

# FLK.../EZ-DR...

## VARIOFACE System Cable With Flat-Ribbon Cable Connector

### INTERFACE

Data Sheet  
100018\_en\_02

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### 1 Description

Using VARIOFACE modules (see INTERFACE catalog), pre-assembled flat-ribbon cables provide a quick and easy connection between the control and field level. The cables are pre-assembled with male connector strips according to IEC 60603-1/DIN 41651 at both ends (1:1 connection). The following number of positions are available in various lengths:

- Unshielded version: 10, 14, 16, 20, 26, 34, 40, and 50 pos.
- Shielded version: 14, 16, 40, and 50 pos.

#### System Cable Color Code FLK.../EZ-DR.../KONFEK and FLK.../EZ-DR.../KONFEK/S

Number of Wires	PIN	Wire Color
10-pos.	1	black
	2	brown
	3	red
	4	orange
	5	yellow
	6	green
	7	blue
	8	violet
	9	gray
	10	white
14-pos.	11	white-black
	12	white-brown
	13	white-red
	14	white-orange
16-pos.	15	white-yellow
	16	white-green

Number of Wires	PIN	Wire Color	
20-pos.	17	white-blue	
	18	white-violet	
	19	white-gray	
	20	brown-black	
	21	brown-red	
	22	brown-orange	
	23	brown-yellow	
	24	brown-green	
	25	brown-blue	
	26	brown-violet	
26-pos.	27	brown-gray	
	28	brown-white	
	29	green-black	
	30	green-brown	
	31	green-red	
	32	green-orange	
	33	green-blue	
	34	green-violet	
	34-pos.	35	green-gray
		36	green-white
37		yellow-black	
38		yellow-brown	
39		yellow-red	
40-pos.		40	yellow-orange
		41	yellow-blue
		42	yellow-violet
		43	yellow-gray
		44	yellow-white
	45	gray-black	
	46	gray-brown	
	47	gray-red	
	48	gray-orange	
	49	gray-yellow	
50-pos.	50	gray-green	



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A conversion table is available on the Internet at [www.download.phoenixcontact.com/general/7000\\_en\\_00.pdf](http://www.download.phoenixcontact.com/general/7000_en_00.pdf).



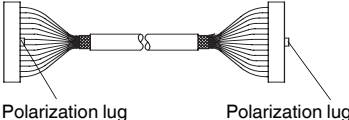
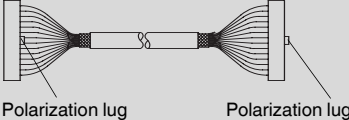
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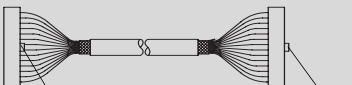
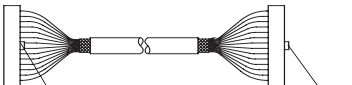
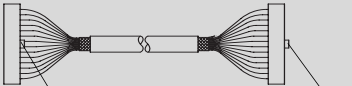
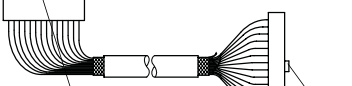
## 2 Unshielded System Cable With Flat-Ribbon Cable Connector

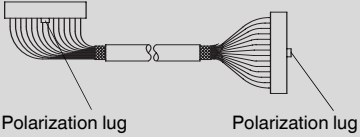
- 1:1 connection
- Pre-assembled round cable in fixed lengths
- Special lengths can be defined using the order key (see page 6)



### 2.1 Ordering Data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt
Assembled round cable, with two 10-pos. socket strips in fixed lengths	10	0.5 m	FLK 10/EZ-DR/ 50/KONFEK	2299204	1
	10	1.0 m	FLK 10/EZ-DR/100/KONFEK	2299217	1
Straight socket strips fitted at both ends:	10	1.5 m	FLK 10/EZ-DR/150/KONFEK	2299220	1
	10	2.0 m	FLK 10/EZ-DR/200/KONFEK	2299233	1
	10	3.0 m	FLK 10/EZ-DR/300/KONFEK	2299246	1
	10	4.0 m	FLK 10/EZ-DR/400/KONFEK	2299259	1
	10	6.0 m	FLK 10/EZ-DR/600/KONFEK	2299262	1
	10	8.0 m	FLK 10/EZ-DR/800/KONFEK	2299275	1
	10	10.0 m	FLK 10/EZ-DR/1000/KONFEK	2299288	1
Assembled round cable, with two 14-pos. socket strips in fixed lengths	14	0.3 m	FLK 14/EZ-DR/ 30/KONFEK	2295729	5
	14	0.5 m	FLK 14/EZ-DR/ 50/KONFEK	2288901	5
Straight socket strips fitted at both ends:	14	1.0 m	FLK 14/EZ-DR/100/KONFEK	2288914	1
	14	1.5 m	FLK 14/EZ-DR/150/KONFEK	2288927	1
	14	2.0 m	FLK 14/EZ-DR/200/KONFEK	2288930	1
	14	2.5 m	FLK 14/EZ-DR/250/KONFEK	2288943	1
	14	3.0 m	FLK 14/EZ-DR/300/KONFEK	2288956	1
	14	3.5 m	FLK 14/EZ-DR/350/KONFEK	2288969	1
	14	4.0 m	FLK 14/EZ-DR/400/KONFEK	2288972	1
	14	4.5 m	FLK 14/EZ-DR/450/KONFEK	2290847	1
	14	5.0 m	FLK 14/EZ-DR/500/KONFEK	2290834	1
	14	5.5 m	FLK 14/EZ-DR/550/KONFEK	2290850	1
	14	6.0 m	FLK 14/EZ-DR/600/KONFEK	2290863	1
	14	8.0 m	FLK 14/EZ-DR/800/KONFEK	2299563	1
	14	10.0 m	FLK 14/EZ-DR/1000/KONFEK	2299576	1

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt
Assembled round cable, with two 16-pos. socket strips in fixed lengths Straight socket strips fitted at both ends: 	16	0.5 m	FLK 16/EZ-DR/ 50/KONFEK	2299291	1
	16	1.0 m	FLK 16/EZ-DR/100/KONFEK	2299301	1
	16	1.5 m	FLK 16/EZ-DR/150/KONFEK	2299314	1
	16	2.0 m	FLK 16/EZ-DR/200/KONFEK	2299327	1
	16	3.0 m	FLK 16/EZ-DR/300/KONFEK	2299330	1
	16	4.0 m	FLK 16/EZ-DR/400/KONFEK	2299343	1
	16	6.0 m	FLK 16/EZ-DR/600/KONFEK	2299356	1
	16	8.0 m	FLK 16/EZ-DR/800/KONFEK	2299369	1
	16	10.0 m	FLK 16/EZ-DR/1000/KONFEK	2299372	1
	Assembled round cable, with two 20-pos. socket strips in fixed lengths Straight socket strips fitted at both ends: 	20	0.5 m	FLK 20/EZ-DR/ 50/KONFEK	2296391
20		1.0 m	FLK 20/EZ-DR/100/KONFEK	2296401	1
20		1.5 m	FLK 20/EZ-DR/150/KONFEK	2296472	1
20		2.0 m	FLK 20/EZ-DR/200/KONFEK	2296485	1
20		3.0 m	FLK 20/EZ-DR/300/KONFEK	2296498	1
20		4.0 m	FLK 20/EZ-DR/400/KONFEK	2296508	1
20		6.0 m	FLK 20/EZ-DR/600/KONFEK	2296511	1
20		8.0 m	FLK 20/EZ-DR/800/KONFEK	2296524	1
20		10.0 m	FLK 20/EZ-DR/1000/KONFEK	2296537	1
Assembled round cable, with two 26-pos. socket strips in fixed lengths Straight socket strips fitted at both ends: 		26	0.5 m	FLK 26/EZ-DR/ 50/KONFEK	2299385
	26	1.0 m	FLK 26/EZ-DR/100/KONFEK	2299398	1
	26	1.5 m	FLK 26/EZ-DR/150/KONFEK	2299408	1
	26	2.0 m	FLK 26/EZ-DR/200/KONFEK	2299411	1
	26	3.0 m	FLK 26/EZ-DR/300/KONFEK	2299424	1
	26	4.0 m	FLK 26/EZ-DR/400/KONFEK	2299437	1
	26	6.0 m	FLK 26/EZ-DR/600/KONFEK	2299440	1
	26	8.0 m	FLK 26/EZ-DR/800/KONFEK	2299453	1
	26	10.0 m	FLK 26/EZ-DR/1000/KONFEK	2299466	1
	Assembled round cable, with two 34-pos. socket strips in fixed lengths Straight socket strips fitted at both ends: 	34	0.5 m	FLK 34/EZ-DR/ 50/KONFEK	2299479
34		1.0 m	FLK 34/EZ-DR/100/KONFEK	2299482	1
34		1.5 m	FLK 34/EZ-DR/150/KONFEK	2299495	1
34		2.0 m	FLK 34/EZ-DR/200/KONFEK	2299505	1
34		3.0 m	FLK 34/EZ-DR/300/KONFEK	2299518	1
34		4.0 m	FLK 34/EZ-DR/400/KONFEK	2299521	1
34		6.0 m	FLK 34/EZ-DR/600/KONFEK	2299534	1
34		8.0 m	FLK 34/EZ-DR/800/KONFEK	2299547	1
34		10.0 m	FLK 34/EZ-DR/1000/KONFEK	2299550	1
Assembled round cable, with two 40-pos. socket strips in fixed lengths Socket strips fitted, straight at one end and angled at the other: 		40	0.5 m	FLK 40/EZ-DR/ 50/KONFEK	2288985
	40	1.0 m	FLK 40/EZ-DR/100/KONFEK	2288998	1
	40	1.5 m	FLK 40/EZ-DR/150/KONFEK	2289007	1
	40	2.0 m	FLK 40/EZ-DR/200/KONFEK	2289010	1
	40	2.5 m	FLK 40/EZ-DR/250/KONFEK	2289023	1
	40	3.0 m	FLK 40/EZ-DR/300/KONFEK	2289036	1
	40	3.5 m	FLK 40/EZ-DR/350/KONFEK	2289049	1
	40	4.0 m	FLK 40/EZ-DR/400/KONFEK	2289052	1
	40	6.0 m	FLK 40/EZ-DR/600/KONFEK	2299589	1
	40	8.0 m	FLK 40/EZ-DR/800/KONFEK	2299592	1
40	10.0 m	FLK 40/EZ-DR/1000/KONFEK	2299602	1	

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt
Assembled round cable, with two 50-pos. socket strips in fixed lengths	50	0.5 m	FLK 50/EZ-DR/ 50/KONFEK	2289065	5
	50	1.0 m	FLK 50/EZ-DR/100/KONFEK	2289078	1
Socket strips fitted, straight at one end and angled at the other:	50	1.5 m	FLK 50/EZ-DR/150/KONFEK	2289081	1
	50	2.0 m	FLK 50/EZ-DR/200/KONFEK	2289094	1
 <p>Polarization lug                      Polarization lug</p>	50	2.5 m	FLK 50/EZ-DR/250/KONFEK	2289104	1
	50	3.0 m	FLK 50/EZ-DR/300/KONFEK	2289117	1
	50	3.5 m	FLK 50/EZ-DR/350/KONFEK	2289120	1
	50	4.0 m	FLK 50/EZ-DR/400/KONFEK	2289133	1
	50	4.5 m	FLK 50/EZ-DR/450/KONFEK	2289573	1
	50	5.0 m	FLK 50/EZ-DR/500/KONFEK	2289586	1
	50	5.5 m	FLK 50/EZ-DR/550/KONFEK	2289599	1
	50	6.0 m	FLK 50/EZ-DR/600/KONFEK	2289609	1
	50	6.5 m	FLK 50/EZ-DR/650/KONFEK	2289612	1
	50	7.0 m	FLK 50/EZ-DR/700/KONFEK	2289625	1
	50	7.5 m	FLK 50/EZ-DR/750/KONFEK	2289638	1
	50	8.0 m	FLK 50/EZ-DR/800/KONFEK	2289641	1
	50	8.5 m	FLK 50/EZ-DR/850/KONFEK	2289654	1
	50	9.0 m	FLK 50/EZ-DR/900/KONFEK	2289667	1
	50	9.5 m	FLK 50/EZ-DR/950/KONFEK	2289670	1
	50	10.0 m	FLK 50/EZ-DR/1000/KONFEK	2289683	1

## 2.2 Technical Data

### General Data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	≤ 0.16 Ω/m
Ambient temperature range	
Operation	-20°C ... +50°C
Storage/transport	-20°C ... +70°C
Conductor cross section	0.14 mm <sup>2</sup> (AWG 26)
Conductor construction	7 Litz wires, Cu tin-plated
Outside diameter	
	10-pos. 6.0 mm
	14-pos. 6.4 mm
	16-pos. 7.0 mm
	20-pos. 7.6 mm
	26-pos. 7.8 mm
	34-pos. 10.0 mm
	40-pos. 10.0 mm
	50-pos. 10.3 mm

Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
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### Approvals

UL, CUL	2 A; 125 V
	

### 3 Shielded System Cable With Flat-Ribbon Cable Connector

- 1:1 connection,
- Pre-assembled round cable in fixed lengths
- Special lengths can be defined using the order key (see page 6).

With shielded cables, a cable end with ferrule is also available as a shield connection (length: 0.5 m, approximately; cable: HO5 V-K 1 mm<sup>2</sup>, black).



#### 3.1 Ordering Data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt	
Assembled round cable, with two 14-pos. socket strips in fixed lengths Straight socket strips fitted at both ends:	14	0.5 m	FLK 14/EZ-DR/ 50/KONFEK/S	2296977	1	
	14	1.0 m	FLK 14/EZ-DR/100/KONFEK/S	2296980	1	
	14	1.5 m	FLK 14/EZ-DR/150/KONFEK/S	2296993	1	
	Shield connection Polarization lug      Polarization lug	14	2.0 m	FLK 14/EZ-DR/200/KONFEK/S	2297002	1
		14	3.0 m	FLK 14/EZ-DR/300/KONFEK/S	2299013	1
		14	4.0 m	FLK 14/EZ-DR/400/KONFEK/S	2299026	1
		14	6.0 m	FLK 14/EZ-DR/600/KONFEK/S	2299039	1
	14	8.0 m	FLK 14/EZ-DR/800/KONFEK/S	2299042	1	
	14	10.0 m	FLK 14/EZ-DR/1000/KONFEK/S	2299055	1	
	Assembled round cable, with two 16-pos. socket strips in fixed lengths Straight socket strips fitted at both ends:	16	0.5 m	FLK 16/EZ-DR/ 50/KONFEK/S	2318075	1
16		1.0 m	FLK 16/EZ-DR/ 100/KONFEK/S	2304542	1	
16		1.5 m	FLK 16/EZ-DR/ 150/KONFEK/S	2304623	1	
Shield connection Polarization lug      Polarization lug		16	2.0 m	FLK 16/EZ-DR/ 200/KONFEK/S	2304555	1
		16	3.0 m	FLK 16/EZ-DR/ 300/KONFEK/S	2318088	1
		16	4.0 m	FLK 16/EZ-DR/ 400/KONFEK/S	2318091	1
		16	5.0 m	FLK 16/EZ-DR/ 500/KONFEK/S	2318952	1
16		6.0 m	FLK 16/EZ-DR/ 600/KONFEK/S	2314477	1	
16		8.0 m	FLK 16/EZ-DR/ 800/KONFEK/S	2318101	1	
16		10.0 m	FLK 16/EZ-DR/1000/KONFEK/S	2318114	1	
Assembled round cable, with two 50-pos. socket strips in fixed lengths Socket strips fitted, straight at one end and angled at the other:	50	0.5 m	FLK 50/EZ-DR/ 50/KONFEK/S	2299097	1	
	50	1.0 m	FLK 50/EZ-DR/100/KONFEK/S	2299107	1	
	50	1.5 m	FLK 50/EZ-DR/150/KONFEK/S	2299110	1	
	Shield connection Polarization lug      Polarization lug	50	2.0 m	FLK 50/EZ-DR/200/KONFEK/S	2299123	1
		50	3.0 m	FLK 50/EZ-DR/300/KONFEK/S	2299136	1
		50	4.0 m	FLK 50/EZ-DR/400/KONFEK/S	2299149	1
		50	6.0 m	FLK 50/EZ-DR/600/KONFEK/S	2299152	1
	50	8.0 m	FLK 50/EZ-DR/800/KONFEK/S	2299165	1	
	50	10.0 m	FLK 50/EZ-DR/1000/KONFEK/S	2299178	1	

### 3.2 Technical Data

#### General Data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	≤ 0.16 Ω/m
Ambient temperature range	
Operation	-20°C ... +50°C
Storage/transport	-20°C ... +70°C
Conductor cross section	0.14 mm <sup>2</sup> (AWG 26)
Conductor construction	7 Litz wires, Cu tin-plated
Shield	Tinned copper-braided shield
Outside diameter	
	14-pos. 6.7 mm
	16-pos. 7.5 mm
	50-pos. 11.0 mm
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4

#### Approvals

UL, CUL	Applied for
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## 4 Special Lengths

Preprinted round cables are used to connect the PLC front adapters to the corresponding VARIOFACE controller boards. Plug connector strips are fitted on both ends of the cables in accordance with IEC 60603-13/DIN 41651. For shielded cables, a cable end with a ferrule is available additionally as a shielded connection (length: approx. 0.5 m; cable H05V-K 1 mm<sup>2</sup>, black).

The order code for special lengths is defined by three features.

The features listed in the corresponding order are as follows:

- cable type,
- assembly,
- length in meters.

There are two order keys, one for unshielded round cables, FLK EZ-DR/.../.../... and one for shielded round cables, FLK EZ-DR-S/.../.../... The features necessary to clearly identify an order are described below:

#### Cable Type

This specifies the number of individual wires in the cable.

#### Assembly

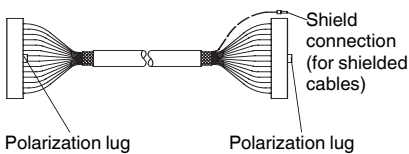
- none, the ends of the cables are not preassembled;
- 10-pos. female connector at both ends, 10-pos. plug connectors are fitted at both ends of the cable (1:1 connection);
- 14-pos. female connector at both ends, 14-pos. plug connectors are fitted at both ends of the cable (1:1 connection); etc. up to
- 50-pos. female connector at both ends, 50-pos. plug connectors are fitted at both ends of the cable (1:1 connection);
- 14-pos. female connector at one end, 16-pos. female connector at one end, the cable is assembled at one end with a 14-pos. plug connector and at the other end with a 16-pos. plug connector (for SIMATIC S7; no 1:1 connection).

4.1 Features of Permissible Assemblies

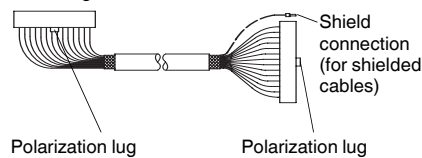
Cable type Assembly	Unshielded round cables FLK EZ-DR.../.../...							
	10-pos.	14-pos.	16-pos.	20-pos.	26-pos.	34-pos.	40-pos.	50-pos.
No assembly	10U/C00/...	14U/C00/...	16U/C00/...	20U/C00/...	26U/C00/...	34U/C00/...	40U/C00/...	50U/C00/...
10-pos. socket strip at both ends	10U/C55/... <sup>1</sup>							
14-pos. socket strip at both ends		14U/C23/... <sup>1</sup>						
16-pos. socket strip at both ends			16U/C58/... <sup>1</sup>					
20-pos. socket strip at both ends				20U/C61/... <sup>1</sup>				
26-pos. socket strip at both ends					26U/C63/... <sup>1</sup>			
34-pos. socket strip at both ends						34U/C65/... <sup>1</sup>		
40-pos. socket strip at both ends							40U/C30/... <sup>3</sup>	
50-pos. socket strip at both ends								50U/C38/... <sup>2</sup>
14-pos. socket strip at one end; 16-pos. socket strip at one end		14U/C52/... <sup>1</sup>						

Cable type Assembly	Shielded round cables FLK EZ-DR-S.../.../...							
		14-pos.	16-pos.				40-pos.	50-pos.
No assembly		14S/C00/...	16S/C00/...				40S/C00/...	50S/C00/...
10-pos. socket strip at both ends								
14-pos. socket strip at both ends		14S/C23/... <sup>1</sup>						
16-pos. socket strip at both ends			16S/C58/... <sup>1</sup>					
20-pos. socket strip at both ends								
26-pos. socket strip at both ends								
34-pos. socket strip at both ends								
40-pos. socket strip at both ends							40S/C30/... <sup>3</sup>	
50-pos. socket strip at both ends								50S/C38/... <sup>2</sup>
14-pos. socket strip at one end; 16-pos. socket strip at one end		14S/C52/... <sup>1</sup>						

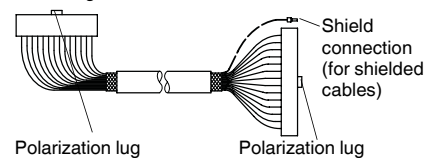
<sup>1</sup> Straight socket strips fitted at both ends:



<sup>2</sup> Socket strips fitted, straight at one end and angled at the other:



<sup>3</sup> Socket strips fitted, straight at one end and angled at the other:



**4.2 Ordering Data for Round Cables in Special Lengths**

Description	Type	Order No.	Pcs./Pkt
Assembled round cables, with socket strips in variable lengths			
Unshielded	FLK EZ-DR.../.../...	2295059	1
Shielded	FLK EZ-DR-S.../.../...	2295046	1

**4.3 Sample Order for Unshielded Round Cable**

Unshielded 50-pos. round cable, assembled with two 50-pos. female connectors, 11.5 m long

Piece	Order No.	Cable type	Assembly	Length [m]
1	2295059	50U	C38	11,50
		10U ≙ 10-pos., unshielded 14U ≙ 14-pos., unshielded 16U ≙ 16-pos., unshielded 20U ≙ 20-pos., unshielded 26U ≙ 26-pos., unshielded 34U ≙ 34-pos., unshielded 40U ≙ 40-pos., unshielded 50U ≙ 50-pos., unshielded	C00 ≙ no assembly C55 ≙ 10-pos. socket strip at both ends C23 ≙ 14-pos. socket strip at both ends C52 ≙ 14-pos. socket strip at one end, 16-pos. socket strip at one end (for S7) C58 ≙ 16-pos. socket strip at both ends C61 ≙ 20-pos. socket strip at both ends C63 ≙ 26-pos. socket strip at both ends C65 ≙ 34-pos. socket strip at both ends C30 ≙ 40-pos. socket strip at both ends C38 ≙ 50-pos. socket strip at both ends	(0.20 m, min.)

**4.4 Sample Order for Shielded Round Cable**

Unshielded 14-pos. round cable, assembled with two 14-pos. female connectors, 12.75 m long

Piece	Order No.	Cable type	Assembly	Length [m]
1	2295046	14S	C23	12,75
		14S ≙ 14-pos., shielded 40S ≙ 40-pos., shielded 50S ≙ 50-pos., shielded	C00 ≙ no assembly C23 ≙ 14-pos. socket strip at both ends C52 ≙ 14-pos. socket strip at one end, 16-pos. socket strip at one end (for S7) C58 ≙ 16-pos. socket strip at both ends C30 ≙ 40-pos. socket strip at both ends C38 ≙ 50-pos. socket strip at both ends	(0.20 m, min.)



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

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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