EAO – Your Expert Partner for
Human Machine Interfaces

EAO Product Information

Series 70

eao

Product Information

General notes

Series 70 offers users an all-bright momentary switch for use in membrane switching systems. Now for the first time the single LED permits exeedingly bright illumination of the complete touch surface in 6 colours in either a round or square configuration.
When employed together with the optionally available white caps the ON condition of these products is clearly visible even under conditions of high ambient lighting due to the change in colour from white to the corresponding LED colour.
Where more importance is attached to the brilliance than the wavelength (color) of the green light the yellow multi LED can be combined with the green cap to boost the light output of the naturally weaker green version. Switchless indicators, non-illuminated types as well as blank elements round of this assortment.
PCB layout and style are in keeping with the most popular switch elements employed in film-seal keypads. Merly the LED leads need to be supplemented in the existing layout. Due to the neat styling and sculptured surface of the caps all products can also be put to use as normal PCB switches having no film seal.
This permits huge savings in the cost of small quantities or pilot series and when keypad seal requirement are not critical. Customized and collated deliveries are possible on request for large-quantity orders.

Specimen order

PCB Pushbutton :

- Switching element illuminative	92-851.342

Essential accessories :

- Lens 15.4 x 15.4 mm, yellow	70-921.4
- Single-LED T1 Bi-Pin, 2.2 VDC, 20 mA, yellow	10-2602.3174D

We reserve the right to modify technical data
All dimensions in mm

Illuminated pushbutton

1 Lens
2 Switching element

Illumination element

The customer has to decide what series resistor shall be used to the LED



Essential Accessories:

Lens page 7

	Illumination	Operating voltage/-current	Terminals	Typ-Nr.	Component layout	Technical drawing	Circuit drawing	kg
Illumination element	-	-	P	**92-800.042**	3	10		0.001
	Bi-colour-LED red/green	1.9/3.5 VDC, 20 mA	P	**70-820.25**	3		1	0.001
	Bi-colour-LED yellow/green	2.0/3.2 VDC, 20 mA	P	**70-820.45**	3		1	0.001
	Single-LED blue	3.5 VDC, 20 mA	P	**70-820.6**	3		3	0.001
	Single-LED green	3.5 VDC, 20 mA	P	**70-820.5**	3		3	0.001
	Single-LED orange	2.1 VDC, 20 mA	P	**70-820.3**	3		3	0.001
	Single-LED red	2.1 VDC, 20 mA	P	**70-820.2**	3		3	0.001
	Single-LED white	3.5 VDC, 20 mA	P	**70-820.9**	3		3	0.001
	Single-LED yellow	2.2 VDC, 20 mA	P	**70-820.4**	3		3	0.001

Terminals: P = PCB terminal
Component layout from page 12, Technical drawing from page 13, Circuit drawing from page 15

Switching element non-illuminated



Essential Accessories:

Spacing cap page 7

	Switching action	Contacts	Contact material	Terminals	Typ-Nr.	Component layout	Technical drawing	Circuit drawing	kg
Switching element non-illuminated with spacing cap	M	1 NO	Au	P	**70-201.0**	2	9	4	0.001
			Ag	P	**70-101.0**	1	8	6	0.001
without spacing cap	M	1 NO	Ag	P	**70-100.0**	1	7	6	0.001

Switching action: M = Momentary action
Contacts: NO = Normally open
Contact material: Au = Gold, Ag = Silver
Terminals: P = PCB terminal
Component layout from page 12, Technical drawing from page 13, Circuit drawing from page 15

Switching element illuminative

The customer has to decide what series resistor shall be used to the LED



Essential Accessories:

Lens page 7

	Switching action	Contacts	Illumination	Operating voltage/-current	Terminals	Typ-Nr.	Component layout	Technical drawing	Circuit drawing	kg
Switching element illuminative	M	1 NO	-	-	P	**92-851.342**	4	11	4	0.001
			Bi-colour-LED red/green	1.9/3.5 VDC, 20 mA	P	**70-220.25**	4		2	0.001
			Bi-colour-LED yellow/green	2.0/3.2 VDC, 20 mA	P	**70-220.45**	4		2	0.001
			Single-LED blue	3.5 VDC, 20 mA	P	**70-220.6**	4		5	0.001
			Single-LED green	3.5 VDC, 20 mA	P	**70-220.5**	4		5	0.001
			Single-LED orange	2.1 VDC, 20 mA	P	**70-220.3**	4		5	0.001
			Single-LED red	2.1 VDC, 20 mA	P	**70-220.2**	4		5	0.001
			Single-LED white	3.5 VDC, 20 mA	P	**70-220.9**	4		5	0.001
			Single-LED yellow	2.2 VDC, 20 mA	P	**70-220.4**	4		5	0.001

Switching action: M = Momentary action
Contacts: NO = Normally open
Terminals: P = PCB terminal
Component layout from page 12, Technical drawing from page 13, Circuit drawing from page 15

Front

Lens

	Lens	⍁ 19.05 x 19.05 mm Typ-Nr.	⍁ 15.4 x 15.4 mm Typ-Nr.	⍁ 12.4 x 12.4 mm Typ-Nr.	Ø 15.4 mm Typ-Nr.	Ø 12.4 mm Typ-Nr.	Technical drawing	kg
Lens Plastic translucent	white	**70-920.9**	**70-921.9**		**70-911.9**		5	0.001
	blue		**70-921.6**				5	0.001
	green		**70-921.5**		**70-911.5**		5	0.001
	orange		**70-921.3**		**70-911.3**		5	0.001
	red		**70-921.2**		**70-911.2**		5	0.001
	yellow		**70-921.4**		**70-911.4**		5	0.001
	blue			**70-922.6**			6	0.001
	green			**70-922.5**		**70-912.5**	6	0.001
	orange			**70-922.3**		**70-912.3**	6	0.001
	red			**70-922.2**		**70-912.2**	6	0.001
	white			**70-922.9**		**70-912.9**	6	0.001
	yellow			**70-922.4**		**70-912.4**	6	0.001

Technical drawing from page 13

Spacing cap

	Typ-Nr.	Technical drawing	kg
Spacing cap 2 recesses for LED, H 13 mm	**70-911.0**	2	0.001
2 recesses for LED, H 22.5 mm	**70-912.0**	3	0.001
2 recesses for LED, H 9 mm	**70-910.0**	1	0.001
without recesses for LED, H 18.9 mm	**70-901.0**	4	0.001

Technical drawing from page 13

Illumination

Single-LED

The customer has to decide what series resistor shall be used to the LED

	Socket	Light colour	Operating voltage/-current	Typ-Nr.	kg
Single-LED	T1 Bi-Pin	blue	3.5 VDC, 20 mA	**10-2602.3206L**	0.001
		green	3.5 VDC, 20 mA	**10-2602.3205L**	0.001
		orange	2.1 VDC, 20 mA	**10-2602.3203L**	0.001
		red	2.1 VDC, 20 mA	**10-2602.3202L**	0.001
		white	3.5 VDC, 20 mA	**10-2602.3209L**	0.001
		yellow	2.2 VDC, 20 mA	**10-2602.3174D**	0.001

Bi-colour LED

The customer has to decide what series resistor shall be used to the LED

	Socket	Light colour	Operating voltage/-current	Typ-Nr.	kg
Bi-colour LED	T1 Bi-Pin	red/green	1.9/3.5 VDC, 20 mA	**10-2603.320AL**	0.001
		yellow/green	2.0/3.2 VDC, 20 mA	**10-2603.320CL**	0.001

Multi-LED

The customer has to decide what series resistor shall be used to the LED

	Socket	Light colour	Operating voltage/-current	Typ-Nr.	kg
Multi-LED	T1 Bi-Pin	yellow	12 VDC, 40 mA	**10-5609.3174D**	0.001

Switching element illuminated

Switching system

Short-travel switching system with 2 independent contact points and tactile operation. Guarantees reliable switching even of very light loads.
1 normally open contact

Material

Material of contact
Gold (Au)

Switching element
Thermoplastic Polyester (PET, PBT) and Polyacetale (POM)

Mechanical characteristics

Actuating force
with overlay foil 4 N ±1,5 N
Max. actuating force >50 N, as per DIN 42115

Actuating travel
0.4 mm

Rebound time
≤1 ms

Resistance to heat of soldering
260 °C, 5 s, as per IEC 60068-2-20

Mechanical lifetime
>5 million operations

Electrical characteristics

Contact resistance
Starting value (initial) ≤100 mΩ, as per IEC 60512-2-2b

Isolation resistance
≥1000 MΩ

Contact resistance
≤100 mΩ
as per 500 000 cycles of operation at 12 VDC, 5 mA resistive load
≤200 mΩ

Electrical life
≥500 000 operations at 42 VDC, 50 mA, as per IEC 60512-5-9c
When attention is paid to the direction of current flow from terminal $^{3}/_{4}$ to $^{1}/_{2}$ the electrical life can be prolonged.

Switch rating
max. 2 VA (resistive load)

Switch rating

Switching voltage VDC/VAC	min. 50 mV, max. 42 V
Switching current VDC/VAC	min. 10 µA, max. 100 mA
Power rating	max. 2 W

Electric strength
500 VAC, 50 Hz, 1 min, as per IEC 60512-2-4a

Electrical characteristics LED

Constant current
15 ... 20 mA

Pre-voltage
Multi-LED typ. 12.5 V
Single-LED typ. 2.2 V

Environmental conditions

Storage temperature
-40 °C ... +85 °C

Operating temperature
-25 °C ... +70 °C

Front protection
front with overlay foil IP 65

Approvals

Declaration of conformity
RoHS

Switching element non-illuminated Typ-Nr. 70-100.0 and 70-101.0

Switching system

Short-travel switching system with 2 independent contact points and tactile operation. Guarantees reliable switching even of very light loads.
1 normally open contact

Material

Material of contact
Silver (Ag)

Mechanical characteristics

Actuating force
with overlay foil 5 N ±2 N
Max. actuating force >50 N, as per DIN 42115

Actuating travel
0.3 mm

Rebound time
≤5ms

Mechanical lifetime
>1 million operations

Electrical characteristics

Isolation resistance
≥50 MΩ

Contact resistance
≤100 mΩ
as per 500 000 cycles of operation at 12 VDC, 5 mA resistive load
≤200 mΩ

Electrical life

at 5 VDC, 1 mA	>1 million operations
at 24 VDC, 1 mA	>100 000 operations

Switch rating
≤1 VA (resistive load)

Switch rating
≤24 VDC, ≤50 mA

Electric strength
250 VAC for 1min.

Environmental conditions

Storage temperature
-30 °C ... +85 °C

Operating temperature
-20 °C ... +70 °C

Front protection
front with overlay foil IP 65

Switching element non-illuminated Typ-Nr. 70-201.0

Switching system

Short-travel switching system with 2 independent contact points and tactile operation. Guarantees reliable switching even of very light loads.
1 normally open contact

Material

Material of contact
Gold (Au)

Switching element
Thermoplastic Polyester (PET, PBT) and Polyacetale (POM)

Mechanical characteristics

Actuating force
with overlay foil 2.1 N ±0.2 N
Max. actuating force >50 N, as per DIN 42115

Actuating travel
max. 0.5 mm

Rebound time
≤1 ms

Resistance to heat of soldering
260 °C, 5 s, as per IEC 60068-2-20

Mechanical lifetime
>5 million operations

Front protection
front with overlay foil IP 65

Electrical characteristics

Contact resistance
Starting value (initial) ≤100 mΩ, as per IEC 60512-2-2b

Isolation resistance
≥1000 MΩ

Contact resistance
≤100 mΩ
as per 500 000 cycles of operation at 12 VDC, 5 mA resistive load
≤200 mΩ

Electrical life
≥500 000 operations at 42 VDC, 50 mA, as per IEC 60512-5-9c
When attention is paid to the direction of current flow from terminal $^3/_4$ to $^1/_2$ the electrical life can be prolonged.

Switch rating
max. 42 V, 50 mA
min. 50 mV, 10 µ

Switch rating

Switching voltage VDC/VAC	min. 50 mV, max. 42 V
Switching current VDC/VAC	min.10 mA, max.100 mA
Switch rating	max. 2 W

Electric strength
500 VAC, 50 Hz, 1 min, as per IEC 60512-2-4a

Environmental conditions

Storage temperature
-40 °C ... +85 °C

Operating temperature
-25 °C ... +70 °C

Front protection
front with overlay foil IP 65

Suppressor circuits

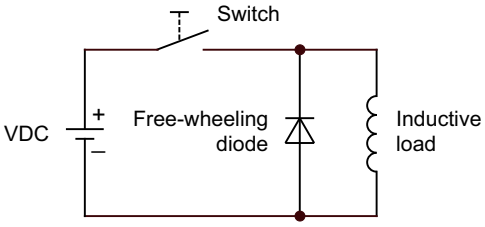
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

Fig. 1 shows an inductive load with a free-wheeling diode connected in parallel. This free-wheeling diode provides a path for the inductor current to flow when the current is interrupted by the switch. Without this free-wheeling diode, the voltage across the coil will be limited only by dielectric breakdown voltages of the circuit or parasitic elements of the coil. This voltage can be kilovolts in amplitude even when nominal circuit voltages are low (e.g. 12 VDC) see Fig. 2.

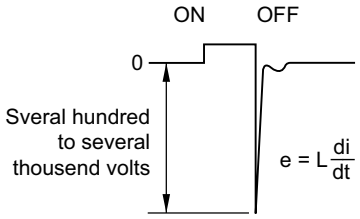
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (VR) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current flowing through the load.

To get an efficient protection, the free-wheeling diode must be connected as close as possible to the inductive load!

Switching with inductive load
Fig. 1

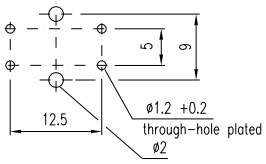


Counter emf
over load without free-wheeling diode
Fig. 2

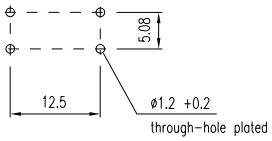


Component layout

1 Switching element non-illuminated page 5



2 Switching element non-illuminated page 5

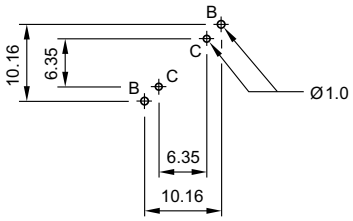


3 Illumination element page 5

Single-LED

Drilling plan (Elementside)

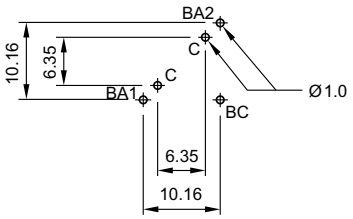
B Holes for LED
C Holes for centering pins



Bi-colour-LED

Drilling plan (Elementside)

B Holes for Bi-colour LED:
BA1 (green) + BA2 (yellow or red) = Anodes, BC = Cathode
C Holes for centering pins

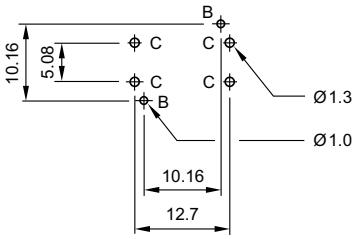


4 Switching element illuminative page 6

Single-LED

Drilling plan (Elementside)

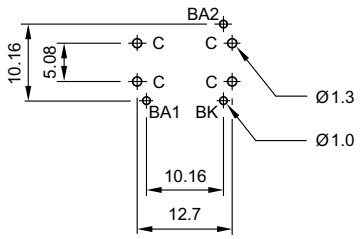
B Holes for LED
C Holes for contact pins
Pad max. Ø 2.5 mm
Through-connection recommended



Bi-colour-LED

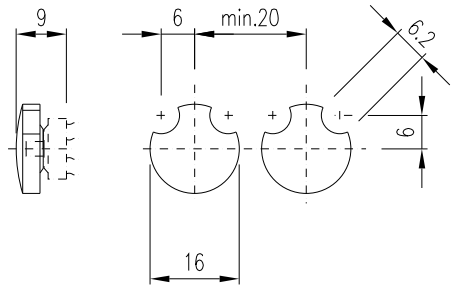
Drilling plan (Elementside)

B Holes for Bi-colour-LED:
BA1 (green) + BA2 (yellow or red) = Anodes, BK = Cathode
C Holes for contact pins
Pad max. Ø 2.5 mm
Through-connection recommended

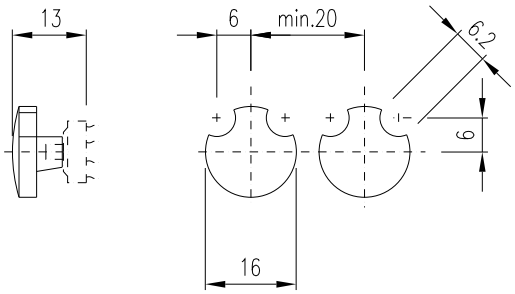


Technical drawing

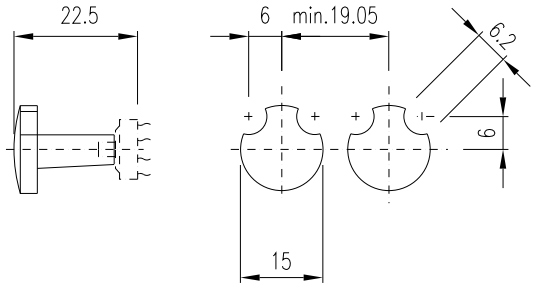
1 Spacing cap page 7



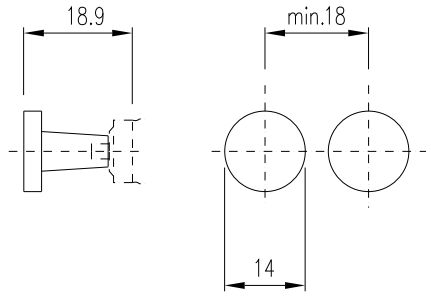
2 Spacing cap page 7



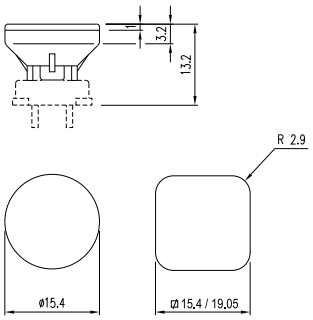
3 Spacing cap page 7



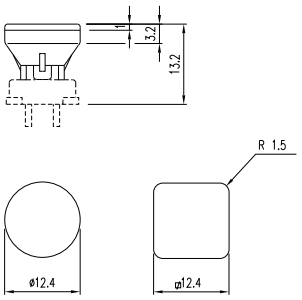
4 Spacing cap page 7



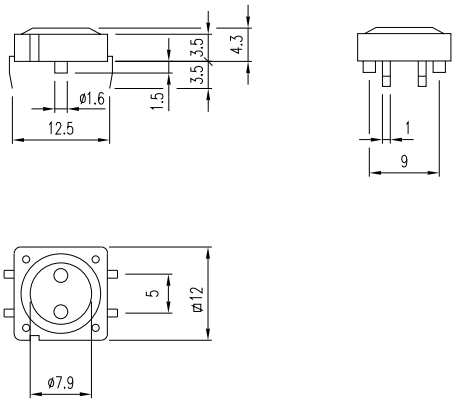
5 Lens page 7



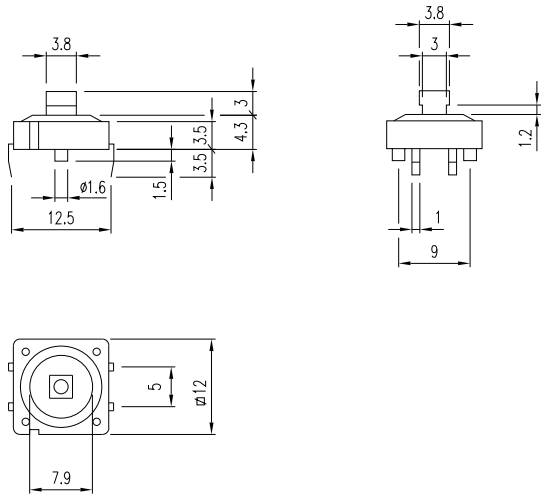
6 Lens page 7



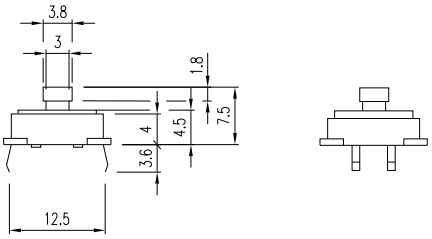
7 Switching element non-illuminated page 5

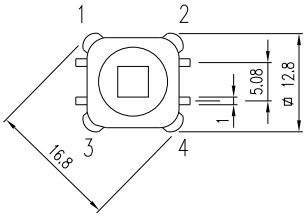


8 Switching element non-illuminated page 5

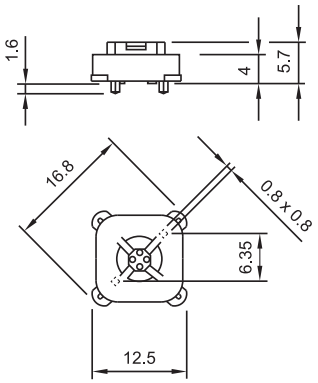


9 Switching element non-illuminated page 5

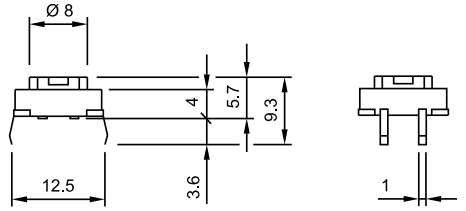


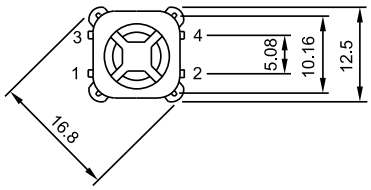


10 Illumination element page 5



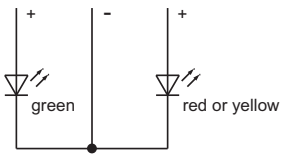
11 Switching element illuminative page 6



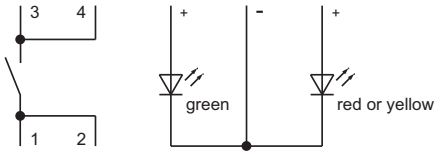


Circuit drawing

1 Illumination element page 5

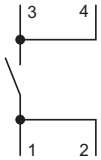


2 Switching element illuminative page 6

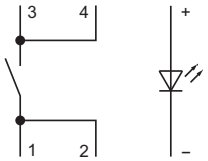


3 Illumination element page 5

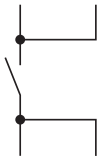
4 Switching element non-illuminated page 5 **| Switching element illuminative** page 6



5 Switching element illuminative page 6



6 Switching element non-illuminated page 5



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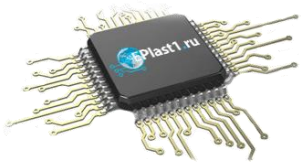
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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