is also a part of what we do – so take advantage of our skills for your own developments!

Permanent communication with our customers plays its part in ensuring that we continue to develop our ability to innovate, our competence and our level of quality in all fields. This ensures that we can always provide the best possible service and that you can rely on BOPLA to be your competent partner for a successful future!

1970 Setting-up of Bündoplast GmbH in Bünde

1972 First in-house development: start of the Euromas series

1977 Take-over by Phoenix Mecano AG

1978 Development of cable glands and enclosures for electronics

1981 Start of international activities

1985 Entry into USA market

1987 Setting-up of PM's own sales companies

1992 Start of production in Kecskemét (Hungary); Initial setting-up of Far East sales structure

1993 **Start of manufacture of input systems, certification according to quality standard ISO 9001**

1998 Opening of the logistic centre; a fully-automatic warehouse system is set up

2002 Start of implementation of electronics services

2005 Setting-up of PM Plastic in Sibiu (Romania) as a new production facility

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All over the world, contact with electronically controlled equipment and machines is an everyday occurrence.

High-quality components are essential to ensure that these function without any problems. Suppliers are required who satisfy the sophisticated demands of customers. Of course, these customers save both time and money when a quality-conscious manufacturer can supply several of the necessary components. BOPLA is one of the few companies in this sector which specialises in the manufacture and sale of a very wide range of components. Our system technology unifies and implements our motto: "Everything from a single source."

BOPLA's system technology combines and channels the products and features on which the group focuses: enclosures, input units and electronics by means of production, assembly and apparatus engineering. The use of modern manufacturing processes, prototyping, and constant quality management ensures high standards.

"Product quality always takes priority!"

Michael Schmidt, Quality Assurance Manager

Consistent research guarantees that we always make use of the latest technologies and processes – the on-going development and optimisation of our products is what we do every day. And customer satisfaction is our reward!

Carefully organised work processes ensure the good quality of our work – in accordance with quality management standard ISO 9001, customer satisfaction is at the heart of our developments.

In 2001 and 2002, the quality management system which BOPLA used was adapted to conform to ISO 9001:2000 and successfully audited in June 2002. Since January 2010, our electronics and module manufacturing department has been certified according to ISO/TS 16949. This also means certification according to ISO 9001:2008. The strategic aim of our QM system is to provide optimal support for our customers, to improve our relations with them, and to ensure on-going improvements to our comprehensive range of services.

Your opinions and wishes are important to us! Recognising and satisfying customers' needs takes absolute priority in a certified company. We are always striving to be the best and to keep on improving our services – that's a promise!

Welcome to BOPLA City...

...your centre for future growth and innovation!

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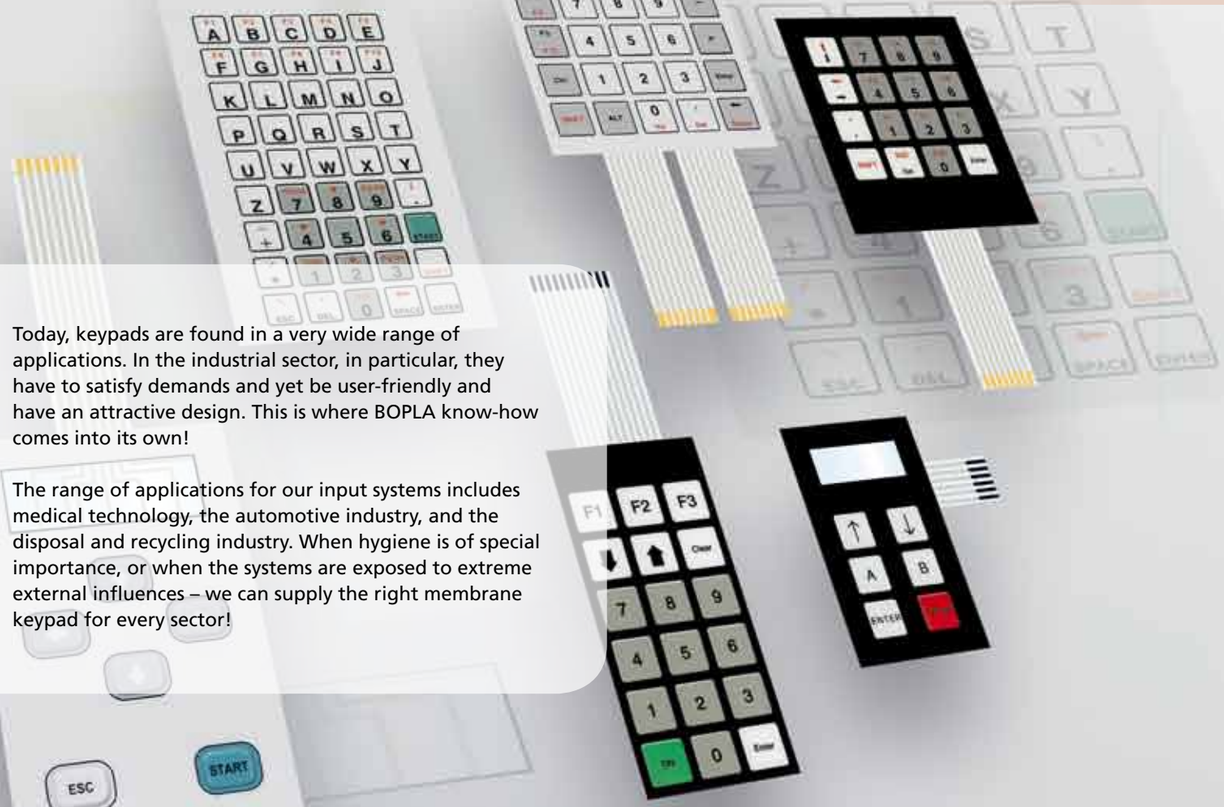
“Functional and attractive designs – we develop professional input systems for all applications and sectors!”

Jochen Niermann, Membrane Keypad Sales Manager



Today, keypads are found in a very wide range of applications. In the industrial sector, in particular, they have to satisfy demands and yet be user-friendly and have an attractive design. This is where BOPLA know-how comes into its own!

The range of applications for our input systems includes medical technology, the automotive industry, and the disposal and recycling industry. When hygiene is of special importance, or when the systems are exposed to extreme external influences – we can supply the right membrane keypad for every sector!

Standard membrane keypads

It doesn’t matter whether they are handheld, desktop or wall-mounted enclosures – we supply the matching membrane keypad. Our standard keypads are specially designed for our enclosures, so they can easily and quickly be modified. This means that we give our customers an opportunity to fit membrane keypads at low cost even for small quantities. We will also be happy to take on the fitting of your membrane keypad.

Customer-specific solutions

You are looking for a membrane keypad with an individual and sophisticated design? Our keypads are manufactured to meet our customers’ exact requirements – whether in terms of size, design or colour, matt, semi-gloss or glossy, with or without a window, with a tactile action point, including LEDs or other components, integrated in supporting plates or pre-mounted on our enclosures. We also develop and manufacture input units with short-stroke keys and matching front membranes. And of course, assembly of the membrane keypad is part of our service offer.

Competence in every field – you can count on us!

We offer maximum competence in all important sectors of technology:

- Copper technology
- FR4 technology
- Silver technology
- Profiline technology
- Gloss technology
- Autotex AM – Anti-microbial decor membrane material
- Touch screens
- FT-E technology
- Electro-luminescence technology (night design)
- Supporting plates

Don’t hesitate to contact us – we’ll be happy to help you!

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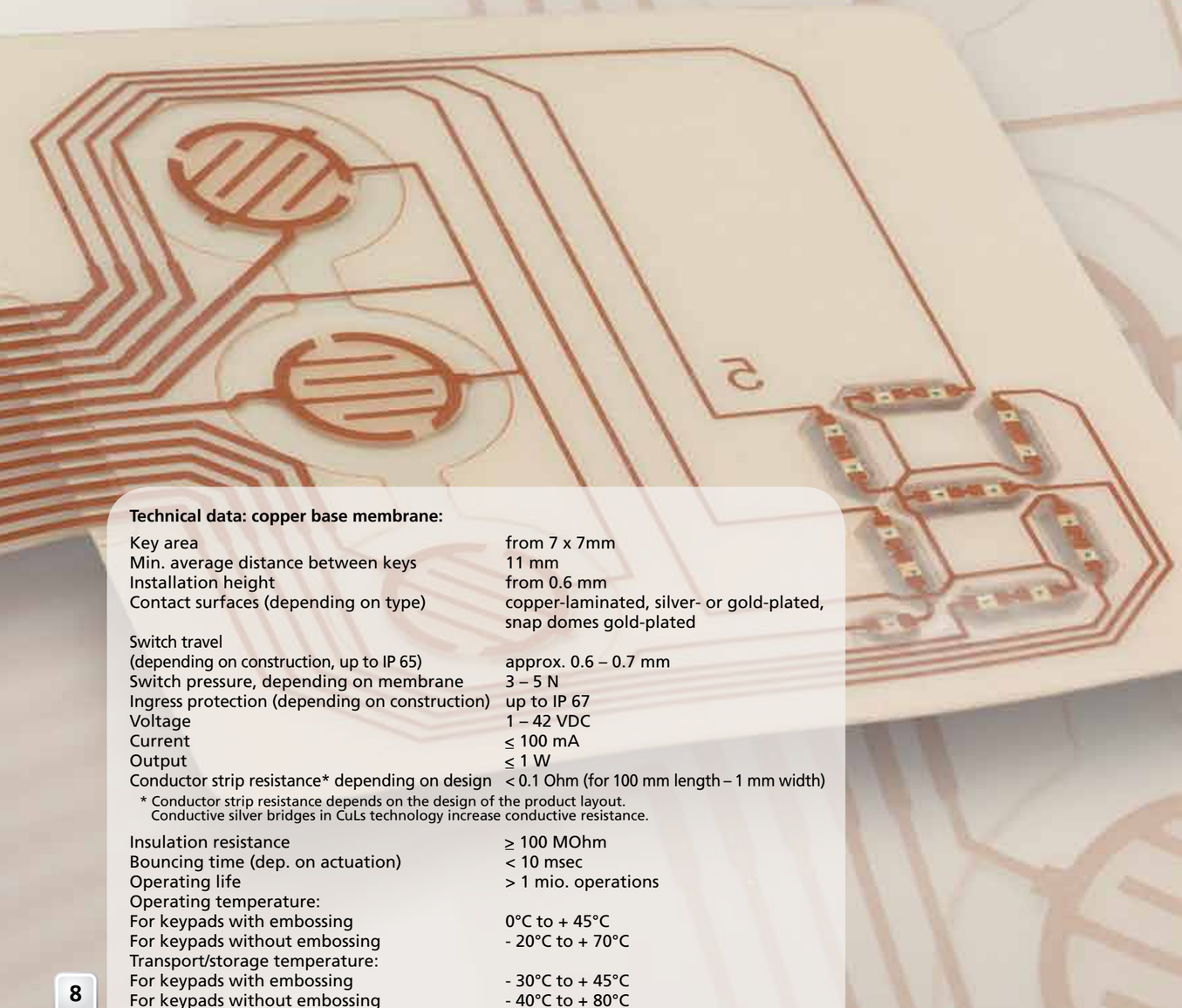
"A special feature: copper technology!"

Andreas Wisgien, Membrane Keypad Designer

In contrast to many firms which offer keys using conductive silver technology, BOPLA manufactures high-quality keypads with copper-laminated base membranes which are galvanically silver-plated (gold-plated on request).



Technical data: copper base membrane:

Key area	from 7 x 7mm
Min. average distance between keys	11 mm
Installation height	from 0.6 mm
Contact surfaces (depending on type)	copper-laminated, silver- or gold-plated, snap domes gold-plated
Switch travel (depending on construction, up to IP 65)	approx. 0.6 – 0.7 mm
Switch pressure, depending on membrane	3 – 5 N
Ingress protection (depending on construction)	up to IP 67
Voltage	1 – 42 VDC
Current	≤ 100 mA
Output	≤ 1 W
Conductor strip resistance* depending on design	< 0.1 Ohm (for 100 mm length – 1 mm width)

* Conductor strip resistance depends on the design of the product layout.
Conductive silver bridges in CuLs technology increase conductive resistance.

Insulation resistance	≥ 100 MOhm
Bouncing time (dep. on actuation)	< 10 msec
Operating life	> 1 mio. operations
Operating temperature:	
For keypads with embossing	0°C to + 45°C
For keypads without embossing	- 20°C to + 70°C
Transport/storage temperature:	
For keypads with embossing	- 30°C to + 45°C
For keypads without embossing	- 40°C to + 80°C

The copper-laminated material is extremely flexible, so there is almost no possibility of breaks to the membrane cable, and problems such as silver migration are practically impossible.

Instead of using an adhesive as in the case of conductive silver technology, we can safely and permanently solder LEDs, photo diodes or other components, and these are features which give our customers the security they require for everyday use.

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Profiline offers customers important advantages:

- Very good tactile feedback
- Tactile feeling to the key element
- Optimal force distribution means less pressure on the snap dome
- Optimal finger guiding
- Large-surface keypads and contact elements can be manufactured
- Freedom of design for the key shape

“Profiline – superlative technology!”

Bernd Oevermann, Membrane Keypad Designer

Profiline – what is so special and important about this technology?
The main features are the improved haptic and operability.

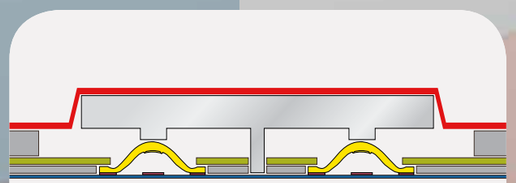
The so-called “short-stroke” feeling considerably improves the input interface, including for keys with extremely small or extremely large surfaces.

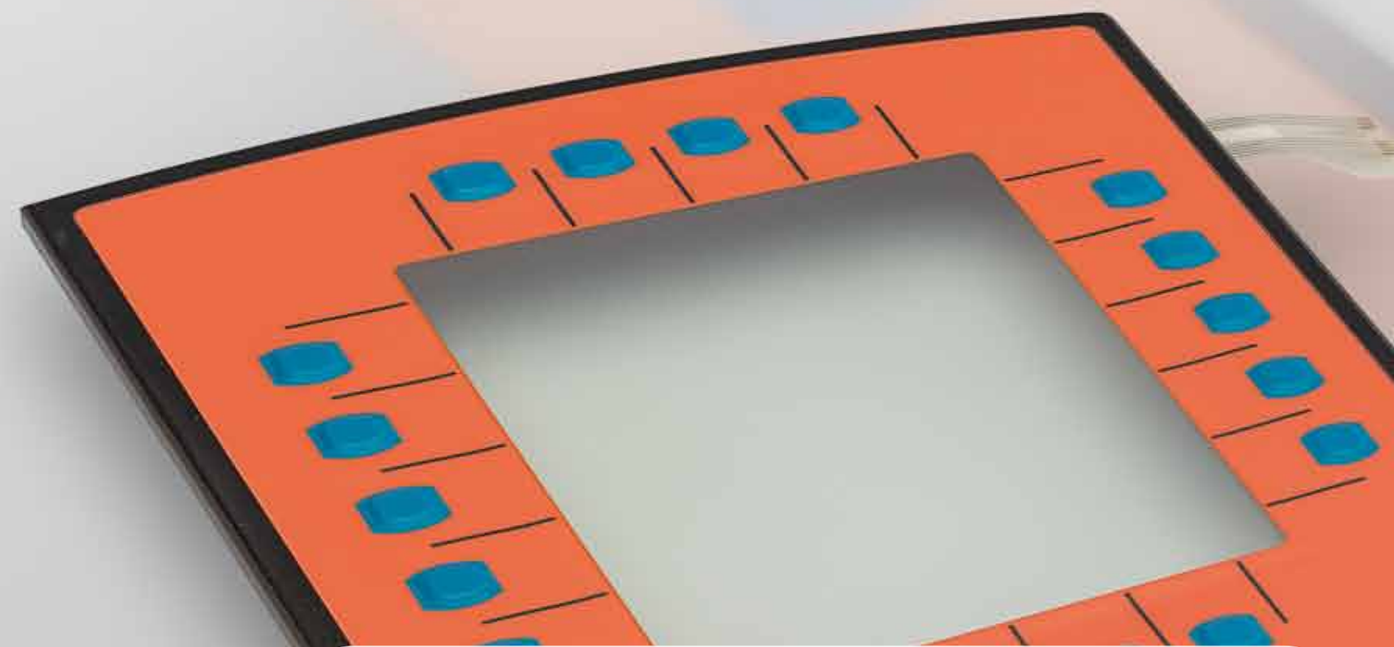
This is guaranteed by the highly-tactile, robust key element which is fitted between the snap dome and front membrane.

In addition to providing better feedback, the Profiline key areas are also extremely robust. The integrated acrylic inlay gives protection against dust and moisture and also protects the snap dome against possible deformation. Not even heavy point-specific pressure can damage the key areas.

Our EU patent behind Profiline’s superlative technology is the effective result of our on-going developments to create keypads which offer the best haptic and ergonomic features.

Customers’ special wishes can also be implemented by arranging the inlays as required. The illustration shows a design with a rocker in a +/- key. Even the requirement for a cursor block has already been successfully achieved with Profiline inlays.

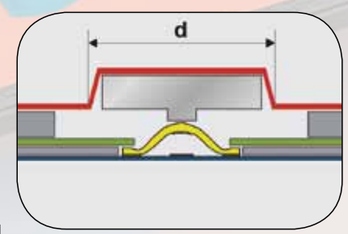




Profiline technology

Electrical characteristics:

Voltage	1 – 42 VDC
Consumption	≤ 100 mA
Insulation resistance	> 100 MOhm
Contact bounce time	< 10 ms
Contact element	Snap dome, gold-plated



Mechanical characteristics:

Key geometry	can be designed as required
Key size (d) min.	≥ ø 8 mm / 8 x 8 mm cornered / corner radii ≥ 1.0 mm [preferably: R2.0 mm]
Max. key size	260 x 360 mm
Clearance (a) from embossing edge to embossing edge	≥ 10 mm with circular embossing [preferably: 16.0 mm] ≥ 11 mm with parallel embossing edges
Installation height for keypad	1.4 – 1.6 mm (depending on construction) [preferably: 1.6 mm]
Key height	1.0 – 1.5 mm (standard 1 mm), tolerance +0.2 mm
Actuating force	3 – 5 N
Switch actions	> 1 mio.
Operating temperature	- 20°C to + 70°C (storage temperature - 40°C to + 80°C)
Membrane polyester; polycarbonate	PETP; PC (Blend)
Chemical resistance	List available on request

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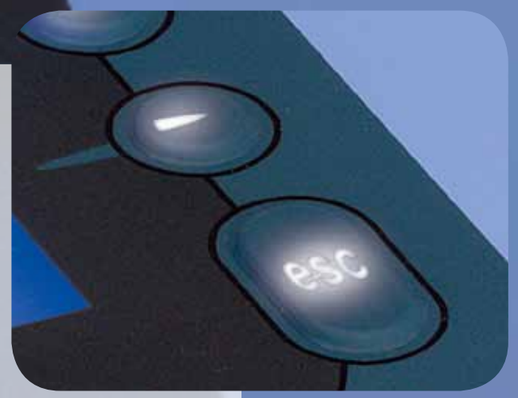
Keypads with night design: EL membranes and Profiline back-lit

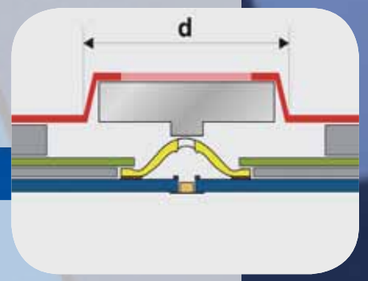
“Nowadays there are no limits to the use of electrical equipment in dark surroundings!”

Carsten Altrock, Head of Sales for Germany
Illuminated short-stroke keys, our back-lit Profiline keypad and EL membranes show the way!

There are many constructional advantages to the use of EL membranes, including their low mechanical installation height, their flexibility, and their low power requirements. An additional advantage is the homogeneous light distribution in the back-lighting process.

In contrast to points of light, the electro-luminescent phosphor particles are evenly distributed on the surface of the membranes, so the membranes emit homogeneous light over the entire surface. This high degree of efficiency means that the EL membranes consume very little power. If electric bulbs or LEDs are replaced with EL membranes, the power consumption is reduced by more than 50%. Almost any design can be created, because EL membranes are manufactured using silk-screen printing.





The back-lit Profiline keypad has additional advantages such as its long operating life, low power consumption and haptic. This technology makes it possible to illuminate the keys separately – the light passes through a hole in the special snap dome into the integrated acrylic inlay, where it is scattered accordingly.

The easy-to-feel key element makes it much easier to use.

Keypads for dark situations
Profiline back-lit

The back-lit Profiline keypad is constructed in a similar way to the standard Profiline keypad, so it offers the decisive features of this technology and provides the well-known advantages for the customer.

One main difference in the construction of the back-lit Profiline keypad is the base membrane which is designed on the basis of an FR4 PCB. An LED is fitted in the middle of the key field on the back of this PCB.

- The key area is clear lacquered, max. ø 10.0 mm
- Key height: approx. 12 mm, tolerance +/- 0.2 mm
- Installation height of the keypad: approx. 2.8 mm, tolerance +/- 10%
- Actuation force: approx. 5 N

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**State-of-the-art technology –
BOPLA's modern, high-quality input systems**

"The design of our input systems ensures a high level of functional safety!"

Nikolai Wilke, Input Unit Product Manager

When manufacturing our membrane keypads, we use only high-quality materials which ensure a long operating life under all conditions. Our keypads are tested to guarantee their long-term function.

Technical features of our membrane keypads:

- Contact elements embedded between high-quality polyester membranes
- Stainless steel snap dome with gold-plated contact side
- Safety chamber for each snap dome, depending on design
- Elegant matt front membrane
- Protected against dirt and splashing water acc. to DIN EN 60529
- Base membrane in copper technology or in conductive silver technology

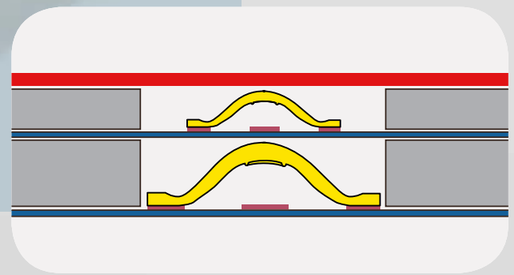
For special occasions – high-gloss technology

A special type of surface design can be created by using a glossy membrane and a special structure lacquer. The partial glossy sections upgrade the design considerably, giving the keypad a sophisticated and high-quality look and ensuring that it stands out from standard industrial keypads.

For extra protection: double contact

High safety standards demand a high level of reliability, especially when it comes to operating devices and machines. This can be achieved by the use of keypads with two-stage key functions, which is why we offer the keypad with a double-contact function.

The user can easily distinguish between two switch functions, and TÜV requirements for two separate switch levels are easily met.



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“Touch screens: control by touch!”

Stefan Matthes, Input Unit Designer

Graphic user interfaces can be found everywhere today. We have been implementing the integration of touch screens in connection with our enclosures and membrane keypads for years. The main feature of this technology is the improved handling and ease of use.

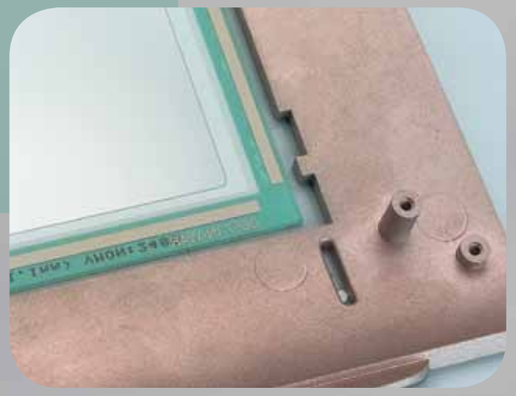
Touch and membrane keypad

In the past it was often claimed that touch screens would replace membrane keypads. Our customers see it differently, and increasingly they are calling for a combination of both input systems.

We will be happy to develop and implement solutions of this kind for you, so please do not hesitate to contact us.

Integration of touch screens and glass

The integration of touch screens with enclosures or customer-specific supporting plates can be achieved in many ways. For applications which preclude the presence of edges which might harbour dirt (medical technology or foodstuffs), we also offer solutions with a continuous front membrane, laminated over the entire area or with spacer dots on the back.



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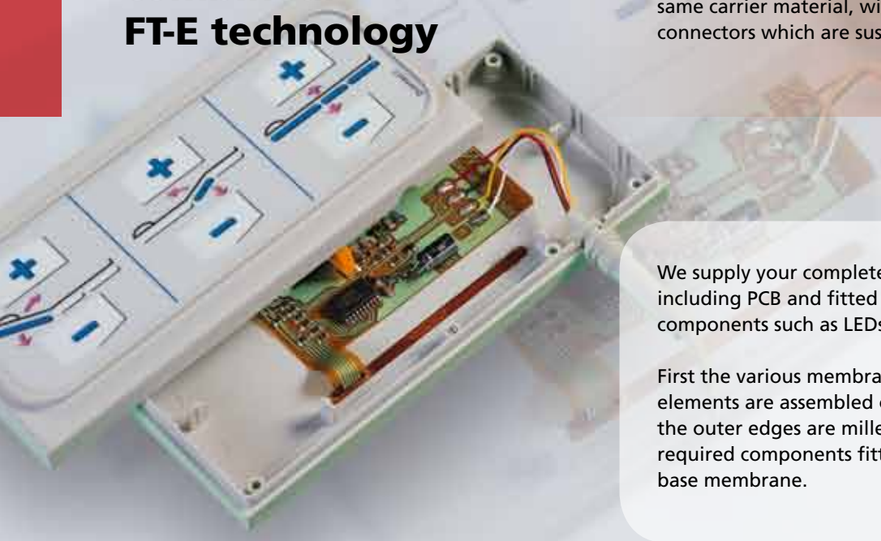
Genius and simplicity combined: FT-E technology

The sheer simplicity of our FT-E technology will fascinate you: the input unit (FT) and the accompanying electronics (E) are on the same carrier material, without any expensive connectors which are susceptible to defects.

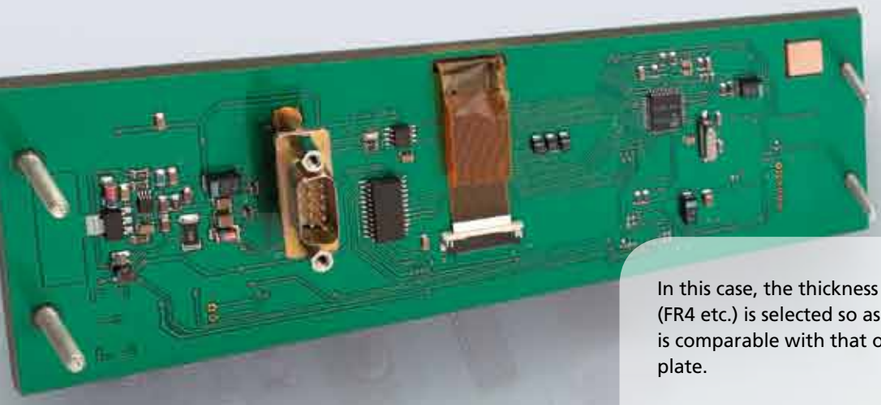


We supply your complete membrane keypad, including PCB and fitted with active and passive components such as LEDs, resistors etc.

First the various membrane layers and switch elements are assembled on the PCB, and then the outer edges are milled or punched and the required components fitted to the extended base membrane.

Low cost: Keypad construction without supporting plate

By using a direct combination of keypad fields with PCBs, there is no need for a supporting plate.



In this case, the thickness of the PCB material (FR4 etc.) is selected so as to ensure that the stability is comparable with that of a metal supporting plate.

Threaded bolts can be fitted, and openings or relief milling are possible. The decor layer is then fitted to the front in the same way as a conventional keypad. Using this method results in considerable savings for our customers.

"We are the competent and reliable partner at your side when you need solutions for your electronics!"

Andreas Fliege, Product Manager for System Technology

System technology

For you, "system solution" means that we provide a complete range of intelligent services tailor-made to create your ideal application.

For 40 years, BOPLA has been your reliable partner for sophisticated solutions in complicated situations. We have constantly extended and perfected our range of services.

You are certain to benefit from our competencies in the enclosure, input unit, and electronics services sectors.

We look forward to talking to you!

Contents:

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System technology
Electronics services

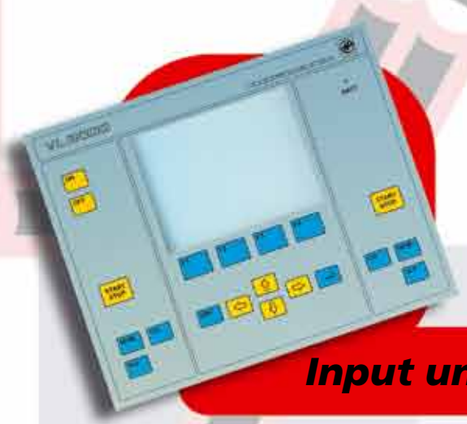
Electronics

We accompany you from the development of the assembly to the materials logistics and production, right up to the complete assembly and validation of your individual assembly.

Service

We offer a wide range of services, from the mechanical processing of our enclosures to engraving and printing, up to assembly of the electronic modules.

The latest machines and a highly-qualified team guarantee 100% results for you: the work which is carried out on BOPLA's premises greatly reduces your risk of rejects.



Input units

Standard enclosures made of plastic or aluminium, 19" enclosure systems, mounting racks or customer-specific special enclosures – BOPLA provides the ideal enclosure for every application.

Enclosures

Modern systems require professional input units at the all-important interface between human operator and machine.
Designing keypads which are both functional and attractive is what we do every day. Individual customised solutions are a special feature of our work. Any new developments introduced are all based on everyday practice and are the result of constructive and ongoing dialogue with our customers.

Do you need the most modern manufacturing technologies and competent advice before, during and after the project?

Then take advantage of our expertise! We are the professional partner you can rely on when it comes to developing system solutions. You, the customer, can take advantage of our many years of experience in designing and manufacturing enclosure systems, input units and electronics services.

Electronics services

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Enclosures

It is often difficult to find a suitable enclosure. There is a wide range of products on the market, which is why good advice is so important.

BOPLA is your competent partner for every type of enclosure.

You can choose between aluminium and plastic enclosures, and also according to the level of ingress protection that your enclosure needs. We offer you a wide range of products.

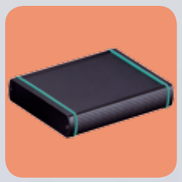
We are here to help you when you are looking for an enclosure in our comprehensive product range, which includes the following types of enclosures:


Hand-held enclosures
Desktop enclosures
Console enclosures
Wall enclosures
Display enclosures
DIN rail enclosures
Control panel mounting enclosures
Operating panel enclosures
Terminal enclosures
19“ enclosures





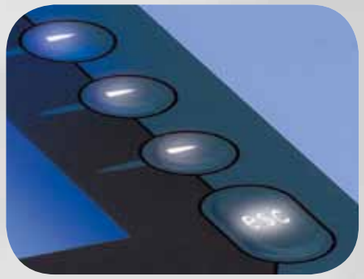






Input units

State of the art technology: The design of our input units ensures the extremely high quality of their function.



When manufacturing our input units, we only use materials which guarantee a long operating life in every situation. Put your trust in us and our expert knowledge.

We offer a wide range of input units. Our consultants will be happy to help you on your premises when you are looking for suitable input unit technology for your application.

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Procurement, warehousing and preparation for manufacturing

After a thorough concept phase during which we give you full information and an overview of costs for your final product, our actual performance begins with the procurement phase.

Our purchasing department operates worldwide and is always in contact with the established distributors of components and PCBs. In addition, we can also make use of brokers to find any rare components needed to put your ideas into practice. Manufacturing batches of 1 piece and more!

We always keep a large number of standard components in stock, which means that we can react quickly at any time.

Our many machines make possible the optimal preparation of the PCBs and components.

- Manual bending and cutting equipment for axial components
- IC bending device
- Paste printing as preparation for fitting SMDs

Fitting and soldering

Some key data about possibilities for electronics manufacture:

- Fitting up to 15,000 components per hour on each of three machines working in parallel / up to 30,000 components per hour on one machine
- Paste printing on two automatic machines using lasered templates
- Standard soldering processes under a protective atmosphere

We solder using the following methods:

Reflow soldering
- Reflow oven SMT full convection machine
- PCB width up to max. 400 mm
- Special sizes available on request

Vapour phase soldering
The vapour phase soldering machine guarantees a constant soldering temperature for the entire module.

Wave soldering
- Wave soldering machine, conforms to RoHS
- Full tunnel machine with preheating stations, spray fluxer and cooling tunnel
- Produces all standard soldering profiles
- Soldering process under protective gas atmosphere

Selective soldering by machine
- Soldering of temperature-sensitive components
- Soldering on fitted modules
- High level of reproducibility compared with manual soldering
- Selective heat introduction means no need for expensive soldering masks and coverings

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Services

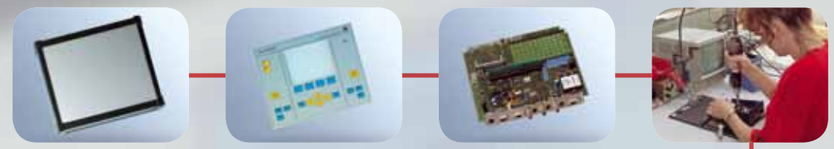
In addition to services such as mechanical processing, printing, lacquering, EMC coating and engraving, we also offer you electronics-related services for your products.

Electronics-related services

This include PCB, wire and cable assembly (flat cable, coaxial cable, control cables and complex cable harnesses). On request, we also carry out AOI and ICT tests. Of course, function tests and component tests using test adapters are also possible. Finally, we assemble the electronics in the enclosure you have selected, and fit the input unit. Packaging which is appropriate for the sales process completes our service offer.

Complete solution

We look forward to meeting you and creating your solution. As you have seen, this starts with an analysis of requirements and continues with procurement and manufacture until final assembly and delivery take place.



And then it's done, and your complete solution is ready for delivery to the end customer! Now you can be absolutely certain that all BOPLA components are of high quality and have undergone several tests. You have saved a lot of time, effort and money – after all, you are working with a competent supplier who offers you the complete package with all the answers.

We have already implemented large numbers of complete solutions for customers in very many sectors:

- Safety engineering
- Medical technology
- Automotive technology
- Telecommunications
- Building automation
- Audio technology
- Optoelectronics
- Agricultural technology
- ...

Welcome to BOPLA City!

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Mat.-Nr. 88112704 06/2010