

INDUSTRIAL TRAY SOLUTIONS

Tray-Rated Power, Control & Data Cables

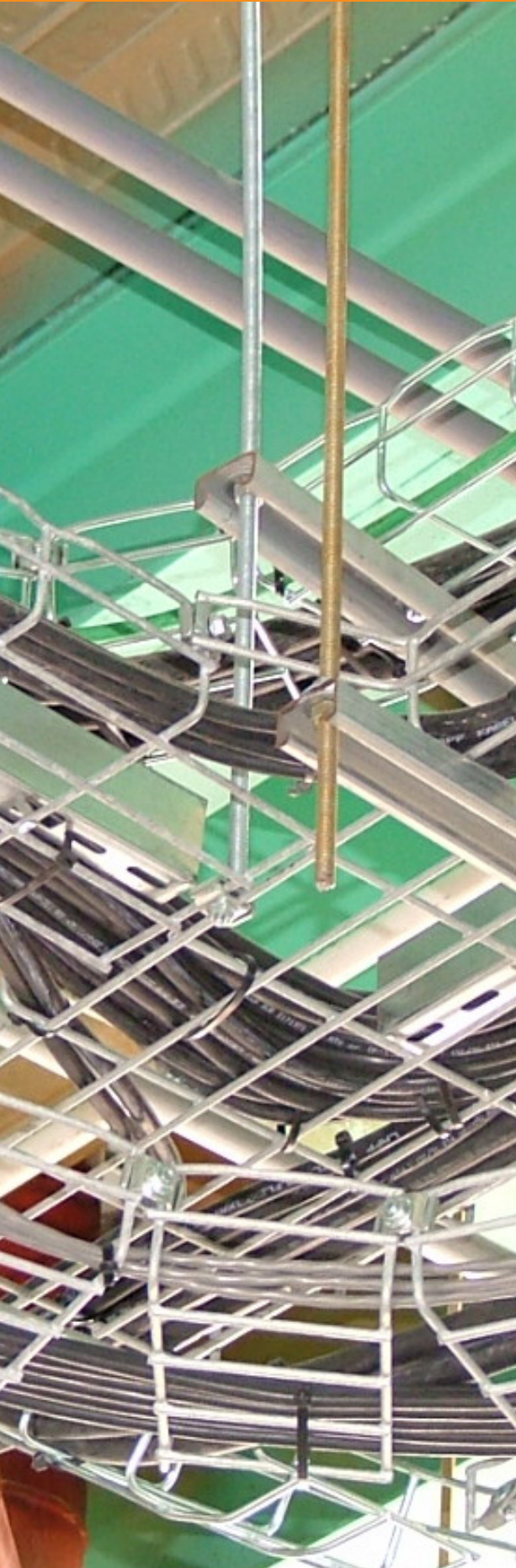


make the right connection



LAPP GROUP

make the right connection



Not all tray cables are created equal.

Lapp Group's tray cables have a well-earned reputation for playing critical roles in a wide array of industries and manufacturing applications. Our business partners depend on the quality, performance, and durability of our tray cables to help keep their power, control, communications, and data lines performing optimally, even in the most demanding conditions.

Lapp Group tray cables offer many valuable benefits for manufacturers:

- Industry-leading oil resistance
- Superior bending radius
- Enhanced temperature resistance
- No conduit required
- UV-resistant and direct burial capabilities
- UL TC-ER approved

Unrivalled flexibility, durability, and cost effectiveness.

For the most effective and long-lasting performance, it's critical to know your installation environment for all types and voltages of tray cable, including where the cables are going to be run and important environmental factors such as cold, hot, damp, oil-heavy or wash down conditions. The applications are equally important, including significant curves, rises and falls, trays being run next to conveyors, and torsion ratings for wind turbines. Cold temperature flexibility ratings are also significant and can vary from -5°C to -25°C. Installations below the cold temperature flexibility can potentially cause the cable to be damaged during installation.

Lapp Group's 600V power and control tray cables come in a wide variety of insulation and jacket materials. These cables pass stringent impact and crush tests per UL 1569 and don't require conduit, which lowers operational and maintenance costs and increases layout flexibility. A smooth, round jacket design optimizes the seal when used with cable glands and connectors.

Lapp Group also offers data and communication cable that can be run in cable trays. Most are PLTC (power limited tray cable) rating per UL 13 and are PLTC-ER (exposed run) rated. PLTC cables can be run in the same tray as 600V power and control tray cables when they are separated by a divider.

Partner with the industry leader.

When you choose products from Lapp Group's complete line of tray cables, you connect with a company that combines international capabilities with domestic manufacturing; ensuring product quality and availability. And you connect with unrivaled customer support that is always there for you.

To find out how Lapp Group and our full line of tray cable products can help meet your power, control, and data needs, please visit us at **lappgroup.com** or call us at 1-800-774-3539.





Lapp Tray-Rated Products

ÖLFLEX® TRAY II & ÖLFLEX® CONTROL TM

PAGE 6

ÖLFLEX® TRAY II & CONTROL TM offer unrivaled reliability, flexibility and durability for machine tool applications.

ÖLFLEX® TRAY VTC

PAGE 10

ÖLFLEX® TRAY VTC offers greater flexibility and oil resistance when compared to commodity tray cables making it perfect for new plant installations and factory expansions.

ÖLFLEX® AUTO-I

PAGE 12

ÖLFLEX® AUTO-I offers durability and reliability for heavy duty tray applications as well as in machine wiring.

I 304

PAGE 13

I 304 instrumentation cable offers flexibility and durability in industrial applications. Rated for UL CMG, PLTC & ITC and CSA CMG.

APPLICATION ADVANTAGES

- UL TC-ER & CSA CIC/TC
- Meets UL Oil Res I & II and AWM 21098
- UL MTW
- WTTC per UL 2277
- Higher abrasion resistance
- Superior flexibility down to -25°C
- -40°C cold bend
- Oil and chemical resistant

- Easier to pull than standard tray cable
- UL TC-ER approval reduces material costs
- UL wet rating +90°C
- Black numbered conductors with printed color code for easy identification
- UV resistant and direct burial

- UL TC-ER & CSA CIC/TC approval
- UV resistant
- Number coded for easy wiring with either blue, red, orange, black, or yellow conductors
- TPE jacket

- UL/CSA rated 300V
- Passes UL & CSA Flame Test (70,000 BTU)
- Sunlight & UV resistant, direct burial
- Rated +105°C

MARKETS

Industrial machinery
Wind
Food & beverage
Machine tool

Industrial machinery
Food & beverage
Machine tool

Automotive
Machine tool
Machinery
Food & beverage

Petrochemical processing
Machine control
Low voltage control wiring



UNITRONIC® 300/300S

PAGE 15

UNITRONIC® 300 offers flexibility and durability that are expected for internal and external wiring of OEM equipment and routing through cable tray.

UNITRONIC® 300 STP

PAGE 17

UNITRONIC® 300 STP is your cable of choice for internal and external wiring of OEM equipment. Twisted and shielded pairs, unrivaled oil resistance, and improved flexibility make it ideal for tray applications.

ETHERLINE® TRAY

PAGE 18

ETHERLINE® TRAY is designed for flexible and tray applications. Engineered to protect against EMI and ideal for use in areas where reliable transmission is key.

ETHERLINE® CAT.5

PAGE 19

ETHERLINE® CAT.5 provide reliable network communication in demanding industrial applications while ensuring protection from EMI. Suitable for stationary tray applications.

APPLICATION ADVANTAGES

- UL PLTC-ER
- Extended temperature rating of -40° C to +105°C
- Flexible design for ease of routing
- Suitable for use in cable tray
- Oil- and UV-resistant jacket
- Sequential foot marking for ease of installation
- Maximim RFI & EMI protection

- UL PLTC-ER
- Oil- and UV-resistant jacket (Oil Res I)
- Extended temperature rating of -40°C to +105°C
- Flexible design for ease of routing
- Suitable for use in cable tray
- Sequential foot marking for ease of installation

- Wide application range due to multiple certifications
- UL PLTC (power limited tray cable) for protected use on cable trays
- UL Oil Res I
- Suitable for EtherNet/IP applications

- UL PLTC
- Double screening ensures high transmission reliability in areas with EMI
- Flame retardant
- Highly oil- and abrasion-resistant PUR jacket
- Conforms to PROFINET® Standard
- Fast connect style allows for quick installation

MARKETS

Process control
Electrical equipment
Industrial machinery

Process control
Electrical equipment
Industrial machinery

Industrial machinery
Plant infrastructure

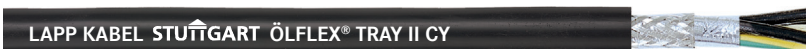
Stationary applications
Industrial field and cell lever networking
PLCs, sensors, and other network devices



LAPP GROUP

ÖLFLEX® TRAY II/TRAY II CY

Extremely Oil-Resistant & Flexible Tray Cable with UL & CSA; Unshielded and Shielded



ÖLFLEX® TRAY II is an industrial grade tray cable with superior oil performance for long cable life. It has a pressure-extruded jacket and fine copper stranding for excellent flexibility, making it much easier to pull through tray. With UL TC-ER approval, no conduit is needed so you can reduce material costs along with saving on labor. ÖLFLEX® TRAY II CY has Lapp's new double laminated foil tape and tinned copper braid shield for improved effectiveness.

Recommended Applications

Industrial plant expansions; automotive plants; tray wiring; anywhere VNTC® cables are used

Approvals



Cable Attributes, see page 22			
OR-03	FR-03	WT-02	MP-03
OIL	FLAME	MOTION	MECHANICAL

Similar Cables

- ÖLFLEX® CONTROL TM/CONTROL TM CY
- ÖLFLEX® TC 600/600 S

Complete the Installation



Technical Data

Minimum Bend Radius: - for installation: - < 1 AWG: 4 x cable diameter - ≥ 1 AWG: 6 x cable diameter - shielded: 6 x cable diameter	Color Code: Black with white numbers, plus green/yellow ground
Temperature Range: - UL/CSA TC: -25°C to +90°C - for stationary use: -40°C to +105°C - for flexible use: -25°C to +105°C	Approvals: UL: TC-ER per UL 1277 MTW per UL 1063 WTTC per UL 2277 Submersible Pump (14 AWG & larger) PLTC-ER per UL 13 (18 - 12 AWG) ITC-ER per UL 2250 (18 - 12 AWG) DP-1 per UL 1690 AWM 20886 Attributes: UL Oil Res I/II 75°C Wet; 90°C Dry Sunlight Resistant Direct Burial NFPA 79 NEC: Class 1 Division 2 per NEC Article 501 Canada: c(UL) CIC/TC FT4 (18 - 4/0 AWG) CSA AWM I/II A/B FT4 Additional: Torsion Rated for Wind Market (± 90°/m) & (± 150°/m) CE & RoHS MSHA: P07-KA050016-MSHA (shielded only)
Nominal Voltage: - UL/CSA TC: 600V - UL WTTC/CSA AWM: 1000V	
Test Voltage: 2000V	
Conductor Stranding: - 18-6 AWG: Class 5 fine wire* - 4-2 AWG: Class K fine wire - 1 AWG - 500 KCMIL: Stranded wire * 18 AWG meets only Class 5 cross section and DC resistance.	

VNTC® is a registered trademark of General Cable.

ÖLFLEX® TRAY II

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
18 AWG (1.00 mm²)						10 AWG (6 mm²)					
221803	3	0.297 7.5	20	57	S2111	221003	3	0.498 12.6	117	218	S2116
221804	4	0.320 8.1	26	66	S2111	221004	4	0.578 14.7	155	264	S2121
221805	5	0.346 8.8	33	77	S2111	221005	5	0.631 16.0	194	317	S2121
221807	7	0.373 9.5	46	99	S2111	221007	7	0.686 17.4	271	445	S2129
221809	9	0.429 10.9	59	112	S2113	8 AWG (10 mm²)					
221812	12	0.477 12.1	79	172	S2116	220804	4	0.703 17.9	258	384	S2129
221818	18	0.587 14.9	118	245	S2121	220805	5	0.772 19.6	323	518	S2129
221825	25	0.664 16.9	164	322	S2121	6 AWG (16 mm²)					
221850	50	0.939 23.9	303	646	S2129	220603	3	0.776 19.7	310	454	S2129
16 AWG (1.50 mm²)						220604	4	0.899 22.8	413	580	S2129
221603	3	0.325 8.3	29	68	S2111	220605	5	0.982 24.9	517	725	S2136
221604	4	0.351 8.9	39	84	S2111	4 AWG (21 mm²)					
221605	5	0.381 9.7	49	99	S2113	220403	3	0.999 25.3	386	919	S2136
221607	7	0.412 10.5	68	128	S2113	220404	4	1.094 27.8	544	952	S2136
221608	8	0.444 11.3	78	137	S2113	2 AWG (33.7 mm²)					
221609	9	0.476 12.1	88	172	S2116	220203	3	1.155 29.3	658	2577	S2136
221612	12	0.565 14.4	117	220	S2121	220204	4	1.272 32.3	859	1320	S2248
221616	16	0.621 15.8	155	271	S2121	1 AWG (42.3 mm²)					
221618	18	0.652 16.6	175	289	S2121	220104	4	1.400 35.6	1065	1563	S2142
221625	25	0.741 18.8	242	397	S2129	1/0 AWG (52.9 mm²)					
221634	34	0.904 23.0	296	540	S2129	221104	4	1.466 37.2	1302	1920	S2142
221641	41	0.986 25.0	357	626	S2136	2/0 AWG (67.3 mm²)					
221650	50	1.048 26.6	436	760	S2136	222204	4	1.674 42.5	1720	2369	S2148
221661	61	1.085 27.6	533	771	S2136	3/0 AWG (84.8 mm²)					
14 AWG (2.50 mm²)						223304	4	1.695 43.1	2185	3020	S2148
221403	3	0.362 9.2	49	88	S2111	4/0 AWG (106.7 mm²)					
221404	4	0.392 10.0	65	106	S2113	224404	4	2.059 52.3	2695	3597	53112080*
221405	5	0.427 10.8	81	128	S2113	250 KCMIL (128.4 mm²)					
221407	7	0.463 11.8	113	170	S2116	221504	4	2.167 55.0	3211	4221	531112511*
221409	9	0.571 14.5	146	225	S2121	350 KCMIL (181.9 mm²)					
221412	12	0.636 16.2	194	309	S2121	223504	4	2.501 63.5	4542	6004	53112510*
221418	18	0.737 18.7	290	439	S2129	500 KCMIL (257.6 mm²)					
221425	25	0.886 22.5	404	586	S2129	225004	4	2.902 73.7	6410	8233	53112512*
12 AWG (4 mm²)											
221203	3	0.423 10.7	78	126	S2113						
221204	4	0.460 11.7	104	152	S2113						
221205	5	0.503 12.8	129	187	S2116						
221207	7	0.581 14.8	181	258	S2121						

* SKINTOP® MS-M: nickel-plated brass with metric thread.

ÖLFLEX® TRAY II CY

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
18 AWG (1.00 mm²)						12 AWG (4 mm²)					
2218030	3	0.322 8.2	29	79	53112220	2212040	4	0.491 12.5	126	212	53112240
2218040	4	0.346 8.8	38	93	53112220	2212050	5	0.568 14.4	157	260	53112250
2218050	5	0.371 9.4	45	99	53112230	2212070	7	0.612 15.5	209	335	53112250
2218070	7	0.398 10.1	59	130	53112230	10 AWG (6 mm²)					
2218120	12	0.508 12.9	101	223	53112240	2210040	4	0.609 15.5	183	370	53112250
2218180	18	0.618 15.7	145	295	53112250	2210050	5	0.662 16.8	224	412	53112250
2218250	25	0.695 17.7	238	386	53112260	2210070	7	0.717 18.2	308	575	53112260
16 AWG (1.50 mm²)						8 AWG (10 mm²)					
2216030	3	0.350 8.9	41	97	53112220	2208040	4	0.737 18.7	295	575	53112260
2216040	4	0.376 9.6	51	117	53112230	6 AWG (16 mm²)					
2216050	5	0.406 10.3	63	128	53112230	2206040	4	0.918 23.3	470	811	53112260
2216070	7	0.443 11.3	88	165	53112240	4 AWG (21 mm²)					
2216120	12	0.596 15.1	144	287	53112250	2204040	4	1.127 28.6	579	1331	53112270
2216180	18	0.683 17.3	210	346	53112260	2 AWG (33.7 mm²)					
2216250	25	0.772 19.6	280	430	53112260	2202040	4	1.309 33.2	950	1951	53112670†
14 AWG (2.50 mm²)											
2214030	3	0.387 9.8	62	121	53112230						
2214040	4	0.423 10.7	85	150	53112230						
2214050	5	0.458 11.6	101	181	53112240						
2214070	7	0.494 12.5	136	220	53112240						
2214120	12	0.667 16.9	225	399	53112250						
2214180	18	0.768 19.5	328	527	53112260						
2214250	25	0.917 23.3	461	705	53112260						

† SKINTOP® MS-SC with metric thread.

Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available.
For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.



ÖLFLEX® CONTROL TM/TM CY

Extremely Oil-Resistant Flexible Control Cable with UL MTW & UL/CSA TC; Unshielded & Shielded



ÖLFLEX® CONTROL TM is a multi-conductor cable designed for use on machine tool equipment and other industrial machinery conforming to NFPA 79. ÖLFLEX® CONTROL TM is also UL/CSA TC approved so it can be routed in tray as well. ÖLFLEX® CONTROL TM CY has foil tape and a tinned copper braid shield for improved effectiveness against noise and interference.

Recommended Applications

Machine tool machinery; food & beverage; processing equipment; machine wiring for conformance to NFPA 79

Approvals



Unshielded Construction

Conductors: Finely stranded bare copper

Insulation: Specially blended PVC/nylon

Jacket: Specially formulated gray thermoplastic polymer

Shielded Construction

Conductors: Finely stranded bare copper

Insulation: Specially blended PVC/nylon

Shielding: Foil tape and tinned copper braid (85% coverage)

Jacket: Specially formulated gray thermoplastic polymer

Application Advantage








- Industrial grade jacket (Oil Res I/II)
- Conforms to NFPA 79 standards for wiring machinery (UL MTW)
- Gray jacket and number-coded for easy connection
- UL TC-ER approval so it can be installed off the machine and into an overhead tray without conduit
- Flexible copper stranding and pressure-extruded jacket, improved shielding effectiveness

Cable Attributes, see page 22			
OR-03	FR-03	WT-02	MP-03
OIL	FLAME	MOTION	MECHANICAL

Similar Cables
<ul style="list-style-type: none"> • ÖLFLEX® 190/190 CY • ÖLFLEX® TRAY II/TRAY II CY

Complete the Installation	
SKINTOP® Strain Relief	EPIC® Connectors

Technical Data:

	Minimum Bend Radius: - for installation: 4 x cable diameter - shielded: 6 x cable diameter		Approvals: UL: TC-ER per UL 1277 MTW per UL 1063 WTTC per UL 2277 Bus Drop Cable (14 AWG & larger; 3c & 4c only) AWM 2587 & 21098 (Oil)
	Temperature Range: - UL/CSA TC: -25°C to +90°C - for stationary use: -40°C to +105°C - for flexible use: -25°C to +90°C	Attributes: UL Oil Res I/II 75°C Wet; 90°C Dry Sunlight Resistant Direct Burial NFPA 79 NEC: Class 1, Division 2 per NEC Article 501 Canada: c(UL) CIC/TC FT4 CSA AWM I/II A/B FT4	Additional: Torsion rated for Wind Market (± 90°/m) & (± 150°/m) Passes Impact and Crush test per UL 1277 (excluding 20 AWG) CE & RoHS
	Nominal Voltage: - UL/CSA TC: 600V - UL WTTC: 1000V		
	Test Voltage: 2000V		
	Conductor Stranding: Class 5 fine wire* * 18 AWG meets only Class 5 cross section and DC resistance.		
	Color Code: Black with white numbers, plus green/yellow ground		

Photographs are not to scale and are not true representations of the products in question.

For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.

ÖLFLEX® CONTROL TM

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
18 AWG (1.00 mm²)						14 AWG (2.50 mm²)					
281803	3	0.291 7.4	20	55	S1111	281403*	3	0.356 9.0	49	88	S1111
281804	4	0.315 8.0	26	64	S1111	281404*	4	0.386 9.8	65	106	S1113
281805	5	0.340 8.6	33	75	S1111	281405	5	0.421 10.7	81	123	S1113
281807	7	0.367 9.3	46	97	S1111	281407	7	0.457 11.6	113	163	S1113
281809	9	0.423 10.7	59	108	S1113	281409	9	0.563 14.3	146	218	S1121
281812	12	0.471 12.0	79	165	S1116	281412	12	0.628 16.0	194	298	S1121
281818	18	0.579 14.7	118	245	S1121	281419	19	0.729 18.5	307	450	S1129
281819	19	0.579 14.7	124	262	S1121	281425	25	0.872 22.1	404	569	S1129
281825	25	0.656 16.7	164	311	S1121	12 AWG (4 mm²)					
16 AWG (1.50 mm²)						281203*	3	0.417 10.6	78	110	S1113
281603	3	0.319 8.1	29	66	S1111	281204*	4	0.454 11.5	104	148	S1113
281604	4	0.345 8.8	39	79	S1111	281205	5	0.497 12.6	129	181	S1116
281605	5	0.375 9.5	48	95	S1111	281207	7	0.573 14.6	181	324	S1121
281607	7	0.406 10.3	68	123	S1113	281209	9	0.665 16.9	233	359	S1121
281609	9	0.470 11.9	88	165	S1116	10 AWG (6 mm²)					
281612	12	0.557 14.1	116	214	S1121	281003*	3	0.492 12.5	117	194	S1116
281618	18	0.644 16.4	175	289	S1121	281004*	4	0.570 14.5	155	256	S1121
281619	19	0.644 16.4	184	293	S1121	281005	5	0.623 15.8	194	306	S1121
281625	25	0.733 18.6	242	311	S1129	281007	7	0.678 17.2	271	430	S1121
						281009	9	0.791 20.1	349	549	S1129

* Cable meets UL Bus Drop Approval.

ÖLFLEX® CONTROL TM CY

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
18 AWG (1.00 mm²)						14 AWG (2.50 mm²)					
281803CY	3	0.316 8.0	37	79	53112220	281403CY*	3	0.381 9.7	71	121	53112230
281804CY	4	0.339 8.6	41	93	53112220	281404CY*	4	0.411 10.4	91	150	53112230
281805CY	5	0.365 9.3	55	99	53112220	281405CY	5	0.452 11.5	108	181	53112240
281807CY	7	0.392 10.0	69	130	53112230	281407CY	7	0.488 12.4	143	220	53112240
281812CY	12	0.502 12.8	109	223	53112240	281412CY	12	0.659 16.7	246	399	53112250
281819CY	19	0.610 15.5	172	295	53112250	281419CY	19	0.760 19.3	369	527	53112260
281825CY	25	0.687 17.4	222	386	53112260	281425CY	25	0.903 22.9	474	705	53112260
16 AWG (1.50 mm²)						12 AWG (4 mm²)					
281603CY	3	0.344 8.7	44	97	53112220	281203CY*	3	0.448 11.4	104	161	53112240
281604CY	4	0.370 9.4	60	117	53112230	281204CY*	4	0.485 12.3	133	212	53112240
281605CY	5	0.400 10.2	72	128	53112230	281205CY	5	0.560 14.2	163	260	53112250
281607CY	7	0.437 11.1	94	165	53112230	281207CY	7	0.604 15.3	217	452	53112250
281612CY	12	0.588 14.9	151	287	53112250	10 AWG (6 mm²)					
281618CY	18	0.675 17.1	227	326	53112260	281003CY*	3	0.555 14.1	150	271	53112250
281625CY	25	0.764 19.4	305	476	53112260	281004CY*	4	0.601 15.3	191	370	53112250
						281005CY	5	0.654 16.6	245	412	53112250
						281007CY	7	0.709 18.0	330	575	53112260

* Cable meets UL Bus Drop Approval.

Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available.
For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.



LAPP GROUP

ÖLFLEX® TRAY VTC

Flexible Tray Cable with TC-ER for Easier Installation



ÖLFLEX® TRAY VTC is a multi-conductor cable approved for use in cable trays. It is UL TC-ER & CSA CIC, making it perfect for new plant installations and factory expansions. Premium PVC insulation provides greater flexibility over PVC/nylon without sacrificing cable size.

Recommended Applications

Plant expansion; contractor markets; A&E firm plant designs; tray wiring; anywhere VNTC® cables are used

Approvals



Unshielded Construction

Conductors: Finely stranded bare copper

Insulation: Specially formulated PVC

Jacket: Specially formulated black PVC

Application Advantage

- Easier to pull than standard tray cable
- UL TC-ER approval reduces material costs; no conduit is needed
- Black numbered conductors with printed color code for easy identification
- UV-resistant and direct burial
- UL wet rating 90°C
- PVC insulation provides greater flexibility over PVC/nylon

Cable Attributes, see page 22			
OR-02	FR-03	FL-01	MP-03
OIL	FLAME	MOTION	MECHANICAL

Complete the Installation	
	SKINTOP® Strain Relief
	EPIC® Connectors

Technical Data

	Minimum Bend Radius:		Approvals:	UL:	TC-ER per UL 1277
	- for installation:			WTTC per UL 2277	AWM 20886
	Temperature Range:			Attributes:	UL Oil Res I
	- UL TC/c(UL) CIC:				90°C Wet; 90°C Dry
	- for flexible use:				Sunlight Resistant
	- for stationary use:				Direct Burial
	Nominal Voltage:			NEC:	Class 1 Division 2 per NEC Article 501
	- UL TC:			Canada:	c(UL) CIC FT4
	- UL WTTC:				cRU AWM I/II A/B FT4
	- UL AWM/cRU AWM:			Additional:	CE & RoHS
	Test Voltage:				2000V
	Conductor Stranding:				Class B stranded wire
	Color Code:				Black with white numbers, and color name per color chart ICEA-NEMA (K-2): Chart 10, page 21, plus green/yellow ground

VNTC® is a registered trademark of General Cable.

Photographs are not to scale and are not true representations of the products in question.

For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.

ÖLFLEX® TRAY VTC

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter		Copper Weight	Approx. Weight	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter		Copper Weight	Approx. Weight	SKINTOP® Non-Metallic PG Thread
		(in)	(mm)	(lbs/mft)	(lbs/mft)				(in)	(mm)	(lbs/mft)	(lbs/mft)	
18 AWG (7 strand)							12 AWG (19 strand)						
201803	3	0.286	7.3	16	46	S2111	201203	3	0.381	9.7	64	106	S2113
201804	4	0.307	7.8	21	56	S2111	201204	4	0.413	10.5	85	110	S2113
201805	5	0.332	8.4	26	67	S2111	201205	5	0.451	11.5	106	164	S2113
201807	7	0.358	9.1	37	84	S2111	201207	7	0.490	12.4	149	217	S2116
201809	9	0.411	10.4	48	106	S2113	201212	12	0.673	17.1	255	378	S2129
201812	12	0.458	11.6	63	133	S2116	201216	16	0.743	18.9	341	488	S2129
201818	18	0.562	14.3	95	204	S2121	10 AWG (19 strand)						
201819	19	0.562	14.3	101	211	S2121	201003	3	0.433	11.0	102	150	S2116
201825	25	0.636	16.2	132	267	S2121	201004	4	0.471	12.0	136	193	S2116
16 AWG (7 strand)							201005	5	0.516	13.1	170	236	S2121
201603	3	0.312	7.9	26	59	S2111	201007	7	0.594	15.1	238	333	S2129
201604	4	0.336	8.5	34	73	S2111	8 AWG (19 strand)						
201605	5	0.365	9.3	43	87	S2111	200804	4	0.621	15.8	217	320	S2121
201607	7	0.394	10.0	60	112	S2113	200805	5	0.680	17.3	271	392	S2129
201608	8	0.424	10.8	68	127	S2113	6 AWG (19 strand)						
201609	9	0.455	11.6	77	142	S2116	200604	4	0.756	19.2	343	484	S2129
201612	12	0.508	12.9	103	180	S2121	200605	5	0.871	22.1	429	629	S2129
201616	16	0.593	15.1	137	249	S2121							
201618	18	0.622	15.8	154	275	S2129							
201619	19	0.622	15.8	162	284	S2129							
201625	25	0.706	17.9	214	363	S2129							
14 AWG (19 strand)													
201403	3	0.344	8.7	40	78	S2111							
201404	4	0.372	9.4	54	98	S2111							
201405	5	0.405	10.3	67	118	S2113							
201407	7	0.439	11.2	94	154	S2113							
201409	9	0.509	12.9	121	197	S2121							
201412	12	0.602	15.3	161	269	S2129							
201418	18	0.697	17.7	242	381	S2129							
201419	19	0.697	17.7	255	396	S2129							
201425	25	0.794	20.2	335	508	S2129							

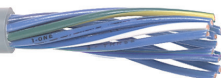
Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available.
For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.



ÖLFLEX® AUTO-I

Heavy Duty, Flexible Tray Cable with Colored Conductors for DC or AC Control Wiring

LAPP KABEL STUTTGART ÖLFLEX® AUTO-I



ÖLFLEX® AUTO-I is a UV-resistant, multi-conductor cable designed for use on machine tool equipment and other industrial machinery conforming to NFPA 79 wiring norms. ÖLFLEX® AUTO-I is color-coded with either blue, red, yellow, orange, or black conductors for DC, AC, and other control wiring.

Construction

Conductors: Finely stranded bare copper

Insulation: Specially formulated PVC/nylon

Jacket: Specially formulated gray thermoplastic elastomer (TPE)

Recommended Applications

Machine tool machinery; food & beverage; processing equipment; automotive and machine wiring for conformance to NFPA 79

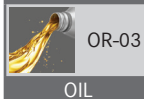
Application Advantage

- UL TC-ER & CSA CIC/TC approval
- Number coded for easy wiring with either blue, red, orange, black, or yellow conductors

Approvals



Cable Attributes, see page 22



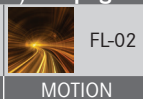
OR-03

OIL



FR-03

FLAME



FL-02

MOTION



MP-03

MECHANICAL

Similar Cables

- ÖLFLEX® TRAY II
- ÖLFLEX® CONTROL TM

Complete the Installation



SKINTOP®
Strain Relief



EPIC®
Connectors

Technical Data

Minimum Bend Radius: 4 x cable diameter

Temperature Range:

- UL/CSA TC: -25°C to +90°C
- for flexible use: -25°C to +105°C
- for stationary use: -40°C to +105°C

Nominal Voltage:

- UL/CSA TC: 600V
- UL WTTC: 1000V

Test Voltage:

2000V

Conductor Stranding:

Class K fine wire

Color Code:

- up to 3c:

- 4c & higher (blue):
- 4c & higher (red):
- 4c & higher (yellow):

Color & number-coded, plus green/
yellow ground (black and blue have
white numbers)

No. 2 conductor is white/blue

No. 2 conductor is white

No. 2 conductor is white/yellow

Approvals:

UL: TC-ER per UL 1277

WTTC per UL 2277

Attributes: UL Oil Res I

75°C Wet; 90°C Dry

Sunlight Resistant

Direct Burial

NFPA 79

NEC: Class 1 Division 2 per NEC Article 501

Canada: c(UL) CIC/TC FT4

CSA AWM I/II A/B FT4

Additional: CE & RoHS

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
18 AWG (1.00 mm²)							16 AWG (1.50 mm²)						
251803IB	3	0.297	7.5	20	57	S1111	251603IB	3	0.323	8.2	26	66	S1111
251805IB	5	0.346	8.7	33	77	S1111	251607IB	7	0.409	10.4	60	126	S1113
251807IB	7	0.373	9.4	46	99	S1111	251611IB	11	0.541	13.7	94	203	S1121
251811IB	11	0.463	11.8	71	156	S1116	251612IB	12	0.557	14.1	103	218	S1121
251812IB	12	0.477	12.1	78	172	S1116	251617IB	17	0.638	16.1	145	256	S1121
251819IB	19	0.583	14.8	123	253	S1121	251619IB	19	0.643	16.3	162	284	S1121
251825IB	25	0.677	17.2	162	322	S1121	251625IB	25	0.737	18.7	213	397	S1129
251833IB	33	0.736	18.7	200	397	S1129	251633IB	33	0.816	20.7	270	489	S1129
251842IB	42	0.818	20.7	254	509	S1129	251642IB	42	0.950	24.1	343	628	S1129
251849IB	49	0.908	23.0	317	617	S1129	251649IB	49	1.005	25.5	401	760	S1136
251865IB	65	1.011	25.6	420	688	S1136	251665IB	65	1.123	28.5	531	1005	S1136

Part numbers shown are for blue conductors. For other colors, replace the 'B' with an 'R' for red, 'Y' for yellow, 'O' for orange, or 'K' for black conductors.

Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available. Photographs are not to scale and are not true representations of the products in question. For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.

300V PLTC ITC Instrumentation Cable with Individually Shielded Pairs/Triads; Overall Shield



I 304 is an instrumentation cable rated for UL CMG, PLTC & ITC and CSA CMG. It is available with individually shielded pairs and triads and has an overall foil shield.

Construction

Conductors: Bare copper

Insulation: PVC insulation (cabled pairs or triads); individually foil-shielded pairs or triads with a tinned copper drain wire; orange PVC communication wire*

Shield: Overall foil shield with a tinned copper drain wire (100% coverage)

Jacket: Specially blended black PVC

*Not required for single pair/triad construction.

Recommended Applications




Petrochem processing; machine control; oil & gas refining; low voltage control wiring

Application Advantage

- UL/CSA rated 300 V
- Passes UL & CSA Flame Test (70,000 BTU)
- Sunlight & UV resistant, Direct Burial
- Rated 105°C

Approvals



Cable Attributes, see page 22			
 OR-01	 FR-03	 FL-01	 MP-01
OIL	FLAME	MOTION	MECHANICAL

Similar Cables

- UNITRONIC® 300 STP

Complete the Installation





SKINTOP®
Strain Relief




EPIC®
Connectors


Technical Data


 **Minimum Bend Radius:** 8 x cable diameter

 **Temperature Range:**
- for stationary use: -30°C to +105°C
- for flexible use: -10°C to +105°C

 **Nominal Voltage:** 300V

 **Test Voltage:** 1500V

 **Conductor Stranding:** Class B stranded wire

 **Color Code:**
- Pairs: Black & white with printed numbers
- Triads: Black, white, red with printed numbers

Approvals:

UL: CMG per UL 444

PLTC per UL 13

ITC per UL 2250

AWM 2464

Attributes: Sunlight Resistant

Direct Burial

NFPA 79

Canada: CSA CMG FT4

CSA AWM I/II A/B FT4

CSA C22.2 No.214

CSA C22.2 No. 210

I 304: Pairs

Part Number	Number of Pairs	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Pairs	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
20 AWG							16 AWG						
2221312	1	0.213	5.4	10	25	S2107	2221297	1	0.257	6.5	22	46	S2109
2221313	2	0.327	8.3	24	54	S2111	2221298	2	0.450	11.4	53	114	S2113
2221314	8	0.514	13.1	79	141	S2116	2221299	3	0.481	12.2	78	138	S2116
2221315	12	0.637	16.2	116	207	S2121	2221300	4	0.512	13.0	96	164	S2116
18 AWG							2221301	6	0.600	15.2	139	218	S2121
2221285	1	0.233	5.9	15	36	S2107	2221302	8	0.687	17.4	181	281	S2129
2221286	2	0.408	10.4	37	81	S2113	2221303	12	0.822	20.9	267	386	S2129
2221287	4	0.468	11.9	67	125	S2116	2221304	16	0.936	23.8	352	507	S2129
2221288	6	0.530	13.5	96	163	S2116	2221305	24	1.149	29.2	523	714	S2136
2221289	8	0.594	15.1	125	196	S2121							
2221290	12	0.737	18.7	183	283	S2129							
2221291	16	0.836	21.2	241	350	S2129							

I 304: Triads

Part Number	Number of Triads	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Triads	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
18 AWG							16 AWG						
2221292	1	0.236	6.0	21	45	S2107	2221306	1	0.271	6.9	30	59	S2109
2221293	2	0.450	11.4	48	116	S2113	2221307	2	0.506	12.9	67	150	S2116
2221294	4	0.533	13.5	89	167	S2121	2221308	4	0.569	14.5	127	224	S2121
2221295	6	0.593	15.1	129	221	S2121	2221309	6	0.666	16.9	186	316	S2121
2221296	8	0.654	16.6	169	284	S2121	2221310	8	0.704	17.9	244	389	S2129
							2221311	12	1.000	25.4	361	563	S2136

UNITRONIC® 300/300 S

Multi-Conductor, 300V Flexible Industrial Signal & Control Cable; Unshielded & Shielded

Control Cable (20 AWG - 16 AWG)

LAPP KABEL STUTTGART UNITRONIC® 300

Signal Cable (24 AWG - 22 AWG)

LAPP KABEL STUTTGART UNITRONIC® 300

Control Cable (20 AWG - 16 AWG)

LAPP KABEL STUTTGART UNITRONIC® 300 S

Signal Cable (24 AWG - 22 AWG)

LAPP KABEL STUTTGART UNITRONIC® 300 S

UNITRONIC® 300/300 S is a rugged, multi-conductor, low voltage control and signal cable for internal and external wiring of OEM equipment for industrial applications. The jacket is very oil resistant and is pressure-extruded for improved flexibility and easier installation. UNITRONIC® 300 S has a foil tape and tinned copper braid shield for maximum RFI & EMI protection.

Recommended Applications

Process control; electrical equipment; industrial machinery; low-voltage control interconnect

Approvals



Unshielded Construction

Conductors: Finely stranded tinned copper

Insulation: Blended PVC

Jacket: Oil-resistant gray PVC

Shielded Construction

Conductors: Finely stranded tinned copper

Insulation: Blended PVC

Shielding: Tri-laminate foil shield and tinned copper braid (75% coverage); drain wire

Jacket: Oil-resistant gray PVC

Application Advantage

- Extended temperature rating of -40°C to +105°C
- Flexible design for ease of routing
- Suitable for use in cable tray
- Oil- and UV-resistant jacket (Oil Res I)
- Sequential foot marking for ease of installation

Cable Attributes, see page 22



Similar Cables

- UNITRONIC® 190/190 CY

Complete the Installation



Technical Data

Minimum Bend Radius: - for installation: 4 x cable diameter - shielded: 6 x cable diameter	Temperature Range: - for stationary use: -40°C to +105°C - for flexible use: -25°C to +105°C	Nominal Voltage: 300V	Test Voltage: 1500V	Conductor Stranding: Fine wire	Color Code: - 24 - 22 AWG: Chart 4, page 21 - 20 - 16 AWG: Chart 5, page 21	Approvals:	UL: CMG per UL 444 PLTC-ER per UL 13 ITC-ER per UL 2250 AWM 2464
							Attributes: UL Oil Res I -40°C Cold Bend; -25°C Cold Impact Sunlight Resistant Direct Burial NEC: Meets NEC Art. 725 & 800 Class 1 Division 2 (PLTC only) Canada: c(UL) CMG FT4 CSA AWM I/II A/B FT1 Additional: 18 & 16 AWG rated PLTC-ER & ITC-ER CE & RoHS

Photographs are not to scale and are not true representations of the products in question. For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.



UNITRONIC® 300

Part Number	Number of Conductors	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread	Part Number	Number of Conductors	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
22 AWG (0.38 mm ²)							18 AWG (1.00 mm ²)						
302202	2	0.179	4.5	5	15	S1107	301802	2	0.241	6.1	12	42	S1107
302203	3	0.187	4.7	7	20	S1107	301803	3	0.254	6.5	18	44	S1109
302204	4	0.200	5.1	10	22	S1107	301804	4	0.285	7.2	24	53	S1111
302206	6	0.229	5.8	15	31	S1107	301806	6	0.333	8.5	36	68	S1111
302208	8	0.245	6.2	19	37	S1107	301808	8	0.358	9.1	47	95	S1111
302210	10	0.289	7.3	24	44	S1111	301810	10	0.437	11.1	61	130	S1113
302215	15	0.324	8.2	36	62	S1111	301815	15	0.494	12.5	91	165	S1116
302220	20	0.355	9.0	47	99	S1111	301820	20	0.544	13.8	121	220	S1121
302225	25	0.414	10.5	59	126	S1113	301825	25	0.629	16.0	151	276	S1121
20 AWG (0.62 mm ²)							16 AWG (1.32 mm ²)						
302002	2	0.225	5.7	8	37	S1107	301602	2	0.263	6.7	17	55	S1109
302003	3	0.237	6.0	12	40	S1107	301603	3	0.288	7.3	25	60	S1111
302004	4	0.256	6.5	15	51	S1109	301604	4	0.312	7.9	33	75	S1111
302006	6	0.308	7.8	23	66	S1111	301606	6	0.366	9.3	49	110	S1111
302008	8	0.331	8.4	30	90	S1111	301608	8	0.417	10.6	65	163	S1113
302010	10	0.381	9.7	38	97	S1113	301610	10	0.481	12.2	82	181	S1116
302015	15	0.452	11.5	57	121	S1113	301615	15	0.546	13.9	122	242	S1121
302020	20	0.497	12.6	76	174	S1116	301620	20	0.603	15.3	163	331	S1121
302025	25	0.554	14.1	94	238	S1121	301625	25	0.696	17.7	204	410	S1129

UNITRONIC® 300 S

Part Number	Number of Conductors	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	Part Number	Number of Conductors	Nominal Outer Diameter (in) (mm)		Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
22 AWG (0.38 mm²)							18 AWG (1.00 mm²)						
302202S	2	0.202	5.1	13	22	53112210	301802S	2	0.266	6.8	25	53	53112210
302203S	3	0.210	5.3	16	26	53112210	301803S	3	0.289	7.3	33	57	53112220
302204S	4	0.223	5.7	19	31	53112210	301804S	4	0.310	7.9	41	68	53112220
302206S	6	0.252	6.4	25	42	53112210	301806S	6	0.358	9.1	55	88	53112220
302208S	8	0.278	7.1	30	48	53112210	301808S	8	0.383	9.7	69	115	53112230
302210S	10	0.312	7.9	37	57	53112220	301810S	10	0.469	11.9	88	154	53112240
302215S	15	0.347	8.8	52	77	53112220	301815S	15	0.525	13.3	121	196	53112240
302220S	20	0.378	9.6	64	95	53112230	301820S	20	0.575	14.6	157	256	53112250
302225S	25	0.445	11.3	81	117	53112240	301825S	25	0.660	16.8	189	311	53112250
20 AWG (0.62 mm²)							16 AWG (1.32 mm²)						
302002S	2	0.248	6.3	19	48	53112210	301602S	2	0.298	7.6	34	66	53112220
302003S	3	0.260	6.6	23	51	53112210	301603S	3	0.313	8.0	43	79	53112220
302004S	4	0.289	7.3	27	62	53112220	301604S	4	0.337	8.6	52	95	53112220
302006S	6	0.331	8.4	35	79	53112220	301606S	6	0.413	10.5	71	141	53112230
302008S	8	0.354	9.0	46	106	53112220	301608S	8	0.448	11.4	91	181	53112240
302010S	10	0.426	10.8	56	115	53112230	301610S	10	0.512	13.0	114	209	53112240
302015S	15	0.483	12.3	77	143	53112240	301615S	15	0.577	14.7	157	342	53112250
302020S	20	0.528	13.4	88	203	53112240	301620S	20	0.654	16.6	201	401	53112250
302025S	25	0.585	14.9	104	271	53112250	301625S	25	0.727	18.5	247	496	53112260

Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available.

For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.

UNITRONIC® 300 STP

Multi-Pair, 300V Flexible Industrial Communication & Signal Cable; Shielded

LAPP KABEL STUTTGART UNITRONIC® 300 STP



UNITRONIC® 300 STP is a multi-pair, low voltage communication, signal, and control cable with an overall shield for internal and external wiring of OEM equipment for industrial applications. The jacket is very oil resistant and is pressure-extruded for improved flexibility and easier installation. UNITRONIC® 300 STP has an overall foil tape and tinned copper braid shield for maximum RFI & EMI protection.

Recommended Applications

Process control; electrical equipment; industrial machinery; low-voltage control interconnect

Approvals



Construction

Conductors: Finely stranded tinned copper

Insulation: Blended PVC

Shielding: Foil tape and tinned copper braid
(75% coverage); drain wire

Jacket: Specially formulated gray PVC

Application Advantage

- Extended temperature rating of -40°C to +105°C
- Flexible design for ease of routing
- Suitable for use in cable tray
- Oil- and UV-resistant jacket (Oil Res I)
- Sequential foot marking for ease of installation

Cable Attributes, see page 22



Similar Cables

- UNITRONIC® 190 CY (TP)

Complete the Installation



Technical Data

Minimum Bend Radius: 6 x cable diameter

Temperature Range:
- for stationary use: -40°C to +105°C
- for flexible use: -25°C to +105°C

Nominal Voltage: 300V

Test Voltage: 1500V

Conductor Stranding: Fine Wire

Color Code: Chart 3, page 21
- 24 - 22 AWG single pair: Black & white

Approvals: UL: CMG per UL 444
PLTC-ER per UL 13
ITC-ER per UL 2250
AWM 2464
Attributes: UL Oil Res I
-40°C Cold Bend; -25°C Cold Impact
Sunlight Resistant
Direct Burial
NEC: Meets NEC Art. 725 & 800
Class 1 Division 2 (PLTC only)
Canada: cUL CMG FT4
CSA AWM I/II A/B FT1
Additional: 18 AWG rated PLTC-ER & ITC-ER
CE & RoHS

Part Number	Number of Pairs	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	Part Number	Number of Pairs	Nominal Outer Diameter (in) (mm)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
22 AWG (0.38 mm²)						18 AWG (1.00 mm²)					
302201STP*	1	0.202 5.1	13	26	53112210	301801STP	1	0.266 6.8	26	71	53112210
302202STP	2	0.278 7.1	23	35	53112210	301802STP	2	0.422 10.7	45	82	53112230
302203STP	3	0.305 7.7	26	48	53112220	301803STP	3	0.452 11.5	58	101	53112240
302206STP	6	0.379 9.6	47	84	53112230	301806STP	6	0.574 14.6	103	218	53112250
302209STP	9	0.459 11.7	64	130	53112240	301809STP	9	0.681 17.3	147	328	53112260
302215STP	15	0.553 14.0	96	165	53112250	301815STP	15	0.836 21.2	248	544	53112260
20 AWG (0.62 mm²)						16 AWG (1.32 mm²)					
302001STP	1	0.248 6.3	18	68	53112210	301601STP	1	0.298 7.6	34	68	53112220
302002STP	2	0.372 9.4	32	86	53112230						
302003STP	3	0.412 10.5	46	108	53112230						
302006STP	6	0.524 13.3	72	216	53112240						
302009STP	9	0.604 15.3	97	293	53112250						
302015STP	15	0.762 19.4	165	452	53112260						

* Pair is black & white

Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available. Photographs are not to scale and are not true representations of the products in question. For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.



ETHERLINE® TRAY CAT.5e; Flexible

Industrial Ethernet Cable for Flexible Applications



ETHERLINE® TRAY CAT.5e cables are designed for flexible applications. Designed with a foil and braid shield, the cable is protected against EMI and can be used in areas where reliable transmission is key.

Recommended Applications

Flexible applications, cable trays, industrial machinery, plant infrastructure

Approvals



Construction

Conductors: Stranded bare copper
Pairs: 4 pairs twisted together
Insulation: Thermoplastic-based insulation
Shielding: Foil and tinned copper braid
Jacket: Green PVC

Application Advantage

- Wide application range due to multiple certifications
- PLTC (power limited tray cable) for protected use on cable trays
- Suitable for EtherNet/IP applications

ÖLFLEX® CONNECT

Complete assemblies available from
ÖLFLEX® CONNECT



Complete the Installation



SKINTOP®
MS-SC

Technical Data

Minimum Bend Radius: - for stationary use: 10 x cable diameter - for flexible use: 15 x cable diameter	Color Code: White/blue & blue, white/orange & orange, white/green & green, white/brown & brown
Temperature Range: - for stationary use: -40°C to +80°C - for flexible use: -25°C to +80°C	Approvals: UL: UL Oil Res I CMR per UL 444 CMG per UL 444 PLTC per UL 13 AWM 2570 80°C 600V Canada: c(UL) CMG Additional: RoHS 2
Nominal Voltage: 600V (not for power applications)	
Characteristic Impedance: 100Ω ± 15Ω (1 – 100 MHz)	

Part Number	Size / Pairs	Stranding	Jacket Material	Jacket Color	Approvals	Fast Connect	Nominal Outer Diameter (in)	Nominal Outer Diameter (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
CAT.5e Cables										
2170450	22 AWG/4pr	7 wire	PVC	Green	UL CMR, UL AWM, 600V	No	0.380	9.6	77	53112230

ETHERLINE® 2 Pair: CAT.5; Stationary

Industrial Ethernet Cable for Stationary Applications

LAPP KABEL STUTTGART ETHERLINE® CAT.5

ETHERLINE® CAT.5 cables provide reliable network communication in demanding industrial environments. The high quality foil and braid shield assure protection from EMI. Cables meet the transmission requirements for Category 5.

Recommended Applications

Stationary applications; industrial field and cell level networking; PLCs, sensors, and other network devices; dry and damp rooms; transmission rates up to 10/100 Mbit/sec

Approvals



EtherCAT

Construction

Conductors: Solid bare copper

Pairs: 2 twisted pairs or star quad

Insulation: Polyethylene

Shielding: Foil and copper braid

Jacket: Green PVC; teal polyurethane or halogen-free

Application Advantage

- Double screening ensures high transmission reliability in areas with EMI
- Flame retardant
- Highly oil- and abrasion-resistant PUR jacket
- Conforms to PROFINET standard
- Fast connect style allows for quick installation

ÖLFLEX® CONNECT

Complete assemblies available from
ÖLFLEX® CONNECT



Cable Attributes, see page 22



Similar Cables

- ETHERLINE® 2 Pair: CAT.5/5e Flexible & Continuous Flex

Complete the Installation



RJ45
Connectors



Fast Connect
Stripping Tool

Technical Data

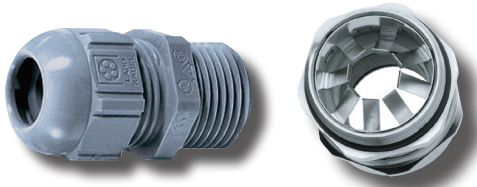
Minimum Bend Radius: - for stationary use:	10 x cable diameter	Color Code:	White, yellow, blue, orange
Temperature Range:	-40°C to +80°C	Approvals:	UL: AWM 21694 PLTC
Nominal Voltage:	600V (UL AWM) (not for power applications)	Canada:	c(UL) CMG
Characteristic Impedance:	100Ω ± 15Ω	Additional:	RoHS

Part Number	Size / Pairs	Stranding	Jacket Material	Jacket Color	Approvals	Fast Connect	Nominal Outer Diameter (in)	Nominal Outer Diameter (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
CAT.5 Cable										
2170893	22 AWG/2pr	Solid	PVC	Green	PROFINET, UL/CSA CMG, UL AWM, 600V	Yes	0.256	6.5	47	53112210

Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available. Photographs are not to scale and are not true representations of the products in question. For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.



LAPP GROUP



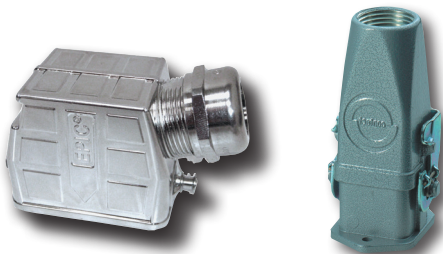
SKINTOP® Cable Glands

Secure connections are critical to reliable performance. SKINTOP® polyamide and metallic strain relief cable glands make cable termination fast and easy. SKINTOP® MS-SC and BRUSH metallic glands provide 360° grounded shielding for EMC protection.



EPIC® Circular Connectors

EPIC® CIRCON LS1 (power) and CIRCON M23 (control/feedback) series circular connectors are ideal for servo motor and general supply applications; ensuring quick and easy assembly, high reliability, and protection from wash down, vibration, and EMC. The result is long uninterrupted service in tough industrial environments.



EPIC® Rectangular Connectors

EPIC® rectangular connectors provide secure and reliable electrical connections for a wide variety of power, control, and data applications in harsh industrial environments. For the toughest industrial environments, EPIC® ULTRA HB housings have a hard, conductive, nickel surface finish with stainless steel latching hardware for strength, corrosion resistance, and EMC protection.



EPIC® Pin & Sleeve Connectors

EPIC® IEC60309 pin & sleeve connectors are designed to meet the power connectivity needs and safety requirements of North American and European industrial applications. Suitable for indoor and outdoor single- and three-phase power circuits, they are color coded and keyed to match the electrical supply. Choose from the cost-saving MULTIMAX series or the traditional CEE series.

Chart 3

Pair	Color	Pair	Color	Pair	Color
1	Black + red	7	Black + orange	13	Red + orange
2	Black + white	8	Red + white	14	Green + white
3	Black + green	9	Red + green	15	Green + blue
4	Black + blue	10	Red + blue	16	Green + yellow
5	Black + yellow	11	Red + yellow	17	Green + brown
6	Black + brown	12	Red + brown	18	Green + orange

Chart 4

Conductor	Color	Conductor	Color	Conductor	Color
1	Black	10	White	19	White/gray
2	Brown	11	White/black	20	White/black/brown
3	Red	12	White/brown	21	White/black/red
4	Orange	13	White/red	22	White/black/orange
5	Yellow	14	White/orange	23	White/black/yellow
6	Green	15	White/yellow	24	White/black/green
7	Blue	16	White/green	25	White/black/blue
8	Violet	17	White/blue		
9	Gray	18	White/violet		

Chart 5

Conductor	Color	Conductor	Color	Conductor	Color
1	Black	10	Gray	19	White/yellow
2	Red	11	Pink	20	White/blue
3	White	12	Tan	21	White/brown
4	Green	13	Red/green	22	White/orange
5	Orange	14	Red/yellow	23	White/gray
6	Blue	15	Red/black	24	White/violet
7	Brown	16	White/black	25	White/black/red
8	Yellow	17	White/red		
9	Violet	18	White/green		

Chart 10

Conductor	Print Legend	Conductor	Print Legend	Conductor	Print Legend	Conductor	Print Legend
1	1 - Black	7	Red/black	13	Blue/red	19	Orange/blue
2	2 - Red	8	Blue/black	14	Orange/red	20	Yellow/blue
3	3 - Blue	9	Orange/black	15	Yellow/red	21	Brown/blue
4	4 - Orange	10	Yellow/black	16	Brown/red	22	Black/orange
5	5 - Yellow	11	Brown/black	17	Black/blue	23	Red/orange
6	6 - Brown	12	Black/red	18	Red/blue	24	Blue/orange

The last conductor of the cable is always green/yellow (30% stripe width) with no printing.

Example:

Lapp part number 201812 is a 12-conductor cable. The base color for this cable is black and printed with white ink as follows:

1: black, 2: red, 3: blue, 4: orange, 5: yellow, 6: brown, 7: red/black, 8: blue/black, 9: orange/black, 10: yellow/black, 11: brown/black, 12: green/yellow





Oil Resistance

Level	USA	CSA*	Europe*
OR-00	Minimal oil resistance characteristics	—	—
OR-01	UL 758 In oil for 7 days @ 60°C 75% Unaged Tensile Strength 75% Unaged Elongation	C22.2 No. 49 In oil for 7 days @ 60°C 75% Unaged Tensile Strength 75% Unaged Elongation	VDE 0281 Part 1 In oil for 7 days @ 60°C ± 30% Unaged Tensile Strength ± 30% Unaged Elongation
OR-02	UL Oil Res. I In oil for 4 days @ 100°C 50% Unaged Tensile Strength 50% Unaged Elongation	C22.2 No. 230 In oil for 4 days @ 100°C 50% Unaged Tensile Strength 50% Unaged Elongation	VDE 0472 Sect. 803A In oil for 1 day @ 100°C ± 25% Unaged Tensile Strength ± 25% Unaged Elongation
OR-03	UL Oil Res. II In oil for 60 days @ 75°C 65% Unaged Tensile Strength 65% Unaged Elongation	C22.2 No. 210.2 In oil for 4 days @ 100°C 65% Unaged Tensile Strength 65% Unaged Elongation	SEV TP 20 B In oil for 30 days @ 70°C No cracking after bending
OR-04	UL AWM 21098 In oil for 60 days @ 80°C 65% Unaged Tensile Strength 65% Unaged Elongation	C22.2 No 0.3 In oil for 60 days @ 80°C 65% Unaged Tensile Strength 65% Unaged Elongation	VDE 0472 Sect. 803B In oil for 7 days @ 90°C ± 25% Unaged Tensile Strength ± 25% Unaged Elongation
OR-05	In oil for 4 weeks @ 100°C 40% Unaged Tensile Strength 40% Unaged Elongation	—	—

*These oil immersion standards are mentioned for purposes of reference only. Some Canadian and European test standards are not necessarily represented here as complete equivalents to the US Standards but have been referenced due to similarities in requirements. Refer to the individual standards for detailed test procedures and any comparable evaluations.



Flame Resistance

Level	USA	CSA*	Europe*
FR-01	UL 62: Horizontal Flame Test One 30-second flame application. Cable must not emit flame or glowing particles.	FT2: One 30-second flame application. Cable must not emit flame or glowing particles.	VDE 0472 Part 804 One 1-minute flame application. Cable must not ignite or emit flames.
FR-02	UL VW-1 (UL 1581): Vertical Flame Test Five 15-second flame applications. Cable must not emit flame or glowing particles.	FT1: Vertical Flame Test Five 15-second flame applications. Cable must not emit flame or glowing particles.	IEC 60332-1 Flame application time varies by cable diameter. Cable must self-extinguish.
FR-03	UL 1581: Vertical Tray Test Exposed to flame (70,000 BTU) for 20 min. Damage cannot exceed 8 feet.	FT4: Vertical Tray Test Exposed to flame for 20 min. Damage cannot exceed 5 feet.	IEC 60332-3-24 Exposed to flame for 20 min. Damage cannot exceed 8.2 feet.

*These flame standards are mentioned for purposes of reference only. Some Canadian and European test standards are not necessarily represented here as complete equivalents to the US Standards but have been referenced due to some similarities in requirements. Refer to the individual standards for detailed test procedures and any comparable evaluations.

Motion Type



Level	Description	Definition	Cycle Life Range
FL-01	Flexible	Can be easily installed in machines, conduit, and cable tray when applicable	—
FL-02	Highly Flexible	High flexibility with continuous flexing design attributes	—
WT-02	Wind Turbine Torsion -40°C	Designed for basic wind torsion to an angle of $\pm 150^\circ/\text{m}$ Application temperature: -40°C	up to 2,000 cycles
CF-01	Continuous Flexing: Basic	Designed for basic continuous flexing and cable track applications Distance: chain length up to 15 feet	1 - 2 million cycles
CF-02*	Continuous Flexing: Moderate	Designed for continuous flexing and cable track applications Distance: chain length up to 30 feet	2 - 8 million cycles
CF-03*	Continuous Flexing: High	Designed for high cycle continuous flexing and cable track applications Distance: chain length up to 30 feet	8 - 20 million cycles
CF-04*	Continuous Flexing: High-Extended	Designed for high cycle continuous flexing and long cable track applications Distance: chain length up to 300 feet	8 - 20 million cycles
CF-04A*	Continuous Flexing: High-Extended High Acceleration (A) applications	Designed for high cycle continuous flexing and long cable track applications Distance: chain length up to 300 feet; Acceleration: up to 50m/s ² for chain length up to 15 feet	8 - 20 million cycles

* When comparing cycle life data between cables, the following critical variables must be evaluated: bend radius, distance, acceleration, speed & weight.

Mechanical Properties



Level	Description	Impact	Crush	Cold Impact	Cold Bend	Tensile	Elongation	Standard
MP-01	Average	—	*	*	—	1,500 psi	100%	ASTM D-412
MP-02	Good: Independent lab-tested for crush & impact	10/50 lb	1,000/ 2,000 lbf	—	-25°C	1,700 psi	175%	UL 1277 ASTM D-412
MP-03	Very Good: Rated for Exposed Run use (-ER)	10/50 lb	2,500/ 4,200 lbf	-25°C (CSA-TC)	-40°C (UL 62)	2,300 psi	275%	UL 1277 ASTM D-412
MP-05	Excellent	**	**	—	—	3,400 psi	325%	ASTM D-1457

* Impact and crush tests not applicable for intended end use of product.

** Testing is not required. If tested, these groups would meet or exceed UL 1277 impact and crush requirements by virtue of their superior mechanical properties.

*** Lapp standard.

Note: Lapp mechanical protection test values for each level meet or exceed the requirements of the standards referenced.



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