

Automation

Make the right connection.



Automation Guide

for Servo Motors/Drives
and BUS Systems



LAPP GROUP

Make the right connection.

At the Lapp Group we understand the critical role electrical connectivity products play in a wide array of industrial manufacturing applications. And how our customers depend on the quality, performance and durability of Lapp's cable and connectivity solutions to keep their facilities and lines up and running, even in the most demanding conditions.

Helping our customers meet productivity goals at the lowest cost of ownership is the single focus of everything we do. Helping them make the right connection.

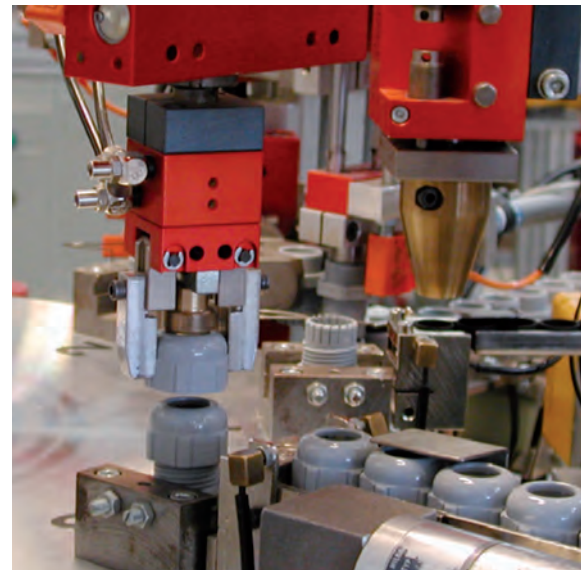
When you choose the Lapp Group you connect with a group of industry experts who embrace the company's rich history of developing solutions that enable our customers to achieve optimum productivity and greater business success. You'll have access to a robust line of products that provide more uptime and reduce downtime, no matter the job at hand. You'll connect with a global company that combines international capabilities with domestic manufacturing; which ensures the utmost in product quality and availability. And you'll connect with unrivaled customer support that is with you every step of the way.

First established in Germany in the 1950s and in the US in 1976, Lapp Group North America is headquartered in a newly renovated 130,000 square foot facility in Florham Park, New Jersey. The North American facility includes our state-of-the-art cable manufacturing plant, Lapp Cable Works. Lapp's domestic manufacturing enables a fast and flexible focus on customer needs, greater inventory and the ability to meet demanding needs quickly. Additionally, Lapp has invested in engineering know-how to develop new products, and to support real-world applications with an in-house UL Certified Test Data Lab that is unique in the industry.

Lapp Group's complete connectivity solutions for industrial machine and infrastructure applications include a full suite of power and control cable, connectors, accessories and systems. These products and solutions are specifically tailored for a wide array of industries including automotive, food and beverage, wind energy, oil and gas, packaging and manufacturing.

Lapp brands include; **ÖLFLEX®**, **UNITRONIC®**, **EPIC®**, **SKINTOP®**, **ETHERLINE®**, **HITRONIC®**, **SILVYN®**, AND **FLEXIMARK®**

We welcome the opportunity to collaborate with you to make the right connection.





A Full Suite of Connectivity Solutions

- Machine Cables for all applications
- TC-ER Rated Tray Cables
- Cables for major VFDs and manufacturers of servo motors and drives
- Industrial Grade Data Cables for signal, control and networks
- Environmentally Protected Industrial Connectors for power, control, and data; including Rectangular, Circular, and IEC Pin and Sleeve Connectors
- Strain Relief Products
- Cable Management Accessories including: Conduit, Track, Sleeving and Marking Systems

Industry Leading Expertise

- Specially trained national sales team
- In-house team of engineers
- State-of-the-art cable manufacturing in North America
- North American based UL Client test Data Lab
- Worldwide logistics centers
- Extensive product inventory
- In-house Systems Group providing Custom Assemblies and Populated Cable Tracks
- ISO Certified

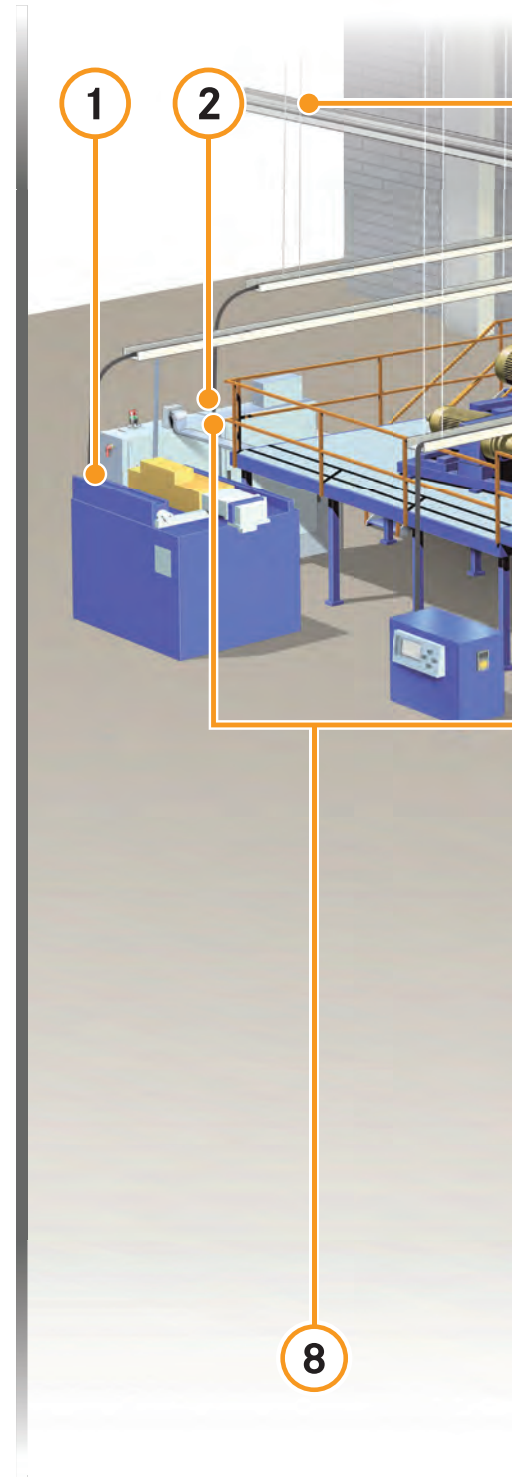


LAPP GROUP



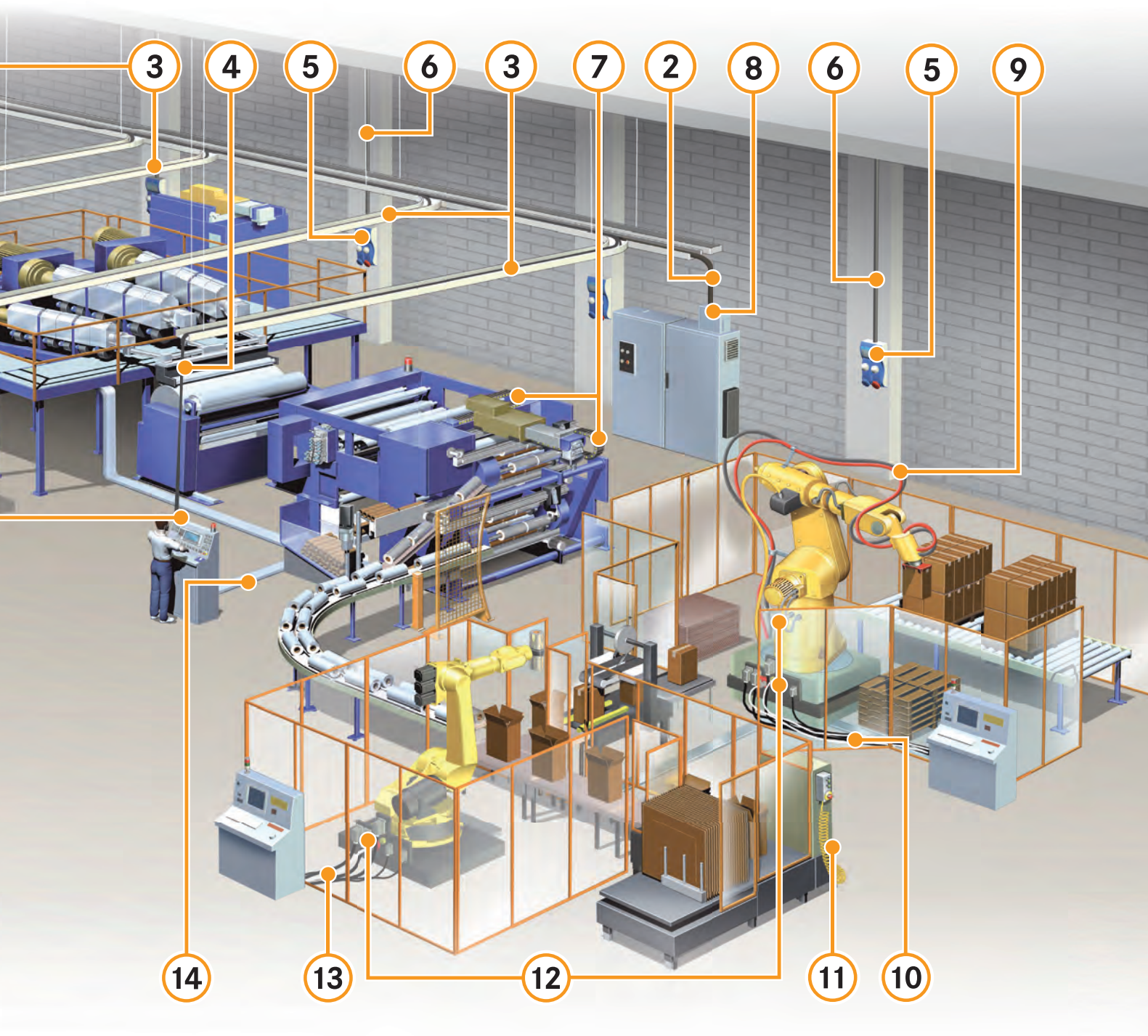
PRODUCT APPLICATIONS

1	Industrial Equipment Cables
2	Power & Control Cable for Enclosures
3	Flame Resistant Industrial Tray Cable: Stationary
4	Automation & Control Cables
5	Power Outlet Pin & Sleeve Connectors
6	Fixed Installation, Single Wire
7	Cables & Cable Tracks for Continuous Flexing
8	Cable Protection, Routing & Support Glands
9	Continuous Flex & Torsion Cables
10	Signal, Bus System, DeviceNet™ & Ethernet Cables
11	Retractable Cord for Remote Control
12	Servo Cables & Cable Harness Assembly Receptacles
13	Ethernet & Data Communication System Cables
14	Signaling, Instrumentation, Power & Communication Cables
ALL	Power, Control & Data Connectors, Strain Relief Cable Glands, Conduit, Cable Marking Systems



ÖLFLEX® EPIC® SKINTOP® UNITRONIC®

Providing Cable Innovations, Connectors & Wire Management Solutions



SILVYN® FLEXIMARK® ETHERLINE® HITRONIC®



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Technical Information and Reference

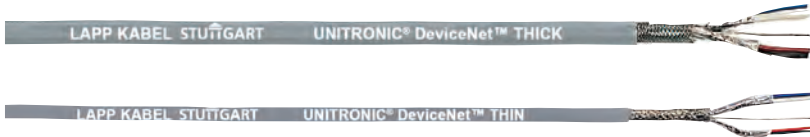
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Bus System	Part Number	Cable Attributes, see page 73				Page
		Oil Resistance	Flame Resistance	Motion Type	Mechanical Properties	
DeviceNet™	4001, 4002	OR-01	FR-02	FL-02	MP-01	11
	6001, 6002	OR-01	FR-03	CF-02	MP-01	11
	2170342, 2170343	OR-02	FR-03	CF-02	MP-01	11
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	2170344, 2170345	OR-04	FR-02	CF-02	MP-05	11
	2170346, 2170347	OR-02	FR-03	CF-02	MP-01	11
PROFIBUS	2170220	OR-00	FR-01	FL-01	MP-01	15
	2170219	OR-00	FR-02	FL-01	MP-01	15
	2170824	OR-00	FR-02	FL-02	MP-01	15
	2170820	OR-00	FR-03	FL-01	MP-01	15
	2170853	OR-04	FR-03	FL-01	MP-05	15
	2170222	OR-04	FR-01	CF-02	MP-05	15
	2170822, 2170322	OR-04	FR-02	CF-02	MP-05	15
	2170332	OR-04	FR-02	FL-02 (Torsion ± 180° /m)	MP-05	15
CAN Bus	2170260 to 2170270	OR-00	FR-02	FL-02	MP-01	18
	2170272 to 2170279	OR-04	FR-02	CF-02	MP-05	18
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	2170204, 2170205	OR-00	FR-01	FL-02	MP-01	19
	2170213	OR-04	FR-01	CF-02	MP-05	19
	2170813	OR-04	FR-02	CF-02	MP-05	19
	2170214	OR-04	FR-01	CF-02	MP-05	19
	2170814	OR-04	FR-02	CF-02	MP-05	19
	2170215	OR-04	FR-01	CF-02	MP-05	19
	2170815	OR-04	FR-02	CF-02	MP-05	19
Sensor & Actuator Wiring	7038867 to 7038866	OR-04	FR-01	CF-02	MP-05	19

UNITRONIC® BUS DeviceNet™ Gray

For DeviceNet Bus Systems; Stationary & Continuous Flex Applications; 120 Ω



Technical Data

Minimum Bend Radius:	10 x cable diameter
Temperature Range:	-20°C to +75°C
Nominal Voltage:	300V
Impedance:	120 Ω
Nominal Capacitance:	12 pF/ft

Color Code:

- Power pair:	Red & black
- Data pair:	Blue & white

Approvals:

UL:	CL2
	CM (6002)
Canada:	CSA AWM (4001, 4002, 6001)
	CSA CMG (6002)

Construction

Conductors: Stranded tinned copper

Insulation: Power conductors: PVC;

Data conductors: Polyethylene

Shielding: Pairs: tri-laminated foil shield (100% coverage); tinned copper drain wire; overall foil wrap and braid (65% coverage)

Jacket: Gray PVC

Rate Tables

Communication Rate	Maximum Length: Trunk Cable			
	THICK		THIN	
	(feet)	(meters)	(feet)	(meters)
125 Kbps	1640	500	328	100
250 Kbps	820	250	328	100
500 Kbps	328	100	328	100

Communication Rate	Maximum Length: Drop Cable			
	THICK		THIN	
	(feet)	(meters)	(feet)	(meters)
125 Kbps	512	156	20	6
250 Kbps	256	78	20	6
500 Kbps	128	39	20	6

Cable Attributes, page 73

OR-01	FR-02	FL-02 or CF-02	MP-01
OIL	FLAME	MOTION	MECH

UNITRONIC® BUS DeviceNet™ Violet

For DeviceNet Bus Systems; Stationary & Continuous Flex Applications; 120 Ω



Technical Data

Minimum Bend Radius:	
- for installation:	7.5 x cable diameter
- for continuous flexing:	15 x cable diameter
Temperature Range:	see table below
Nominal Voltage:	300V

Impedance: 120 Ω

Nominal Capacitance: 12 pF/ft

Color Code:

- Power pair:	Red & black
- Data pair:	Blue & white

Approvals: see table below

Construction

Conductors: Stranded tinned copper

Insulation: Power conductors: PVC (PVC jacket); polyethylene (Halogen-free jacket);

Data conductors: Polyethylene

Shielding: Pairs: tri-laminated foil shield; tinned copper drain wire; overall foil wrap and braid

Jacket: Violet PVC or halogen-free polyurethane

Cable Attributes, page 73

see table on page 10

OIL	FLAME	MOTION	MECH
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Part Number	Type	Conductor Description	Temperature Range	Approvals	Nominal Outer Diameter (in)	Nominal Outer Diameter (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
Stationary: PVC Jacket								
2170342	Thick	18 AWG/1pr + 15 AWG/1pr	-20°C to +75°C	UL/CSA CMG, UL PLTC	0.480	12.2	129	53112240
2170343	Thin	24 AWG/1pr + 22 AWG/1pr	-20°C to +75°C	UL/CSA CMG, UL CL2	0.272	6.9	45	53112210
Stationary: Halogen-Free & Flame Retardant (FRNC) Jacket								
2170340	Thick	18 AWG/1pr + 15 AWG/1pr	-25°C to +75°C	UL/CSA CMG, UL PLTC	0.480	12.2	131	53112240
2170341	Thin	24 AWG/1pr + 22 AWG/1pr	-25°C to +75°C	UL/CSA CMG	0.272	6.9	47	53112210
Continuous Flex: PUR Jacket								
2170344	Thick	18 AWG/1pr + 15 AWG/1pr	-40°C to +75°C	UL/CSA CMX, UL CLX2	0.480	12.2	124	53112240
2170345	Thin	24 AWG/1pr + 22 AWG/1pr	-40°C to +75°C	UL/CSA CMX, UL CLX2	0.272	6.9	45	53112210
Continuous Flex: PVC Jacket								
2170346	Thick	18 AWG/1pr + 15 AWG/1pr	-10°C to +75°C	UL/CSA CMG, UL PLTC	0.480	12.2	131	53112240
2170347	Thin	24 AWG/1pr + 22 AWG/1pr	-10°C to +75°C	UL/CSA CMG, UL CL2	0.272	6.9	47	53112210

DN4110150,
DN4110151



DN4110152,
DN4110153



DN4110157



DN4110156



DN4110155



DN4110154



Technical Data

 **Temperature Range:** max +85°C

 **Nominal Voltage:** 250V/125V

 **Nominal Current:** 4A or 9A

Part Number	Size	Terminal Type	Number of Positions	PG Connection	Cable Diameter (mm) min. max.	Nominal Voltage	Nominal Current
DN4110150	7/8" Male	Screw	5	PG 9	6 8	250V	9A
DN4110151	7/8" Male	Screw	5	PG 13	10 12	250V	9A
DN4110152	7/8" Female	Screw	5	PG 9	6 8	250V	9A
DN4110153	7/8" Female	Screw	5	PG 13	10 12	250V	9A
DN4110157	M12 Male	Screw	5	PG 9	4 8	125V	4A
DN4110156	M12 Female	Screw	5	PG 9	4 8	125V	4A
DN4110155	M12 Male 90°	Screw	5	PG 9	4 8	125V	4A
DN4110154	M12 Female 90°	Screw	5	PG 9	4 8	125V	4A

DeviceNet™ T-Connectors

DN4110012



DN4110014



DN4110013



Technical Data

 **Temperature Range:** -40°C to +75°C

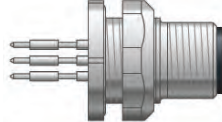
Part Number	End Connector 1	End Connector 2	End Connector 3	Nominal Voltage	Nominal Current
DN4110012	Female 7/8" 5-pos.	Female 7/8" 5-pos.	Male 7/8" 5-pos.	300V	9A
DN4110013	Female M12 5-pos.	Female M12 5-pos.	Male M12 5-pos.	250V	4A
DN4110014	Male 7/8" 5-pos.	Female M12 5-pos.	Female 7/8" 5-pos.	250V	4A

DeviceNet™ PCB Connectors

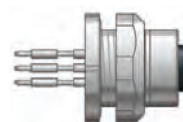
DN4110007



DN4110045



DN4110044



Technical Data

 **Temperature Range:** -40°C to +105°C

Part Number	Size	Number of Positions	Nominal Voltage	Nominal Current
DN4110007	Female 7/8"	5	300V	9A
DN4110045	Female M12	5	250V	4A
DN4110044	Male M12	5	250V	4A

DeviceNet™ Feed-Through Receptacles

DN4110051



DN4110043



Technical Data

 **Temperature Range:** -40°C to +75°C

 **IP Protection Rating:** IP67

Part Number	End Connector 1	End Connector 2	Nominal Voltage	Nominal Current
DN4110051	Male 7/8" 5-pos.	Female 7/8" 5-pos.	300V	9A
DN4110043	Male M12 5-pos.	Female M12 5-pos.	250V	4A

Cordsets are terminated with connectors A - H. Add cable length in meters to the end of the part number.

A
Male 7/8"
Straight Connector



B
Male 7/8"
90° Connector



C
Female 7/8"
Straight Connector



D
Female 7/8"
90° Connector



E
Male 7/8"
Panel Mount



F
Male 7/8"
Bulkhead



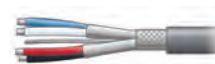
G
Female 7/8"
Panel Mount



H
Female 7/8"
Bulkhead



Ø
Flying Leads



Technical Data

Cable Type:

- for stationary use: 4001, page 11
- for continuous flexing: 6001, page 11

For pin outs, design, and electrical data, see page 20

Single-Ended Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male 7/8"	Ø Flying Leads	DN4110001S*	DN4110001F*
B Male 7/8" 90°	Ø Flying Leads	DN4110002S*	DN4110002F*
C Female 7/8"	Ø Flying Leads	DN4110003S*	DN4110003F*
D Female 7/8" 90°	Ø Flying Leads	DN4110004S*	DN4110004F*
E Male 7/8" Panel Mount	Ø Flying Leads	DN4110005S*	DN4110005F*
F Male 7/8" Blk	Ø Flying Leads	DN4110097S*	DN4110097F*
G Female 7/8" Panel Mount	Ø Flying Leads	DN4110006S*	DN4110006F*
H Female 7/8" Blk	Ø Flying Leads	DN4110098S*	DN4110098F*

* Add cable length in meters to end of part number

Double-Ended Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male 7/8"	A Male 7/8"	DN4110052S*	DN4110052F*
A Male 7/8"	B Male 7/8" 90°	DN4110053S*	DN4110053F*
A Male 7/8"	C Female 7/8"	DN4110008S*	DN4110008F*
A Male 7/8"	D Female 7/8" 90°	DN4110009S*	DN4110009F*
B Male 7/8" 90°	B Male 7/8" 90°	DN4110054S*	DN4110054F*
B Male 7/8" 90°	C Female 7/8"	DN4110010S*	DN4110010F*
B Male 7/8" 90°	D Female 7/8" 90°	DN4110011S*	DN4110011F*
C Female 7/8"	C Female 7/8"	DN4110055S*	DN4110055F*
C Female 7/8"	D Female 7/8" 90°	DN4110056S*	DN4110056F*
D Female 7/8" 90°	D Female 7/8" 90°	DN4110057S*	DN4110057F*

* Add cable length in meters to end of part number

Bulkhead Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male 7/8"	E Male 7/8" Blk	DN4110072S*	DN4110072F*
A Male 7/8"	F Female 7/8" Blk	DN4110017S*	DN4110017F*
B Male 7/8" 90°	E Male 7/8" Blk	DN4110073S*	DN4110073F*
B Male 7/8" 90°	F Female 7/8" Blk	DN4110018S*	DN4110018F*
C Female 7/8"	E Male 7/8" Blk	DN4110015S*	DN4110015F*
C Female 7/8"	F Female 7/8" Blk	DN4110078S*	DN4110078F*
D Female 7/8" 90°	E Male 7/8" Blk	DN4110016S*	DN4110016F*
D Female 7/8" 90°	F Female 7/8" Blk	DN4110079S*	DN4110079F*

* Add cable length in meters to end of part number



DeviceNet™ Cordsets

Thin Cordsets for DeviceNet; Stationary or Continuous Flex

Cordsets are terminated with connectors A - O. Add cable length in meters to the end of the part number.

A
Male 7/8"
Straight Connector



B
Male 7/8"
90° Connector



C
Female 7/8"
Straight Connector



D
Female 7/8"
90° Connector



E
Male 7/8"
Panel Mount



F
Male 7/8"
Bulkhead



G
Female 7/8"
Panel Mount



H
Female 7/8"
Bulkhead



I
Male M12
Straight Connector



J
Male M12
90° Connector



K
Female M12
Straight Connector



L
Female M12
90° Connector



M
Male M12
Bulkhead



N
Female M12
Bulkhead



O
Plug Header



Ø
Flying Leads



Technical Data

Cable Type:

- for stationary use: 4002, page 11
- for continuous flexing: 6002, page 11

For pin outs, design, and electrical data, see page 20

Single-Ended Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
I Male M12	Ø Flying Leads	DN4110019S*	DN4110019F*
J Male M12 90°	Ø Flying Leads	DN4110020S*	DN4110020F*
K Female M12	Ø Flying Leads	DN4110021S*	DN4110021F*
L Female M12 90°	Ø Flying Leads	DN4110022S*	DN4110022F*
M Male M12 Blk	Ø Flying Leads	DN4110040S*	DN4110040F*
N Female M12 Blk	Ø Flying Leads	DN4110039S*	DN4110039F*

* Add cable length in meters to end of part number

Bulkhead Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male 7/8"	M Male M12 Blk	DN4110085S*	DN4110085F*
A Male 7/8"	N Female M12 Blk	DN4110091S*	DN4110091F*
B Male 7/8" 90°	M Male M12 Blk	DN4110086S*	DN4110086F*
B Male 7/8" 90°	N Female M12 Blk	DN4110092S*	DN4110092F*
C Female 7/8"	M Male M12 Blk	DN4110087S*	DN4110087F*
C Female 7/8"	N Female M12 Blk	DN4110093S*	DN4110093F*
D Female 7/8" 90°	M Male M12 Blk	DN4110088S*	DN4110088F*
D Female 7/8" 90°	N Female M12 Blk	DN4110094S*	DN4110094F*
I Male M12	F Male 7/8" Blk	DN4110074S*	DN4110074F*
I Male M12	H Female 7/8" Blk	DN4110080S*	DN4110080F*
J Male M12 90°	F Male 7/8" Blk	DN4110075S*	DN4110075F*
J Male M12 90°	H Female 7/8" Blk	DN4110081S*	DN4110081F*
K Female M12	F Male 7/8" Blk	DN4110076S*	DN4110076F*
K Female M12	H Female 7/8" Blk	DN4110082S*	DN4110082F*
L Female M12 90°	F Male 7/8" Blk	DN4110077S*	DN4110077F*
L Female M12 90°	H Female 7/8" Blk	DN4110083S*	DN4110083F*
I Male M12	M Male M12 Blk	DN4110089S*	DN4110089F*
I Male M12	N Female M12 Blk	DN4110037S*	DN4110037F*
J Male M12 90°	M Male M12 Blk	DN4110090S*	DN4110090F*
J Male M12 90°	N Female M12 Blk	DN4110038S*	DN4110038F*
K Female M12	M Male M12 Blk	DN4110035S*	DN4110035F*
K Female M12	N Female M12 Blk	DN4110095S*	DN4110095F*
L Female M12 90°	M Male M12 Blk	DN4110036S*	DN4110036F*
L Female M12 90°	N Female M12 Blk	DN4110096S*	DN4110096F*

* Add cable length in meters to end of part number

Double-Ended Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male 7/8"	I Male M12	DN4110058S*	DN4110058F*
A Male 7/8"	J Male M12 90°	DN4110061S*	DN4110061F*
A Male 7/8"	K Female M12	DN4110027S*	DN4110027F*
A Male 7/8"	L Female M12 90°	DN4110028S*	DN4110028F*
B Male 7/8" 90°	I Male M12	DN4110059S*	DN4110059F*
B Male 7/8" 90°	J Male M12 90°	DN4110062S*	DN4110062F*
B Male 7/8" 90°	K Female M12	DN4110029S*	DN4110029F*
B Male 7/8" 90°	L Female M12 90°	DN4110030S*	DN4110030F*
C Female 7/8"	I Male M12	DN4110031S*	DN4110031F*
C Female 7/8"	J Male M12 90°	DN4110032S*	DN4110032F*
C Female 7/8"	K Female M12	DN4110065S*	DN4110065F*
C Female 7/8"	L Female M12 90°	DN4110068S*	DN4110068F*
D Female 7/8" 90°	I Male M12	DN4110033S*	DN4110033F*
D Female 7/8" 90°	J Male M12 90°	DN4110034S*	DN4110034F*
D Female 7/8" 90°	K Female M12	DN4110066S*	DN4110066F*
D Female 7/8" 90°	L Female M12 90°	DN4110069S*	DN4110069F*
I Male M12	I Male M12	DN4110060S*	DN4110060F*
I Male M12	J Male M12 90°	DN4110063S*	DN4110063F*
I Male M12	K Female M12	DN4110023S*	DN4110023F*
I Male M12	L Female M12 90°	DN4110024S*	DN4110024F*
J Male M12 90°	J Male M12 90°	DN4110064S*	DN4110064F*
J Male M12 90°	K Female M12	DN4110025S*	DN4110025F*
J Male M12 90°	L Female M12 90°	DN4110026S*	DN4110026F*
K Female M12	K Female M12	DN4110067S*	DN4110067F*
K Female M12	L Female M12 90°	DN4110070S*	DN4110070F*
L Female M12 90°	L Female M12 90°	DN4110071S*	DN4110071F*

* Add cable length in meters to end of part number

Plug Header Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male 7/8"	O Plug Header	DN4110046S*	DN4110046F*
F Male 7/8" Blk	O Plug Header	DN4110050S*	DN4110050F*
I Male M12	O Plug Header	DN4110048S*	DN4110048F*
M Male M12 Blk	O Plug Header	DN4110049S*	DN4110049F*
Ø Flying Leads	O Plug Header	DN4110047S*	DN4110047F*

* Add cable length in meters to end of part number

UNITRONIC® BUS PB

For PROFIBUS-DP/FMS/FIP Bus Systems; Stationary Applications; 150 Ω



Technical Data	
Minimum Bend Radius:	
- for installation:	10 x cable diameter
Temperature Range:	
- PVC:	-40°C to +80°C
- Halogen-free:	-30°C to +80°C
Impedance:	150 Ω ± 15 Ω

Nominal Capacitance:	9 pF/ft
Color Code:	Red & green pair
Approvals:	see table below

Part Number	Jacket Type	Conductor Description	Approvals	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
Stationary						
2170220	PVC	22 AWG/1pr	—	0.315 8	50	53112220
2170219	PVC	22 AWG/1pr	UL/CSA CMX	0.315 8	38	53112220
2170824*	PVC	24 AWG/1pr, 7 wire	UL/CSA CMG, UL CL3	0.315 8	37	53112220
Stationary: Fast Connect						
2170820	PVC	22 AWG/1pr	UL/CSA CMG, UL CL3	0.315 8	56	53112220
2170853	Halogen-free	22 AWG/1pr	UL/CSA CMG	0.315 8	50	53112220

*For applications where vibrations occur.

Construction

Conductors: Solid and stranded bare copper

Insulation: Polyethylene

Shielding: Specially designed foil/tinned copper braid

Jacket: Violet PVC (except 2170853: halogen-free)

Maximum Cable Length by Bit Rate

Communication Rate	Length of Cable Segment (feet) (meters)	
93.75 Kbps	3936	1200
187.5 Kbps	3280	1000
500 Kbps	1312	400
1.5 Mbps	656	200
12.0 Mbps	328	100

Cable Attributes, page 73			
see table on page 10			
OIL	FLAME	MOTION	MECH

UNITRONIC® BUS PB FD & PB TORSION

For PROFIBUS-DP/FMS/FIP Bus Systems; Continuous Flex & Torsion Applications; 150 Ω



Technical Data	
Minimum Bend Radius:	see table below
Temperature Range:	
- for stationary use:	-40°C to +80°C
- for flexible use:	-30°C to +70°C
- torsion:	-25°C to +75°C

Impedance:	150 Ω ± 15 Ω
Nominal Capacitance:	9 pF/ft
Color Code:	Red & green pair
Approvals:	see table below

Cable Attributes, page 73			
see table on page 10			
OIL	FLAME	MOTION	MECH

Part Number	Jacket Type	Conductor Description	Min. Bend Radius (x cable diameter)	Approvals	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
Continuous Flex							
2170222	PUR	24 AWG/1pr	9	Torsion Rated	0.315 8	43	53112220
2170822	PUR	24 AWG/1pr	9	UL/CSA CMX, Torsion Rated	0.315 8	39	53112220
Continuous Flex: Fast Connect							
2170322	PUR	24 AWG/1pr	15	UL/CSA CMX	0.315 8	53	53112220
Torsion							
2170332	PUR	22 AWG/1pr	4 (stationary), 15 (flexible)	UL/CSA CMX, Torsion Rated	0.315 8	44	53112220

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.

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EPIC® Data PROFIBUS D-Sub Connectors

For PROFIBUS-DP/FMS/FIP Bus Systems; Stationary Applications; 150 Ω



Technical Data



Temperature Range:

- Operating: see table below
- Transport & storage: -25°C to +80°C
- Relative humidity: max. 75% at +25°C



Protection Rating:

IP20



Supply Voltage:

4.75 - 5.25V DC
(supplied from terminal)



Transmission Rate:

max. 12 Mbit/s



Current Consumption:

- LED terminal: max. 12.5 mA

max. 35 mA



Interfaces:

- PROFIBUS station: 9 pin D-Sub socket
- PROFIBUS cable: see table below



Approvals:

- UL: Programmable Controllers: Components
- Canada: Programmable Controllers Certified: Component
- Additional: CE & RoHS
- D-Sub pin assignment in accordance with PROFIBUS

Part Number	Cable Outlet	Terminal Type	Cable Type	Operating Temperature	PROFIBUS Cable Interfaces	Programming/Diagnostics
21700504	90°	Screw	Solid/Stranded	0°C to +60°C	4 terminal blocks (wires up to 1 mm ²)	No
21700503	90°	Screw	Solid/Stranded	0°C to +60°C	4 terminal blocks (wires up to 1 mm ²)	Yes
21700530	90°	LED Screw	Solid/Stranded	0°C to +60°C	4 terminal blocks (wires up to 1 mm ²)	No
21700529	90°	LED Screw	Solid/Stranded	0°C to +60°C	4 terminal blocks (wires up to 1 mm ²)	Yes
21700509	90°	Spring	Solid/Stranded	0°C to +60°C	4 spring-type terminals (solid conductors up to 0.5 mm ²)	No
21700508	90°	Spring	Solid/Stranded	0°C to +60°C	4 spring-type terminals (solid conductors up to 0.5 mm ²)	Yes
21700502	90°	Fast Connect	Solid	-25°C to +70°C	FC standard cable ø 0.64 mm	No
21700501	90°	Fast Connect	Solid	-25°C to +70°C	FC standard cable ø 0.64 mm	Yes
21700528	90°	Fast Connect	Stranded	-25°C to +70°C	FC standard cable ø 0.64 mm	No
21700527	90°	Fast Connect	Stranded	-25°C to +70°C	FC standard cable ø 0.64 mm	Yes
21700547	90°	LED Fast Connect	Solid	0°C to +60°C	FC standard cable ø 0.64 mm	No
21700546	90°	LED Fast Connect	Solid	0°C to +60°C	FC standard cable ø 0.64 mm	Yes
21700549	90°	LED Fast Connect	Stranded	0°C to +60°C	FC standard cable ø 0.64 mm	No
21700539	90°	LED Fast Connect	Stranded	0°C to +60°C	FC standard cable ø 0.64 mm	Yes
21700505	180°	Screw	Solid/Stranded	0°C to +60°C	4 terminal blocks (wires up to 1 mm ²)	No
21400544	180°	Fast Connect	Solid	-25°C to +70°C	FC standard cable ø 0.64 mm	No
21700545	180°	Fast Connect	Stranded	-25°C to +70°C	FC standard cable ø 0.64 mm	No



PROFIBUS Field Wireable M12 Connectors

M12 Straight Connectors, Screw Connection



Technical Data



Temperature Range:

-40°C to +85°C



Nominal Voltage:

60V



Nominal Current:

4A



Contact Resistance:

3mΩ



Screw Connection:

PG 9



Coding:

B-inverse



Protection Rating:

IP67



Approvals:

RoHS

Part Number	Plug/Receptacle	Number of Positions	Coding	Conductor Cross Section (mm)		Conductor Cross Section (AWG)		Cable Diameter (mm)	
				min.	max.	min.	max.	min.	max.
22260653	Plug	5	B-inverse	0.25	0.75	24	18	6	8.5
22260646	Receptacle	5	B-inverse	0.25	0.75	24	18	6	8.5



PROFIBUS Cordsets

Cordsets for PROFIBUS; Stationary or Continuous Flexing



Cordsets are terminated with connectors A - L. Add cable length in meters to the end of the part number.

A
Male M12
Straight Connector



B
Male M12
90° Connector



C
Female M12
Straight Connector



D
Female M12
90° Connector



E
Male M12
Bulkhead



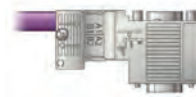
F
Female M12
Bulkhead



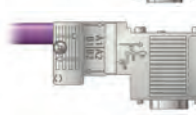
G
D-Sub
Terminator Module



H
D-Sub
Master Module



I
D-Sub
Node Module



J
D-Sub
Straight Module



K
D-Sub Y
Node Module



L
D-Sub Y
Straight Module



Ø
Flying Leads



Technical Data

Cable Type:

- for stationary use: 2170219, page 15
- for continuous flexing: 2170322, page 15

For pin outs, design, and electrical data, see page 20

Single-Ended Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male M12	Ø Flying Leads	PB4110100S*	PB4110100F*
B Male M12 90°	Ø Flying Leads	PB4110101S*	PB4110101F*
C Female M12	Ø Flying Leads	PB4110102S*	PB4110102F*
D Female M12 90°	Ø Flying Leads	PB4110103S*	PB4110103F*
E Male M12 Blk	Ø Flying Leads	PB4110119S*	PB4110119F*
F Female M12 Blk	Ø Flying Leads	PB4110120S*	PB4110120F*

* Add cable length in meters to end of part number

D-Sub Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male M12	G Terminator	PB4110141S*	PB4110141F*
B Male M12 90°	G Terminator	PB4110142S*	PB4110142F*
C Female M12	G Terminator	PB4110143S*	PB4110143F*
D Female M12 90°	G Terminator	PB4110144S*	PB4110144F*
Ø Flying Leads	G Terminator	PB4110140S*	PB4110140F*
A Male M12	H Master	PB4110113S*	PB4110113F*
B Male M12 90°	H Master	PB4110114S*	PB4110114F*
C Female M12	H Master	PB4110115S*	PB4110115F*
D Female M12 90°	H Master	PB4110116S*	PB4110116F*
Ø Flying Leads	H Master	PB4110118S*	PB4110118F*
A Male M12	I Node	PB4110145S*	PB4110145F*
B Male M12 90°	I Node	PB4110146S*	PB4110146F*
C Female M12	I Node	PB4110147S*	PB4110147F*
D Female M12 90°	I Node	PB4110148S*	PB4110148F*
Ø Flying Leads	I Node	PB4110117S*	PB4110117F*
A Male M12	J Straight	PB4110152S*	PB4110152F*
B Male M12 90°	J Straight	PB4110153S*	PB4110153F*
C Female M12	J Straight	PB4110154S*	PB4110154F*
D Female M12 90°	J Straight	PB4110155S*	PB4110155F*
Ø Flying Leads	J Straight	PB4110151S*	PB4110151F*

* Add cable length in meters to end of part number

Double-Ended Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male M12	A Male M12	PB4110128S*	PB4110128F*
A Male M12	B Male M12 90°	PB4110130S*	PB4110130F*
A Male M12	C Female M12	PB4110132S*	PB4110132F*
A Male M12	D Female M12 90°	PB4110136S*	PB4110136F*
B Male M12 90°	A Male M12	PB4110129S*	PB4110129F*
B Male M12 90°	B Male M12 90°	PB4110131S*	PB4110131F*
B Male M12 90°	C Female M12	PB4110133S*	PB4110133F*
B Male M12 90°	D Female M12 90°	PB4110137S*	PB4110137F*
C Female M12	A Male M12	PB4110104S*	PB4110104F*
C Female M12	B Male M12 90°	PB4110106S*	PB4110106F*
C Female M12	C Female M12	PB4110134S*	PB4110134F*
C Female M12	D Female M12 90°	PB4110138S*	PB4110138F*
D Female M12 90°	A Male M12	PB4110105S*	PB4110105F*
D Female M12 90°	B Male M12 90°	PB4110107S*	PB4110107F*
D Female M12 90°	C Female M12	PB4110135S*	PB4110135F*
D Female M12 90°	D Female M12 90°	PB4110139S*	PB4110139F*

* Add cable length in meters to end of part number

D-Sub Y Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
2 Connectors to D-Sub Node Module (K)			
A Male M12	A Male M12	PB4110108S*	PB4110108F*
A Male M12	B Male M12 90°	PB4110149S*	PB4110149F*
B Male M12 90°	B Male M12 90°	PB4110109S*	PB4110109F*
C Female M12	C Female M12	PB4110110S*	PB4110110F*
C Female M12	D Female M12 90°	PB4110150S*	PB4110150F*
D Female M12 90°	D Female M12 90°	PB4110111S*	PB4110111F*
A Male M12	C Female M12	PB4110112S*	PB4110112F*
2 Connectors to D-Sub Straight Module (L)			
A Male M12	A Male M12	PB4110158S*	PB4110158F*
A Male M12	B Male M12 90°	PB4110156S*	PB4110156F*
B Male M12 90°	B Male M12 90°	PB4110160S*	PB4110160F*
C Female M12	C Female M12	PB4110161S*	PB4110161F*
C Female M12	D Female M12 90°	PB4110157S*	PB4110157F*
D Female M12 90°	D Female M12 90°	PB4110162S*	PB4110162F*
A Male M12	C Female M12	PB4110163S*	PB4110163F*

* Add cable length in meters to end of part number



Technical Data

Minimum Bend Radius:	10 x cable diameter
Temperature Range:	-30°C to +80°C
Nominal Voltage:	250V
Impedance:	120 Ω ± 15%
Nominal Capacitance:	12 pF/ft

Color Code: DIN 47100: Chart 8, page 76
 - Pair 1: White & brown
 - Pair 2: Green & yellow

Approvals:
 UL: CMX
 Canada: c(UL) CMX

Construction

Conductors: 7-wire strands of bare copper

Insulation: Polyethylene

Shielding: Foil wrap; tinned copper braid shield

Jacket: Violet PVC

Rate Table (ISO 11898)

Distance (m)	AWG	Max. Rate
0 - 40	22	1 Mbps @ 40 m
40 - 300	22, 20	50 kbps @ 100 m
300 - 600	20	100 kbps @ 500 m
600 - 1000	19	50 kbps @ 1 km

Part Number	Conductor Description (AWG/Pair)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170260	24 AWG/1pr	0.224 5.7	28	53112220
2170261	24 AWG/2pr	0.299 7.6	46	53112220
2170263	22 AWG/1pr	0.268 6.8	37	53112220
2170264	22 AWG/2pr	0.335 8.5	59	53112220
2170266	20 AWG/1pr	0.296 7.5	60	53112220
2170267	20 AWG/2pr	0.382 9.7	71	53112230
2170269	19 AWG/1pr	0.343 8.7	73	53112220
2170270	19 AWG/2pr	0.453 11.5	95	53112230

Cable Attributes, page 73



Technical Data

Minimum Bend Radius:	15 x cable diameter
Temperature Range:	-40°C to +80°C - for installation: - for continuous flexing: -30°C to +70°C
Nominal Voltage:	250V
Impedance:	120 Ω ± 15%

Nominal Capacitance: 18 pF/ft

Color Code: DIN 47100: Chart 8, page 76
 - Pair 1: White & brown
 - Pair 2: Green & yellow

Approvals:
 UL: CMX
 Canada: c(UL) CMX

Construction

Construction: 7-wire strands of bare copper

Insulation: Polyethylene

Shielding: Tinned copper braid shield

Jacket: Violet halogen-free polyurethane

Rate Table (ISO 11898)

Distance (m)	AWG	Max. Rate
0 - 40	22	1 Mbps @ 40 m
40 - 300	22, 20	50 kbps @ 100 m
300 - 600	20	100 kbps @ 500 m
600 - 1000	19	50 kbps @ 1 km

Part Number	Conductor Description (AWG/Pair)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170272	24 AWG/1pr	0.252 6.4	27	53112210
2170273	24 AWG/2pr	0.331 8.4	44	53112220
2170275	22 AWG/1pr	0.268 6.8	40	53112210
2170276	22 AWG/2pr	0.378 9.6	59	53112230
2170278	20 AWG/1pr	0.315 8.0	50	53112220
2170279	20 AWG/2pr	0.426 10.8	67	53112230

Cable Attributes, page 73



UNITRONIC® BUS LD/LD FD P

For RS485/RS422 Bus Systems; Stationary & Continuous Flex Applications; 100 - 120 Ω



Construction

Conductors: Stranded bare copper

Insulation: Polyethylene

Shielding: Copper braid

Jacket: Violet PVC or polyurethane

Technical Data

- Minimum Bend Radius:**
- Stationary cables: 8 x cable diameter
 - Continuous flex cables: 6 x cable diameter
 - for installation: 15 x cable diameter
 - for continuous flexing: 15 x cable diameter

- Temperature Range:**
- Stationary cables: -40°C to +80°C
 - Continuous flex cables: -40°C to +80°C
 - for installation: -40°C to +80°C
 - for flexible use: -30°C to +70°C

Nominal Voltage: 250V

Impedance: 100 - 120 Ω

Nominal Capacitance: 18 pF/ft (800 Hz)

- Color Code:** DIN 47100: Chart 8, page 76
- Pair 1: White & brown
 - Pair 2: Green & yellow
 - Pair 3: Gray & pink

Approvals: see table below

Part Number	Jacket Type	Approvals	Conductor Description (AWG/Pair)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
Stationary						
2170203	PVC	—	24 AWG/1pr	0.225 5.7	25	53112210
2170803	PVC	UL/CSA CMX	24 AWG/1pr	0.225 5.7	26	53112210
2170204	PVC	—	24 AWG/2pr	0.280 7.1	30	53112210
2170205	PVC	—	24 AWG/3pr	0.284 7.2	48	53112210
Continuous Flex						
2170213	PUR	—	24 AWG/1pr	0.236 6.0	26	53112210
2170813	PUR	UL/CSA CMX	24 AWG/1pr	0.244 6.2	26	53112210
2170214	PUR	—	24 AWG/2pr	0.311 7.9	44	53112220
2170814	PUR	UL/CSA CMX	24 AWG/2pr	0.327 8.3	44	53112220
2170215	PUR	—	24 AWG/3pr	0.315 8.0	52	53112220
2170815	PUR	UL/CSA CMX	24 AWG/3pr	0.331 8.4	52	53112220

Cable Attributes, page 73

see table on page 10

OIL FLAME MOTION MECH

UNITRONIC® SENSOR FD

Multi-Conductor Continuous Flex Communication Cable with PUR Jacket; 300V



Construction

Conductors: Super fine stranded bare copper

Insulation: Polypropylene

Shielding: Tinned copper braid (shielded version)

Jacket: Halogen-free black polyurethane

Technical Data

- Minimum Bend Radius:**
- for stationary use: 5 x cable diameter
 - for continuous flexing: 10 x cable diameter

- Temperature Range:**
- for stationary use: -40°C to +80°C
 - for flexible use: -15°C to +80°C

Nominal Voltage: 300V

- Color Code:**
- 3 conductors: 1: Brown, 2: Blue, 3: Black
 - 4 conductors: 1: Brown, 2: White, 3: Blue, 4: Black
 - 5 conductors: 1: Brown, 2: White, 3: Blue, 4: Black, 5: Gray
 - 8 conductors: 1: White, 2: Brown, 3: Green, 4: Yellow, 5: Gray, 6: Pink, 7: Blue, 8: Red

Approvals:

UL: AWM 20549

Additional: RoHS



Cable Attributes, page 73



OIL FLAME MOTION MECH

UNITRONIC® SENSOR FD: Unshielded

Part Number	Size / Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
7038867	24 AWG/5c	0.185 4.7	23	S2107
7038868	24 AWG/8c	0.232 5.9	34	S2107
7038864	22 AWG/3c	0.181 4.6	20	S2107
7038865	22 AWG/4c	0.185 4.7	27	S2107
7038866	22 AWG/5c	0.201 5.1	30	S2107

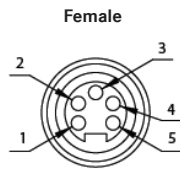
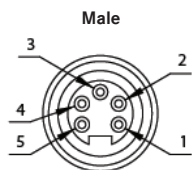
UNITRONIC® SENSOR FD: Shielded

Part Number	Size / Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
7038885	22 AWG/3c	0.181 4.6	79	53112210
7038886	22 AWG/4c	0.185 4.7	88	53112210
7038887	22 AWG/5c	0.201 5.1	97	53112210

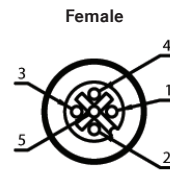
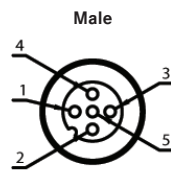
Recommended SKINTOP® assumes minimal OD variance. Additional configurations are available. Photographs are not to scale and are not true representations of the products in question. For current information go to our website. If not otherwise specified, all values relating to the product are nominal values.

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DeviceNet™ 7/8"
 1 = Bare (Shield)
 2 = Red (+Voltage)
 3 = Black (-Voltage)
 4 = White (CAN_H)
 5 = Blue (CAN_L)



DeviceNet™ M12
 1 = Bare (Shield)
 2 = Red (+Voltage)
 3 = Black (-Voltage)
 4 = White (CAN_H)
 5 = Blue (CAN_L)

Technical Data

Materials:	
- Contact carrier:	Blue-gray thermoplastic polyurethane
- Molded head:	Blue-gray thermoplastic polyurethane*
- Contacts:	Gold-plated brass
- Coupling nut:	Nickel-plated brass
- Shield:	Foil (pairs) & overall tinned copper braid
- Outer jacket:	Gray PVC
- Conductor insulation:	
- for data:	Polyethylene
- for power:	PVC

Rated Current:	
- DeviceNet™ 7/8":	9A
- DeviceNet™ M12:	4A

Rated Voltage:	
- DeviceNet™ 7/8":	300V
- DeviceNet™ M12:	250V

Number of Conductors:	
- DeviceNet™ 7/8":	
- 6001:	14 AWG/2c + 18 AWG/2c + 18 AWG drain wire
- 4001:	15 AWG/2c + 18 AWG/2c + 18 AWG drain wire
- DeviceNet™ M12:	22 AWG/2c + 24 AWG/2c + 22 AWG drain wire

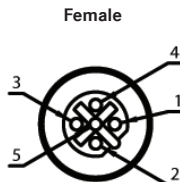
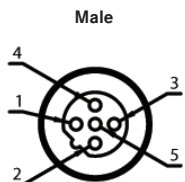
Temperature Range:	-20°C to +75°C
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Protection Class:	Meets NEMA 1, 3, 4, 6, 13 & IEC IP67
--------------------------	--------------------------------------

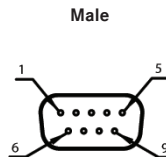
Cable Type:	
- for stationary use:	UNITRONIC® DeviceNet™ Gray, page 11
- for continuous flex:	UNITRONIC® DeviceNet™ Gray, page 11

* Color is typical, not standard

PROFIBUS Cordsets



PROFIBUS M12
 1 = N/C
 2 = Green (BUS_A)
 3 = N/C
 4 = Red (BUS_B)
 5 = Bare (Shield)



PROFIBUS DB9
 1 = N/C
 2 = N/C
 3 = Red (BUS_B)
 4 = N/C
 5 = N/C
 6 = N/C
 7 = N/C
 8 = Green (BUS_A)
 9 = N/C

Technical Data

Materials:	
- Contact carrier:	Black PBT (V-0 per UL 94)
- Molded head:	Black thermoplastic polyurethane*
- Contacts:	Gold-plated brass
- Coupling nut:	Nickel-plated brass
- Shield:	Foil & tinned copper braid
- Outer jacket:	Violet PVC or polyurethane
- Conductor insulation:	Polyethylene

Rated Current:	4A
-----------------------	----

Rated Voltage:	250V
-----------------------	------

Number of Conductors:	24 or 22 AWG/2pr (shielded data pair)
------------------------------	---------------------------------------

Temperature Range:	
- PROFIBUS M12:	-40°C to +80°C
- PROFIBUS DB9:	0°C to +60°C
- Cable:	see specific cable catalog page

Protection Class:	
- PROFIBUS M12:	Meets NEMA 1, 3, 4, 6 & IEC IP67
- PROFIBUS DB:	Meets NEMA 1, 3, 4, 6, 13 & IEC IP67
- D9S:	IP20

Cable Type:	
- for stationary use:	UNITRONIC® BUS PB, page 15
- for continuous flex:	UNITRONIC® BUS PB FD, page 15

* Color is typical, not standard

Pairs	Application	Part Number	Category	Cable Attributes, see page 73				Page
				Oil Resistance	Flame Resistance	Motion Type	Mechanical Protection	
2 Pair	Stationary	2170893	CAT.5	OR-00	FR-03	FL-01	MP-01	22
	Flexible	2170886	CAT.5	OR-00	FR-03	FL-02	MP-01	22
		2170283	CAT.5e	OR-00	FR-01	FL-02	MP-01	22
		2170284	CAT.5e	OR-04	FR-01	FL-02	MP-05	22
	Continuous Flex	2170894	CAT.5	OR-04	FR-02	CF-01	MP-05	22
		2170289	CAT.5e	OR-04	FR-00	CF-02	MP-05	22
	Torsion	2170888	CAT.5	OR-04	FR-01	FL-02 (torsion ± 180° /m)	MP-05	22
4 Pair	Stationary	2170296	CAT.5e	OR-00	FR-01	FL-01	MP-01	23
		2170297	CAT.5e	OR-04	FR-01	FL-01	MP-05	23
		2170464	CAT.6A	OR-00	FR-03	FL-01	MP-01	24
		2170465	CAT.6A	OR-04	FR-01	FL-01	MP-05	24
		2170466	CAT.6A	OR-00	FR-03	FL-01	MP-01	24
		2170474	CAT.7	OR-00	FR-03	FL-01	MP-01	24
		2170475	CAT.7	OR-04	FR-01	FL-01	MP-05	24
	Flexible	2170476	CAT.7	OR-00	FR-03	FL-01	MP-01	24
		2170299	CAT.5e	OR-00	FR-01	FL-02	MP-01	23
	Continuous Flex	2170300	CAT.5e	OR-04	FR-01	FL-02	MP-05	23
		2170489	CAT.5e	OR-04	FR-00	CF-02	MP-05	23
		2170488	CAT.6	OR-04	FR-02	CF-02	MP-05	23
		2170485	CAT.6A	OR-00	FR-02	CF-01	MP-01	24
		2170484	CAT.6A	OR-04	FR-02	CF-01	MP-05	24
	Torsion	2170482	CAT.6A	OR-00	FR-02	FL-02 (torsion ± 180° /m)	MP-01	24
		2170483	CAT.6A	OR-04	FR-02	FL-02 (torsion ± 180° /m)	MP-05	24





ETHERLINE® 2 Pair: CAT.5/5e

Industrial Ethernet Cables for Stationary, Flexing & Continuous Flex Applications

LAPP KABEL STUTTGART ETHERLINE® CAT.5e

LAPP KABEL STUTTGART ETHERLINE® CAT.5e



Construction

Conductors: Solid or stranded bare copper

Pairs: Two twisted pairs or star quad

Insulation: Polyethylene

Shielding: Foil and braid (2170289: braid only)

Jacket: Green or teal PVC, polyurethane, or halogen-free

Cable Attributes, page 73

see table on page 21

OIL

FLAME

MOTION

MECH

Technical Data



Minimum Bend Radius:

- for stationary use: 10 x cable diameter
- for flexible use: 15 x cable diameter
- for continuous flexing: 15 x cable diameter



Temperature Range:

- for stationary use: -40°C to +80°C
- for flexible use:
 - CAT.5 cable: -20°C to +60°C
 - CAT.5e cable: -5°C to +60°C
- for continuous flexing: -20°C to +60°C



Nominal Voltage:

see table below



Impedance:

100Ω ± 15Ω



Color Code:

- CAT.5 cable: White, yellow, blue, orange
- CAT.5e cable: White/orange & orange, white/green & green



Approvals:

see table below

Part Number	Size / Pairs	Stranding	Jacket	Category	Nominal Voltage (not for power)	Approvals	Fast Connect	Nominal Outer Diameter (in)	Nominal Outer Diameter (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
Stationary											
2170893	22 AWG/2pr	Solid	Green PVC	CAT.5	600V	PROFINET, UL AWM, UL/CSA CMG, 600V	Yes	0.256	6.5	47	53112210
Flexing											
2170886	22 AWG/2pr	7 wire	Green PVC	CAT.5	600V	PROFINET, UL AWM, UL/CSA CMG, 600V	Yes	0.256	6.5	45	53112210
2170283*	26 AWG/2pr	7 wire	Teal HF	CAT.5e	125V	—	No	0.213	5.4	29	53112210
2170284*	26 AWG/2pr	7 wire	Teal PUR	CAT.5e	125V	UL/CSA AWM	No	0.228	5.8	30	53112210
Continuous Flex											
2170894	22 AWG/2pr	7 wire	Green PUR	CAT.5	100V	PROFINET, UL/CSA CMX	Yes	0.256	6.5	42	53112210
2170289*	26 AWG/2pr	19 wire	Teal PUR	CAT.5e	125V	UL/CSA AWM	No	0.240	6.1	32	53112210

* Max cable run: 196 ft (60 m)



ETHERLINE® 2 Pair: CAT.5 TORSION

Industrial Ethernet Cable Suitable for Torsion Stress

LAPP KABEL STUTTGART ETHERLINE® CAT.5 TORSION



Construction

Conductors: Stranded tinned copper

Pairs: Star quad

Insulation: Foamed polyethylene

Shielding: Tinned copper braid; non-woven wrap

Jacket: Green halogen-free polyurethane

Technical Data



Minimum Bend Radius:

5 x cable diameter



Temperature Range:

-40°C to +80°C



Nominal Voltage:

100V

(not for power)



Impedance:

100Ω ± 15Ω



Color Code:

White, yellow, blue, orange



Approvals:

UL: AWM 21161
Additional: RoHS

Cable Attributes, page 73



OR-04



FR-01



FL-02*



MP-05

OIL

FLAME

MOTION

MECH

* Torsion ±180°/m

Part Number	Size / Pairs	Stranding	Jacket	Approvals	Fast Connect	Nominal Outer Diameter (in)	Nominal Outer Diameter (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170888	22 AWG/2pr	19 wire	Green PUR	PROFINET, UL AWM	No	0.256	6.5	35	53112210

ETHERLINE® 4 Pair: CAT.5e

Industrial Ethernet Cables for Stationary, Flexing & Continuous Flex Applications



LAPP KABEL STUTTGART

ETHERLINE® CAT.5e



Construction

Conductors: Solid or stranded bare copper

Pairs: 4 pairs twisted together

Insulation: Foam skin, polyethylene, or polyolefin

Shielding: Foil and tinned copper braid (2170489: braid only)

Jacket: Teal polyurethane or halogen-free

Technical Data



Minimum Bend Radius:

- for stationary use: 8 x cable diameter
- for flexible use: 15 x cable diameter



Temperature Range:

see table below



Nominal Voltage:

- 125V (not for power)
- 2170300: 300V (not for power)



Impedance:

100Ω ± 15Ω



Color Code:

White/blue & blue,
white/orange & orange,
white/green & green,
white/brown & brown



Approvals:

RoHS

Cable Attributes, page 73

see table on page 21

OIL FLAME MOTION MECH

Part Number	Size / Pairs	Stranding	Jacket	Temperature Range		Approvals	Fast Connect	Nominal Outer Diameter		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
				for stationary use	for flexible use			(in)	(mm)		
Stationary											
2170296	24 AWG/4pr	Solid	Teal HF	-30°C to +80°C	—	—	No	0.248	6.3	36	53112210
2170297	24 AWG/4pr	Solid	Teal PUR	-30°C to +80°C	—	UL/CSA AWM	No	0.248	6.3	42	53112210
Flexing											
2170299*	26 AWG/4pr	7 wire	Teal HF	-20°C to +75°C	-5°C to +50°C	—	No	0.240	6.1	32	53112210
2170300*	26 AWG/4pr	7 wire	Teal PUR	-40°C to +80°C	-5°C to +60°C	UL/CSA AWM	No	0.240	6.1	36	53112210
Continuous Flex											
2170489*	26 AWG/4pr	19 wire	Teal PUR	-30°C to +80°C	-20°C to +70°C	UL/CSA AWM	No	0.248	6.3	36	53112210

* Max cable run: 196 ft (60 m)

ETHERLINE® 4 Pair: CAT.6

Industrial Ethernet Cable for Continuous Flex Applications



LAPP KABEL STUTTGART

ETHERLINE® CAT.6



Construction

Conductors: Stranded tinned copper

Pairs: 4 pairs divided by central filler element

Insulation: Polypropylene

Shielding: FRNC inner jacket; foil and braid

Jacket: Green polyurethane

Technical Data



Minimum Bend Radius:

- for stationary use: 4 x cable diameter
- for continuous flexing: 7.5 x cable diameter



Temperature Range:

- for stationary use: -40°C to +80°C
- for continuous flexing: -30°C to +70°C



Nominal Voltage:

100V (not for power)



Impedance:

100Ω ± 15Ω



Color Code:

White & blue, white & orange,
white & green, white & brown



Approvals:

UL: CMX
Canada: c(UL) CMX
Additional: RoHS

Cable Attributes, page 73



OR-04



FR-02



CF-02



MP-05

OIL

FLAME

MOTION

MECH

Part Number	Size / Pairs	Stranding	Jacket	Fast Connect	Nominal Outer Diameter		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170488*	26 AWG/4pr	19 wire	Green PUR	No	0.307	7.8	42	53112220

* Max cable run: 196 ft (60 m)



ETHERLINE® 4 Pair: CAT.6A/7; Stationary Industrial Ethernet Cable for Stationary Applications

LAPP KABEL STUTTGART ETHERLINE® P PIMF CAT.6A

LAPP KABEL STUTTGART ETHERLINE® H PIMF CAT.7



Technical Data

- Minimum Bend Radius:**
- for stationary use: 10 x cable diameter
- Temperature Range:**
- PUR & PVC: -40°C to +80°C
- Halogen-free: -25°C to +80°C

- Nominal Voltage:** 100V (not for power)
- Impedance:** 100Ω ± 15Ω
- Color Code:** White/blue & blue, white/orange & orange, white/green & green, white/brown & brown



Part Number	Size / Pairs	Stranding	Jacket	Category	Fast Connect	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170464	22 AWG/4pr	Solid	Green PVC	CAT.6A	No	0.343	8.7	66	53112220
2170465	22 AWG/4pr	Solid	Green PUR	CAT.6A	No	0.343	8.7	61	53112220
2170466	22 AWG/4pr	Solid	Green HF	CAT.6A	No	0.343	8.7	67	53112220
2170474	22 AWG/4pr	Solid	Green PVC	CAT.7	No	0.343	8.7	66	53112220
2170475	22 AWG/4pr	Solid	Green PUR	CAT.7	No	0.343	8.7	61	53112220
2170476	22 AWG/4pr	Solid	Green HF	CAT.7	No	0.343	8.7	67	53112220

ETHERLINE® 4 Pair: CAT.6A; Continuous Flex Industrial Ethernet Cable for Continuous Flex Applications

LAPP KABEL STUTTGART ETHERLINE® P PIMF CAT.6A



Technical Data

- Minimum Bend Radius:**
- for continuous flexing: 15 x cable diameter
- Temperature Range:**
- for stationary use: -40°C to +80°C
- for continuous flexing: -10°C to +70°C

- Nominal Voltage:** 125V (not for power)
- Impedance:** 100Ω ± 15Ω
- Color Code:** White/blue & blue, white/orange & orange, white/green & green, white/brown & brown

Construction

- Conductors:** Stranded tinned copper
- Pairs:** 4 pairs individually shielded with aluminum compound foil
- Insulation:** Foam skin
- Shielding:** Foil-laminated fleece and tinned copper braid
- Jacket:** Green PVC or polyurethane



Part Number	Size / Pairs	Stranding	Jacket	Category	Approvals	Fast Connect	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170485	24 AWG/4pr	7 wire	Green PVC	CAT.6A	PROFINET	No	0.355	9.0	59	53112220
2170484	24 AWG/4pr	7 wire	Green PVC	CAT.6A	UL/CSA AWM, PROFINET	No	0.355	9.0	60	53112220

ETHERLINE® 4 Pair: CAT.6A TORSION Industrial Ethernet Cable for Torsion Stress

LAPP KABEL STUTTGART ETHERLINE® CAT.6A TORSION



Technical Data

- Minimum Bend Radius:** 15 x cable diameter
- Temperature Range:**
- for stationary use: -40°C to +80°C
- for flexible use: -10°C to +70°C

- Nominal Voltage:** 125V (not for power)
- Impedance:** 100Ω ± 15Ω
- Color Code:** White/blue & blue, white/orange & orange, white/green & green, white/brown & brown

Construction

- Conductors:** Stranded tinned copper
- Pairs:** 4 pairs individually shielded with aluminum compound foil
- Insulation:** Foam skin
- Shielding:** Foil-laminated fleece and tinned copper braid
- Jacket:** Green PVC or polyurethane



Part Number	Size / Pairs	Stranding	Jacket	Category	Approvals	Fast Connect	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
2170482	24 AWG/4pr	7 wire	Green PVC	CAT.6A	PROFINET	No	0.355	9.0	59	53112220
2170483	24 AWG/4pr	7 wire	Green PUR	CAT.6A	UL/CSA AWM, PROFINET	No	0.355	9.0	60	53112220



RJ45 Field Wireable Connectors

RJ45 CAT.5e FM45



- Suitable for solid and stranded conductors
- Provides IP20 protection
- Tool-free, re-switchable field termination
- Tension- and vibration-resistant
- Can accommodate both screened and unscreened cables
- IDC/piercing terminal acc. to IEC 60352-4

Part Number	Conductor Size	Max. Cable Outer Diameter		Standard Pack
		(in)	(mm)	
21700540	26 - 23 AWG*	0.315	8.0	1

* 22 AWG is possible, with restrictions

RJ45 CAT.5e, PROFINET



- Suitable for solid and stranded conductors
- Die-cast zinc housing
- Color coded to PROFINET standards
- Conforms to IEC 60603-7-51

Part Number	Conductor Size		Max. Cable Outer Diameter		Standard Pack
	Stranded	Solid	(in)	(mm)	
21700605	27 - 22 AWG (7 wire)	24 - 22 AWG	0.197 - 0.354	5.0 - 9.0	10

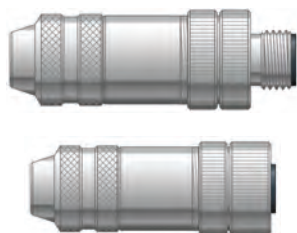
RJ45 CAT.6A



- Suitable for solid and stranded conductors
- Die-cast zinc housing
- Supports 10 Gigabit Ethernet
- Color coded to TIA/EIA-568 standards
- Conforms to IEC 60603-7-51

Part Number	Conductor Size		Color Code	Max. Cable Outer Diameter		Standard Pack
	Stranded	Solid		(in)	(mm)	
21700600	27 - 22 AWG (7 wire)	24 - 22 AWG	T568A	0.197 - 0.354	5.0 - 9.0	10
21700601	27 - 22 AWG (7 wire)	24 - 22 AWG	T568B	0.197 - 0.354	5.0 - 9.0	10

M12 Field Wireable Connectors



Technical Data

 Temperature Range:	Max. 85°C
 Nominal Voltage:	up to 60V

 Nominal Current:	up to 4A
 Screw Connection:	PG 9
 Protection Rating:	IP67

Part Number	Plug/Receptacle	Number of Positions	Max. Conductor Cross Section	Cable Diameter (mm)	
				min.	max.
C5E201C	Plug	8	18 AWG	6	8
C5E200C	Receptacle	8	18 AWG	6	8

CAT.6A M12 Field Wireable Connector



Technical Data

 Temperature Range:	-40°C to +85°C
 Nominal Voltage:	48V
 Nominal Current:	0.5A

 Contact Resistance:	100 mΩ
 Coding:	X
 Approvals:	RoHS

Part Number	Plug/Receptacle	Number of Positions	Coding	Conductor Size		Cable Outer Diameter	
				Stranded	Solid	(in)	(mm)
21700602	Plug	8	X	27 - 22 AWG (7 wire)	24 - 22 AWG	0.197 - 0.382	5.0 - 9.7

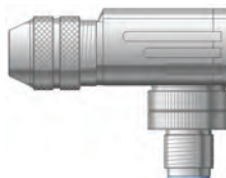
C5E203C



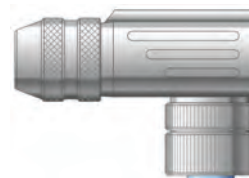
C5E202C



C5E205C



C5E204C



Technical Data

	Temperature Range:	-40°C to +85°C
	Nominal Voltage:	250V
	Nominal Current:	4A
	Coding:	D

Part Number	Description	Number of Positions	Coding	Screw Connection	Fast Connect
C5E203C	Male Straight	4	D	PG 9	Yes
C5E205C	Male 90°	4	D	PG 9	Yes
C5E202C	Female Straight	4	D	PG 9	Yes
C5E204C	Female 90°	4	D	PG 9	Yes

Ethernet Cordsets

2 Pair or 4 Pair Cordsets for Ethernet CAT.5e; Stationary or Continuous Flex

Cordsets are terminated with connectors A - E. Add cable length in meters to the end of the part number.

A
Male M12
Straight Connector



D
Female M12
Bulkhead



B
Male M12
Bulkhead



E
RJ45
Shielded Connector



C
Female M12
Straight Connector



Ø
Flying Leads



Technical Data

	Cable Type:
- for stationary use:	
- 2 Pair:	2170284, page 22
- 4 Pair:	2170300, page 23
- for continuous flexing:	
- 2 Pair:	2170289, page 22
- 4 Pair:	2170489, page 23

For pin outs, design, and electrical data, see page 28

2 Pair Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male M12	Ø Flying Leads	C5E103S*	C5E103F*
B Male M12 Bulkhead	Ø Flying Leads	C5E110S*	C5E110F*
C Female M12	Ø Flying Leads	C5E104S*	C5E104F*
D Female M12 Bulkhead	Ø Flying Leads	C5E111S*	C5E111F*
E RJ45 Shielded	Ø Flying Leads	C5E102S*	C5E102F*
A Male M12	A Male M12	C5E105S*	C5E105F*
A Male M12	C Female M12	C5E107S*	C5E107F*
C Female M12	C Female M12	C5E106S*	C5E106F*
A Male M12	E RJ45 Shielded	C5E108S*	C5E108F*
C Female M12	E RJ45 Shielded	C5E109S*	C5E109F*
E RJ45 Shielded	E RJ45 Shielded	C5E101S*	C5E101F*

* Add cable length in meters to end of part number

4 Pair Cordsets

Connector 1	Connector 2	Stationary Cable	Continuous Flex Cable
A Male M12	Ø Flying Leads	C5E003S*	C5E003F*
B Male M12 Bulkhead	Ø Flying Leads	C5E010S*	C5E010F*
C Female M12	Ø Flying Leads	C5E004S*	C5E004F*
D Female M12 Bulkhead	Ø Flying Leads	C5E011S*	C5E011F*
E RJ45 Shielded	Ø Flying Leads	C5E002S*	C5E002F*
A Male M12	A Male M12	C5E005S*	C5E005F*
A Male M12	C Female M12	C5E007S*	C5E007F*
C Female M12	C Female M12	C5E006S*	C5E006F*
A Male M12	E RJ45 Shielded	C5E008S*	C5E008F*
C Female M12	E RJ45 Shielded	C5E009S*	C5E009F*
E RJ45 Shielded	E RJ45 Shielded	C5E001S*	C5E001F*

* Add cable length in meters to end of part number

Ethernet Cordsets

4 Pair or 2 Pair Stationary or Continuous Flex Cordsets for Ethernet CAT.6A



Cordsets are terminated with connectors A - E. Add cable length in meters to the end of the part number.

A

Male M12
Straight Connector



C

Female M12
Straight Connector



E

RJ45 CAT.6A
Shielded Connector



B

Male M12
Bulkhead



D

Female M12
Bulkhead



Ø

Flying Leads



Connector 1		Connector 2		Stationary Cable	Continuous Flex Cable
A	Male M12	Ø	Flying Leads	C6A003S*	C6A003F*
B	Male M12 Bulkhead	Ø	Flying Leads	C6A010S*	C6A010F*
C	Female M12	Ø	Flying Leads	C6A004S*	C6A004F*
D	Female M12 Bulkhead	Ø	Flying Leads	C6A011S*	C6A011F*
E	RJ45 Shielded	Ø	Flying Leads	C6A002S*	C6A002F*
A	Male M12	A	Male M12	C6A005S*	C6A005F*
A	Male M12	C	Female M12	C6A007S*	C6A007F*
C	Female M12	C	Female M12	C6A006S*	C6A006F*
A	Male M12	E	RJ45 Shielded	C6A008S*	C6A008F*
C	Female M12	E	RJ45 Shielded	C6A009S*	C6A009F*
E	RJ45 Shielded	E	RJ45 Shielded	C6A001S*	C6A001F*

* Add cable length in meters to end of part number

Technical Data



Cable Type:

- for stationary use: 2170464, page 24
- for continuous flexing: 2170484, page 24

For pin outs, design, and electrical data, see page 28

Cordsets for PROFINET

Cordsets are terminated with connectors A - E. Add cable length in meters to the end of the part number.

A

Male M12
Straight Connector



C

Female M12
Straight Connector



E

RJ45
Shielded Connector



B

Male M12
Bulkhead



D

Female M12
Bulkhead



Ø

Flying Leads



Connector 1		Connector 2		Stationary Cable	Continuous Flex Cable
A	Male M12	Ø	Flying Leads	CPN003S*	CPN003F*
B	Male M12 Bulkhead	Ø	Flying Leads	CPN010S*	CPN010F*
C	Female M12	Ø	Flying Leads	CPN004S*	CPN004F*
D	Female M12 Bulkhead	Ø	Flying Leads	CPN011S*	CPN011F*
E	RJ45 Shielded	Ø	Flying Leads	CPN002S*	CPN002F*
A	Male M12	A	Male M12	CPN005S*	CPN005F*
A	Male M12	C	Female M12	CPN007S*	CPN007F*
C	Female M12	C	Female M12	CPN006S*	CPN006F*
A	Male M12	E	RJ45 Shielded	CPN008S*	CPN008F*
C	Female M12	E	RJ45 Shielded	CPN009S*	CPN009F*
E	RJ45 Shielded	E	RJ45 Shielded	CPN001S*	CPN001F*

* Add cable length in meters to end of part number

Technical Data

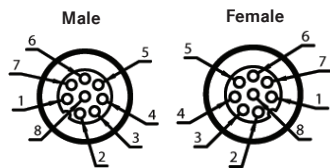


Cable Type:

- for stationary use: 2170886, page 22
- for continuous flexing: 2170894, page 22

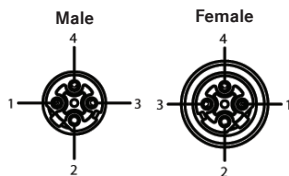
For pin outs, design, and electrical data, see page 28





Ethernet M12 8-pos. 4 Pair

- 1 = White/Blue
- 2 = White/Brown
- 3 = Brown
- 4 = Orange (-TX)
- 5 = White/Green (+RX)
- 6 = White/Orange (+TX)
- 7 = Blue
- 8 = Green (-RX)

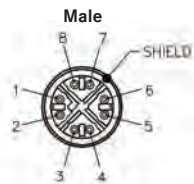


Ethernet M12 4-pos. D-code, 2 Pair

- 1 = White/Orange (+TX)
- 2 = White/Green (+RX)
- 3 = Orange (-TX)
- 4 = Green (-RX)

Ethernet M12 CAT.6A 8-pos. X-code

- 1 = White/Orange
- 2 = Orange
- 3 = White/Green
- 4 = Green
- 5 = White/Brown
- 6 = Brown
- 7 = White/Blue
- 8 = Blue



RJ45 Shielded, 4pr



RJ45 Shielded, 2pr



RJ45 Shielded, 4pr



Ethernet RJ45

- 1 = White/Orange (+TX)
- 2 = Orange (-TX)
- 3 = White/Green (+RX)
- 4 = Blue
- 5 = White/Blue (-RX)
- 6 = Green
- 7 = White/Brown
- 8 = Brown

Ethernet RJ45

- 1 = White/Orange (+TX)
- 2 = Orange (-TX)
- 3 = White/Green (+RX)
- 4 = N/C
- 5 = N/C
- 6 = Green (-RX)
- 7 = N/C

Ethernet RJ45 CAT.6A

- 1 = White/Orange
- 2 = Orange
- 3 = White/Green
- 4 = Blue
- 5 = White/Blue
- 6 = Green
- 7 = White/Brown
- 8 = Brown

Technical Data

Materials:

- Contact carrier: Black thermoplastic polyurethane
- M12: Polycarbonate
- RJ45:
- Molded head: Black thermoplastic polyurethane*
- M12, 8-pos.: Blue-gray thermoplastic polyurethane*
- M12, 4-pos. D-code: Black thermoplastic polyurethane*
- RJ45: Gold-plated brass
- Contacts: Nickel-plated brass
- Coupling nut: Copper braid or foil & copper braid
- Shield: Teal or green polyurethane
- Outer jacket: Polyethylene
- Conductor insulation:

Rated Current: 1.5A

Rated Voltage: 42V

Number of Conductors:

- M12 D-code & RJ45 shield: 26 - 22 AWG/2pr, stranded or solid
- M12 8-pos. & RJ45S: 26 - 22 AWG/4pr, stranded or solid

Temperature Range: see specific cable catalog page

Protection Class:

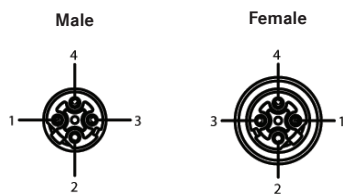
- M12: Meets NEMA 1, 3, 4, 6P & IEC IP67
- RJ45: Meets NEMA 1, 3, 4, 6P & IEC IP20

Cable Type:

- for stationary use:
 - CAT.5e: ETHERLINE® 2 Pair CAT.5e, page 22
 - ETHERLINE® 4 Pair CAT.5e, page 23
 - CAT.6A: ETHERLINE® 4 Pair CAT.6A, page 24
- for continuous flex:
 - CAT.5e: ETHERLINE® 2 Pair CAT.5e, page 22
 - ETHERLINE® 4 Pair CAT.5e, page 23
 - CAT.6A: ETHERLINE® 4 Pair CAT.6A, page 24

* Color is typical, not standard

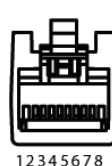
PROFINET Cordsets



PROFINET M12 D-coded

- 1 = Yellow (TD+)
- 2 = Orange (TD-)
- 3 = White (RD+)
- 4 = Blue (RD-)

RJ45 Shielded



PROFINET RJ45

- 1 = Yellow (TD+)
- 2 = Orange (TD-)
- 3 = White (RD+)
- 4 = N/C
- 5 = N/C
- 6 = Blue (RD-)
- 7 = N/C

Technical Data

Materials:

- Plug: PBT (V-0 per UL 94)
- Coupling nut: Nickel-plated brass
- Shield: Foil & tinned copper braid
- Outer jacket: Green polyurethane or PVC
- Conductor insulation: Polyethylene

Number of Conductors: 22 AWG/2pr, stranded

Rated Current:

- PROFINET M12: 4A
- PROFINET RJ45: 1.5A

Rated Voltage:

- PROFINET M12: 250V
- PROFINET RJ45: 42V

Number of Conductors: 22 AWG/2pr, stranded

Temperature Range: see specific cable catalog page

Protection Class:

- PROFINET M12: IP67
- PROFINET RJ45: IP20

Cable Type:

- for stationary use: ETHERLINE® 2 Pair CAT.5, page 22
- for continuous flexing: ETHERLINE® 2 Pair CAT.5, page 22



C304



Construction

Conductors: Tinned copper

Insulation: SR-PVC

Jacket: Gray PVC

Technical Data

Minimum Bend Radius: 7.5 x cable diameter

Temperature Range: -20°C to +105°C

Nominal Voltage: 300V

Test Voltage: 1500V

Conductor Stranding: Fine wire

Color Code: see table below

Approvals:

UL: CMG per UL 444

AWM 2464

Attributes: NFPA 79 2012

NEC: Meets NEC Art. 800

Canada: CSA CMG FT4

CSA AWM I/II A/B FT1

Additional: RoHS

Cable Attributes, page 73



OR-01



FR-03



FL-01



MP-01

OIL

FLAME

MOTION

MECH

* 24 & 22 AWG meet RS-232 applications.

Part Number	Size / Number of Conductors	Stranding	Wall Thickness (in) (mm)		Cable Outer Diameter (in) (mm)		Color Code page 75	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
3020570	24 AWG/2c	7-strand	0.010	0.25	0.149	3.8	black, red	7	S1107
3020571	24 AWG/3c	7-strand	0.010	0.25	0.156	4.0	black, red, green	9	S1107
3020572	24 AWG/4c	7-strand	0.010	0.25	0.168	4.3	Chart 1	14	S1107
3020573	24 AWG/5c	7-strand	0.010	0.25	0.175	4.4	Chart 1	20	S1107
3020574	24 AWG/7c	7-strand	0.010	0.25	0.208	5.3	Chart 1	27	S1107
3020575	24 AWG/10c	7-strand	0.010	0.25	0.226	5.7	Chart 1	33	S1107
3020576	24 AWG/12c	7-strand	0.010	0.25	0.241	6.1	Chart 1	38	S1107
3020577	24 AWG/15c	7-strand	0.010	0.25	0.262	6.7	Chart 2	46	S1109
3020578	24 AWG/25c	7-strand	0.010	0.25	0.319	8.1	Chart 2	75	S1111
3020582	22 AWG/2c	7-strand	0.010	0.25	0.161	4.1	black, red	10	S1107
3020583	22 AWG/3c	7-strand	0.010	0.25	0.169	4.3	black, red, green	15	S1107
3020584	22 AWG/4c	7-strand	0.010	0.25	0.182	4.6	Chart 1	20	S1107
3020585	22 AWG/5c	7-strand	0.010	0.25	0.194	4.9	Chart 1	25	S1107
3020586	22 AWG/6c	7-strand	0.010	0.25	0.206	5.2	Chart 1	29	S1107
3020587	22 AWG/7c	7-strand	0.010	0.25	0.217	5.5	Chart 1	33	S1107
3020588	22 AWG/8c	7-strand	0.010	0.25	0.229	5.8	Chart 1	37	S1107
3020589	22 AWG/9c	7-strand	0.010	0.25	0.239	6.1	Chart 1	40	S1107
3020590	22 AWG/10c	7-strand	0.010	0.25	0.248	6.3	Chart 1	44	S1109
3020591	22 AWG/12c	7-strand	0.010	0.25	0.265	6.7	Chart 1	50	S1109
3020592	22 AWG/15c	7-strand	0.010	0.25	0.289	7.3	Chart 2	62	S1111
3020593	22 AWG/20c	7-strand	0.010	0.25	0.323	8.2	Chart 2	82	S1111
3020594	22 AWG/25c	7-strand	0.010	0.25	0.354	9.0	Chart 2	100	S1111
3020598	20 AWG/2c	7-strand	0.010	0.25	0.180	4.6	black, red	13	S1107
3020599	20 AWG/3c	7-strand	0.010	0.25	0.189	4.8	Chart 1	19	S1107
3020600	20 AWG/4c	7-strand	0.010	0.25	0.207	5.3	Chart 1	27	S1107
3020601	20 AWG/5c	7-strand	0.010	0.25	0.217	5.5	Chart 1	33	S1107
3020602	20 AWG/6c	7-strand	0.010	0.25	0.232	5.9	Chart 1	39	S1107
3020603	20 AWG/7c	7-strand	0.010	0.25	0.245	6.2	Chart 1	45	S1107
3020604	20 AWG/9c	7-strand	0.010	0.25	0.270	6.9	Chart 1	57	S1109
3020605	20 AWG/12c	7-strand	0.010	0.25	0.301	7.6	Chart 1	71	S1111
3020606	20 AWG/15c	7-strand	0.010	0.25	0.329	8.4	Chart 2	91	S1111
3020607	18 AWG/2c	16-strand	0.012	0.30	0.209	5.3	black, red	21	S1107
3020608	18 AWG/3c	16-strand	0.012	0.30	0.221	5.6	Chart 1	27	S1107
3020609	18 AWG/4c	16-strand	0.012	0.30	0.240	6.1	Chart 1	38	S1107
3020610	18 AWG/5c	16-strand	0.012	0.30	0.251	6.4	Chart 1	43	S1109
3020611	18 AWG/7c	16-strand	0.012	0.30	0.285	7.2	Chart 1	60	S1111
3020612	18 AWG/12c	16-strand	0.012	0.30	0.353	9.0	Chart 2	103	S1111
3020613	18 AWG/15c	16-strand	0.012	0.30	0.386	9.8	Chart 2	128	S1113
3020614	18 AWG/25c	16-strand	0.012	0.30	0.492	12.5	Chart 2	206	S1116
3020615	16 AWG/2c	26-strand	0.015	0.38	0.248	6.3	Chart 2	30	S1109
3020616	16 AWG/3c	26-strand	0.015	0.38	0.262	6.7	Chart 2	45	S1109
3020617	16 AWG/4c	26-strand	0.015	0.38	0.286	7.3	Chart 2	59	S1111
3020618	16 AWG/5c	26-strand	0.015	0.38	0.300	7.6	Chart 2	70	S1111
3020619	16 AWG/7c	26-strand	0.015	0.38	0.343	8.7	Chart 2	100	S1111
3020620	16 AWG/12c	26-strand	0.015	0.38	0.430	10.9	Chart 2	173	S1113
3020621	16 AWG/15c	26-strand	0.015	0.38	0.483	12.3	Chart 2	202	S1116
3020622	16 AWG/25c	26-strand	0.015	0.38	0.633	16.1	Chart 2	340	S1121

**C 304 S**

Multi-Conductor, Low-Voltage Communication, Audio & Control Cable; Shielded

C304 S

**Construction**Conductors: Tinned copperInsulation: SR-PVC or polyethyleneShielded: Foil tape facing out (100% coverage); drain wireJacket: Gray PVC**Technical Data** **Minimum Bend Radius:** 7.5 x cable diameter **Temperature Range:**
- SR-PVC: -20°C to +105°C
- Polyethylene: -20°C to +75°C **Nominal Voltage:** 300V **Test Voltage:** 1500V **Conductor Stranding:** Fine wire **Color Code:** see table below **Approvals:**
UL: CMG per UL 444
AWM 2464
Attributes: NFPA 79 2012
NEC: Meets NEC Art. 800
Canada: CSA CMG FT4
CSA AWM I/II A/B FT1
Additional: RoHS**Cable Attributes, page 73**

OR-01



FR-03



FL-01



MP-01

OIL

FLAME

MOTION

MECH

* 24 & 22 AWG meet RS-232 applications.

Part Number	Size / Number of Conductors	Stranding	Primary Insulation	Wall Thickness		Cable Outer Diameter		Color Code page 75	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
				(in)	(mm)	(in)	(mm)			
3020540**	24 AWG/1pr	7-strand	PE	0.010	0.25	0.135	3.4	Chart 1	13	S1107
3020631	24 AWG/3c	7-strand	SR-PVC	0.010	0.25	0.162	4.1	Chart 1	16	S1107
3020632	24 AWG/4c	7-strand	SR-PVC	0.010	0.25	0.173	4.4	Chart 1	19	S1107
3020633	24 AWG/5c	7-strand	SR-PVC	0.010	0.25	0.180	4.6	Chart 1	21	S1107
3020634	24 AWG/6c	7-strand	SR-PVC	0.010	0.25	0.191	4.9	Chart 1	26	S1107
3020635	24 AWG/7c	7-strand	SR-PVC	0.010	0.25	0.201	5.1	Chart 1	28	S1107
3020636	24 AWG/10c	7-strand	SR-PVC	0.010	0.25	0.228	5.8	Chart 1	35	S1107
3020637	24 AWG/12c	7-strand	SR-PVC	0.010	0.25	0.243	6.2	Chart 2	46	S1107
3020638	24 AWG/15c	7-strand	SR-PVC	0.010	0.25	0.264	6.7	Chart 2	52	S1109
3020639	24 AWG/25c	7-strand	SR-PVC	0.010	0.25	0.321	8.2	Chart 2	80	S1111
3020544**	22 AWG/1pr	7-strand	PE	0.015	0.38	0.169	4.3	Chart 1	16	S1107
3020641	22 AWG/3c	7-strand	PE	0.015	0.38	0.184	4.7	Chart 1	21	S1107
3020642	22 AWG/4c	7-strand	PE	0.015	0.38	0.200	5.1	Chart 1	25	S1107
3020643	22 AWG/5c	7-strand	SR-PVC	0.010	0.25	0.196	5.0	Chart 1	27	S1107
3020644	22 AWG/7c	7-strand	SR-PVC	0.010	0.25	0.219	5.6	Chart 1	36	S1107
3020645	22 AWG/8c	7-strand	SR-PVC	0.010	0.25	0.231	5.9	Chart 1	39	S1107
3020646	22 AWG/10c	7-strand	SR-PVC	0.010	0.25	0.250	6.4	Chart 1	43	S1109
3020647	22 AWG/12c	7-strand	SR-PVC	0.010	0.25	0.267	6.8	Chart 1	53	S1109
3020648	22 AWG/15c	7-strand	SR-PVC	0.010	0.25	0.291	7.4	Chart 2	64	S1111
3020649	22 AWG/25c	7-strand	SR-PVC	0.010	0.25	0.370	9.4	Chart 2	103	S1111
3020548**	20 AWG/1pr	7-strand	PE	0.015	0.38	0.191	4.9	Chart 1	22	S1107
3020651	20 AWG/3c	7-strand	PE	0.015	0.38	0.202	5.1	Chart 1	28	S1107
3020652	20 AWG/4c	7-strand	SR-PVC	0.010	0.25	0.209	5.3	Chart 1	31	S1107
3020653	20 AWG/5c	7-strand	SR-PVC	0.010	0.25	0.219	5.6	Chart 2	36	S1107
3020654	20 AWG/6c	7-strand	SR-PVC	0.010	0.25	0.234	5.9	Chart 2	42	S1107
3020655	20 AWG/7c	7-strand	SR-PVC	0.010	0.25	0.247	6.3	Chart 2	47	S1109
3020656	20 AWG/10c	7-strand	SR-PVC	0.010	0.25	0.283	7.2	Chart 2	63	S1111
3020657	20 AWG/12c	7-strand	SR-PVC	0.010	0.25	0.303	7.7	Chart 2	74	S1111
3020658	20 AWG/15c	7-strand	SR-PVC	0.010	0.25	0.331	8.4	Chart 2	94	S1111
3020659	20 AWG/25	7-strand	SR-PVC	0.010	0.25	0.409	10.4	Chart 2	148	S1113
3020552**	18 AWG/1pr	16-strand	PE	0.015	0.38	0.210	5.3	Chart 1	27	S1107
3020661	18 AWG/3c	16-strand	PE	0.015	0.38	0.222	5.6	Chart 1	34	S1107
3020662	18 AWG/4c	16-strand	SR-PVC	0.012	0.30	0.242	6.1	Chart 1	42	S1107
3020663	18 AWG/5c	16-strand	SR-PVC	0.012	0.30	0.253	6.4	Chart 2	49	S1109
3020664	18 AWG/7c	16-strand	SR-PVC	0.012	0.30	0.287	7.3	Chart 2	64	S1111
3020665	18 AWG/12c	16-strand	SR-PVC	0.012	0.30	0.355	9.0	Chart 2	107	S1111
3020666	18 AWG/15c	16-strand	SR-PVC	0.012	0.30	0.388	9.9	Chart 2	130	S1113
3020667	18 AWG/25c	16-strand	SR-PVC	0.012	0.30	0.520	13.2	Chart 2	190	S1116
3020556**	16 AWG/1pr	26-strand	PE	0.015	0.38	0.210	5.3	Chart 1	37	S1107
3020669	16 AWG/3c	26-strand	PE	0.015	0.38	0.250	6.4	Chart 1	48	S1109
3020670	16 AWG/4c	26-strand	SR-PVC	0.015	0.38	0.288	7.3	Chart 1	63	S1111
3020671	16 AWG/5c	26-strand	SR-PVC	0.015	0.38	0.302	7.7	Chart 2	75	S1111
3020672	16 AWG/7c	26-strand	SR-PVC	0.015	0.38	0.345	8.8	Chart 2	103	S1111
3020673	16 AWG/12c	26-strand	SR-PVC	0.015	0.38	0.432	11.0	Chart 2	167	S1113
3020674	16 AWG/15c	26-strand	SR-PVC	0.015	0.38	0.485	12.3	Chart 2	210	S1116
3020675	16 AWG/25c	26-strand	SR-PVC	0.015	0.38	0.635	16.1	Chart 2	350	S1121

** Part numbers will be marked D 304 OS

D 304 IS

Multi-Pair, Low-Voltage Communication, Audio, Signal & Control Cable; Individually Shielded Pairs



ELECTRONIC
CABLE



Construction

Conductors: Tinned copper

Pairs: Pairs are isolated

Insulation: See table below

Shielding: Foil tape facing in (100% coverage); drain wire for each pair

Jacket: Gray PVC



Technical Data

Minimum Bend Radius: 7.5 x cable diameter

Temperature Range: -20°C to +75°C

Nominal Voltage: 300V

Test Voltage: 1500V

Conductor Stranding: Fine wire

Color Code: see table below

Approvals:

UL: CMG per UL 444
Attributes: NFPA 79 2012
NEC: Meets NEC Art. 800
Canada: CSA CMG FT4
CSA AWM I/II A/B FT1
Additional: RoHS

Cable Attributes, page 73



OR-01



FR-03



FL-01



MP-01

OIL

FLAME

MOTION

MECH

* 24 & 22 AWG meet RS-232 applications.

Part Number	Size / Number of Conductors	Stranding	Primary Insulation	Wall Thickness (in) (mm)	Cable Outer Diameter (in) (mm)	Nominal Capacitance pF/ft A ¹ pF/ft B ²	Color Code page 75	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
3020540**	24 AWG/1pr	7-strand	PE	0.010 0.25	0.135 3.4	18 37	Chart 1	13	S1107
3020502	24 AWG/2c	7-strand	FPE	0.013 0.33	0.234 5.9	12.5 23	Chart 3	27	S1107
3020503	24 AWG/3c	7-strand	FPE	0.013 0.33	0.249 6.3	12.5 23	Chart 3	34	S1109
3020504	24 AWG/4c	7-strand	FPE	0.013 0.33	0.274 7.0	12.5 23	Chart 3	46	S1109
3020505	24 AWG/6c	7-strand	FPE	0.013 0.33	0.309 7.8	12.5 23	Chart 3	52	S1111
3020506	24 AWG/9c	7-strand	FPE	0.013 0.33	0.369 9.4	12.5 23	Chart 3	80	S1111
3020507	24 AWG/11c	7-strand	FPE	0.013 0.33	0.395 10.0	12.5 23	Chart 3	94	S1113
3020508	24 AWG/15c	7-strand	FPE	0.013 0.33	0.451 11.5	12.5 23	Chart 3	124	S1113
3020509	24 AWG/27c	7-strand	FPE	0.013 0.33	0.626 15.9	12.5 23	Chart 3	218	S1121
3020544**	22 AWG/1pr	7-strand	PE	0.015 0.38	0.169 4.3	24 47	Chart 1	16	S1107
3020511	22 AWG/2c	7-strand	PP	0.010 0.25	0.220 5.6	30 55	bk/r, gn/w	27	S1107
3020512	22 AWG/3c	7-strand	PP	0.010 0.25	0.235 6.0	30 55	Chart 3	34	S1107
3020513	22 AWG/6c	7-strand	PP	0.010 0.25	0.260 6.6	30 55	Chart 3	45	S1109
3020514	22 AWG/9c	7-strand	PP	0.010 0.25	0.369 9.4	30 55	Chart 3	96	S1111
3020515	22 AWG/11c	7-strand	PP	0.010 0.25	0.395 10.0	30 55	Chart 3	117	S1113
3020516	22 AWG/15c	7-strand	PP	0.010 0.25	0.451 11.5	30 55	Chart 3	150	S1113
3020517	22 AWG/27c	7-strand	PP	0.010 0.25	0.654 16.6	30 55	Chart 3	278	S1121
3020548**	20 AWG/1pr	7-strand	PE	0.015 0.38	0.191 4.9	27 49	Chart 1	22	S1107
3020519	20 AWG/2c	7-strand	PP	0.010 0.25	0.250 6.4	27 49	bk/r, gn/w	36	S1109
3020520	20 AWG/3c	7-strand	PP	0.010 0.25	0.267 6.8	30 55	Chart 3	46	S1109
3020521	20 AWG/4c	7-strand	PP	0.010 0.25	0.296 7.5	30 55	Chart 3	60	S1111
3020522	20 AWG/6c	7-strand	PP	0.010 0.25	0.355 9.0	30 55	Chart 3	84	S1111
3020523	20 AWG/9c	7-strand	PP	0.010 0.25	0.422 10.7	30 55	Chart 3	126	S1113
3020524	20 AWG/11c	7-strand	PP	0.010 0.25	0.452 11.5	30 55	Chart 3	150	S1113
3020525	20 AWG/15c	7-strand	PP	0.010 0.25	0.525 13.3	30 55	Chart 3	204	S1116
3020552**	18 AWG/1pr	16-strand	PE	0.015 0.38	0.210 5.3	30 44	Chart 1	27	S1107
3020527	18 AWG/2c	16-strand	PP	0.015 0.38	0.326 8.3	30 55	Chart 3	50	S1111
3020528	18 AWG/3c	16-strand	PP	0.015 0.38	0.348 8.8	30 55	Chart 3	66	S1111
3020529	18 AWG/4c	16-strand	PP	0.015 0.38	0.386 9.8	30 55	Chart 3	85	S1113
3020530	18 AWG/6c	16-strand	PP	0.015 0.38	0.447 11.4	30 55	Chart 3	120	S1113
3020531	18 AWG/9c	16-strand	PP	0.015 0.38	0.531 13.5	30 55	Chart 3	172	S1121
3020532	18 AWG/11c	16-strand	PP	0.015 0.38	0.568 14.4	30 55	Chart 3	206	S1121
3020533	18 AWG/15c	16-strand	PP	0.015 0.38	0.643 16.3	30 55	Chart 3	264	S1121

** Part number will be marked D304 OS and foil shield is facing out

¹ Capacitance between conductors

² Capacitance between one conductor & the other conductors connected to the shield



D 304 OS

Multi-Pair, Low-Voltage Communication, Audio, Signal & Control Cable; Overall Shield



Construction

Conductors: Tinned copper

Insulation: See next page

Shielding: Foil tape facing out (100% coverage); drain wire for each pair

Jacket: Gray PVC



Technical Data

Minimum Bend Radius: 7.5 x cable diameter

Temperature Range:
- SR-PVC: -20°C to +105°C
- Polyethylene: -20°C to +75°C

Nominal Voltage: 300V

Conductor Stranding: Fine wire

Color Code: See table below

Approvals:
UL: CMG per UL 444
AWM 2464
Attributes: NFPA 79 2012
NEC: Meets NEC Art. 800
Canada: CSA CMG FT4
CSA AWM I/II A/B FT1
Additional: RoHS

Cable Attributes, page 73



OR-01



FR-03



FL-01



MP-01

OIL

FLAME

MOTION

MECH

* 24 & 22 AWG meet RS-232 applications.

Part Number	Size / Number of Pairs	Stranding	Primary Insulation	Wall Thickness (in) (mm)	Cable Outer Diameter (in) (mm)	Color Code page 75	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
3020540	24 AWG/1pr	7-strand	PE	0.010 0.25	0.135 3.4	Chart 1	13	S1107
3020541	24 AWG/2pr	7-strand	SR-PVC	0.010 0.25	0.211 5.4	Chart 3	19	S1107
3020542	24 AWG/3 pr	7-strand	SR-PVC	0.010 0.25	0.224 5.7	Chart 3	27	S1107
3020543	24 AWG/4pr	7-strand	SR-PVC	0.010 0.25	0.244 6.2	Chart 3	33	S1107
3020544	22 AWG/1pr	7-strand	PE	0.015 0.38	0.169 4.3	Chart 1	16	S1107
3020545	22 AWG/2pr	7-strand	SR-PVC	0.010 0.25	0.232 5.9	Chart 3	26	S1107
3020546	22 AWG/3pr	7-strand	SR-PVC	0.010 0.25	0.245 6.2	Chart 3	31	S1107
3020547	22 AWG/4pr	7-strand	SR-PVC	0.010 0.25	0.268 6.8	Chart 3	41	S1109
3020548	20 AWG/1pr	7-strand	PE	0.015 0.38	0.191 4.9	Chart 1	22	S1107
3020549	20 AWG/2pr	7-strand	SR-PVC	0.010 0.25	0.262 6.7	Chart 3	33	S1109
3020550	20 AWG/3pr	7-strand	SR-PVC	0.010 0.25	0.274 7.0	Chart 3	44	S1109
3020551	20 AWG/4pr	7-strand	SR-PVC	0.010 0.25	0.304 7.7	Chart 3	55	S1111
3020552	18 AWG/1pr	16-strand	PE	0.015 0.38	0.210 5.3	Chart 1	27	S1107
3020553	18 AWG/2pr	16-strand	SR-PVC	0.012 0.3	0.304 7.7	Chart 3	45	S1111
3020554	18 AWG/3pr	16-strand	SR-PVC	0.012 0.3	0.323 8.2	Chart 3	63	S1111
3020555	18 AWG/4pr	16-strand	SR-PVC	0.012 0.3	0.356 9.0	Chart 3	79	S1111
3020556	16 AWG/1pr	26-strand	PE	0.015 0.38	0.236 6.0	Chart 1	37	S1107
3020557	16 AWG/2pr	26-strand	SR-PVC	0.015 0.38	0.366 9.3	Chart 3	71	S1111
3020558	16 AWG/3pr	26-strand	SR-PVC	0.015 0.38	0.390 9.9	Chart 3	95	S1113
3020559	16 AWG/4pr	26-strand	SR-PVC	0.015 0.38	0.434 11.0	Chart 3	122	S1113
3020560	14 AWG/1pr	41-strand	PE	0.030 0.76	0.338 8.6	Chart 1	62	S1111
3020561	14 AWG/2pr	41-strand	SR-PVC	0.015 0.38	0.414 10.5	Chart 3	98	S1113
3020562	14 AWG/3pr	41-strand	SR-PVC	0.015 0.38	0.442 11.2	Chart 3	133	S1113
3020563	14 AWG/4pr	41-strand	SR-PVC	0.015 0.38	0.490 12.4	Chart 3	171	S1116



Construction

Conductors: Finely stranded tinned copper

Insulation: Blended PVC

Jacket: Oil-resistant gray PVC

Technical Data

Minimum Bend Radius: 4 x cable diameter

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

Nominal Voltage: 300V

Conductor Stranding: Fine wire

Color Code:
- 24 - 22 AWG: Chart 4, page 76
- 20 - 16 AWG: Chart 5, page 76

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: 24 AWG is not PLTC
PLTC-ER & ITC-ER
(18 & 16 AWG)
CE & RoHS

Cable Attributes, page 73



Part Number	Size / Number of Conductors	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
302402	24 AWG/2c	0.165 4.2	13	S1107
302403	24 AWG/3c	0.172 4.4	15	S1107
302404	24 AWG/4c	0.183 4.6	18	S1107
302406	24 AWG/6c	0.209 5.3	22	S1107
302408	24 AWG/8c	0.223 5.7	29	S1107
302410	24 AWG/10c	0.253 6.4	35	S1109
302415	24 AWG/15c	0.284 7.2	46	S1111
302420	24 AWG/20c	0.321 8.2	57	S1111
302425	24 AWG/25c	0.355 9.0	71	S1111
302202	22 AWG/2c	0.179 4.5	15	S1107
302203	22 AWG/3c	0.187 4.7	20	S1107
302204	22 AWG/4c	0.200 5.1	22	S1107
302206	22 AWG/6c	0.229 5.8	31	S1107
302208	22 AWG/8c	0.245 6.2	37	S1107
302210	22 AWG/10c	0.289 7.3	44	S1111
302215	22 AWG/15c	0.324 8.2	62	S1111
302220	22 AWG/20c	0.355 9.0	99	S1111
302225	22 AWG/25c	0.414 10.5	126	S1113
302002	20 AWG/2c	0.225 5.7	37	S1107
302003	20 AWG/3c	0.237 6.0	40	S1107
302004	20 AWG/4c	0.256 6.5	51	S1109
302006	20 AWG/6c	0.308 7.8	66	S1111
302008	20 AWG/8c	0.331 8.4	90	S1111
302010	20 AWG/10c	0.381 9.7	97	S1113
302015	20 AWG/15c	0.452 11.5	121	S1113
302020	20 AWG/20c	0.497 12.6	174	S1116
302025	20 AWG/25c	0.554 14.1	238	S1121

Part Number	Size / Number of Conductors	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
301802	18 AWG/2c	0.241 6.1	42	S1107
301803	18 AWG/3c	0.254 6.5	44	S1109
301804	18 AWG/4c	0.285 7.2	53	S1111
301806	18 AWG/6c	0.333 8.5	68	S1111
301808	18 AWG/8c	0.358 9.1	95	S1111
301810	18 AWG/10c	0.437 11.1	130	S1113
301815	18 AWG/15c	0.494 12.5	165	S1116
301820	18 AWG/20c	0.544 13.8	220	S1121
301825	18 AWG/25c	0.629 16.0	276	S1121
301602	16 AWG/2c	0.263 6.7	55	S1109
301603	16 AWG/3c	0.288 7.3	60	S1111
301604	16 AWG/4c	0.312 7.9	75	S1111
301606	16 AWG/6c	0.366 9.3	110	S1111
301608	16 AWG/8c	0.417 10.6	163	S1113
301610	16 AWG/10c	0.481 12.2	181	S1116
301615	16 AWG/15c	0.546 13.9	242	S1121
301620	16 AWG/20c	0.603 15.3	331	S1121
301625	16 AWG/25c	0.696 17.7	410	S1129



UNITRONIC® 300 S

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



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

Conductor Stranding: Fine wire

Color Code:
- 24 - 22 AWG: Chart 4, page 76
- 20 - 16 AWG: Chart 5, page 76



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: 24 AWG is not PLTC
PLTC-ER & ITC-ER
(18 & 16 AWG)
CE & RoHS

Construction

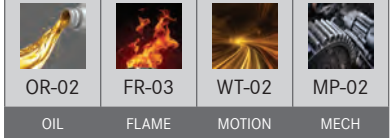
Conductors: Finely stranded tinned copper

Insulation: Blended PVC

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

Jacket: Oil-resistant gray PVC

Cable Attributes, page 73



Part Number	Size / Number of Conductors	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
302402S	24 AWG/2c	0.193	4.9	19	53112210
302403S	24 AWG/3c	0.201	5.1	22	53112210
302404S	24 AWG/4c	0.209	5.3	26	53112210
302406S	24 AWG/6c	0.236	6.0	31	53112210
302408S	24 AWG/8c	0.248	6.3	37	53112210
302410S	24 AWG/10c	0.280	7.1	44	53112210
302415S	24 AWG/15c	0.311	7.9	60	53112220
302420S	24 AWG/20c	0.346	8.8	71	53112220
302425S	24 AWG/25c	0.382	9.7	86	53112230
302202S	22 AWG/2c	0.202	5.1	22	53112210
302203S	22 AWG/3c	0.210	5.3	26	53112210
302204S	22 AWG/4c	0.223	5.7	31	53112210
302206S	22 AWG/6c	0.252	6.4	42	53112210
302208S	22 AWG/8c	0.278	7.1	48	53112210
302210S	22 AWG/10c	0.312	7.9	57	53112220
302215S	22 AWG/15c	0.347	8.8	77	53112220
302220S	22 AWG/20c	0.378	9.6	95	53112230
302225S	22 AWG/25c	0.445	11.3	117	53112240
302002S	20 AWG/2c	0.248	6.3	48	53112210
302003S	20 AWG/3c	0.260	6.6	51	53112210
302004S	20 AWG/4c	0.289	7.3	62	53112220
302006S	20 AWG/6c	0.331	8.4	79	53112220
302008S	20 AWG/8c	0.354	9.0	106	53112220
302010S	20 AWG/10c	0.426	10.8	115	53112230
302015S	20 AWG/15c	0.483	12.3	143	53112240
302020S	20 AWG/20c	0.528	13.4	203	53112240
302025S	20 AWG/25c	0.585	14.9	271	53112250

Part Number	Size / Number of Conductors	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® Non-Metallic PG Thread
301802S	18 AWG/2c	0.266	6.8	53	53112210
301803S	18 AWG/3c	0.289	7.3	57	53112220
301804S	18 AWG/4c	0.310	7.9	68	53112220
301806S	18 AWG/6c	0.358	9.1	88	53112220
301808S	18 AWG/8c	0.383	9.7	115	53112230
301810S	18 AWG/10c	0.469	11.9	154	53112240
301815S	18 AWG/15c	0.525	13.3	196	53112240
301820S	18 AWG/20c	0.575	14.6	256	53112250
301825S	18 AWG/25c	0.660	16.8	311	53112250
301602S	16 AWG/2c	0.298	7.6	66	53112220
301603S	16 AWG/3c	0.313	8.0	79	53112220
301604S	16 AWG/4c	0.337	8.6	95	53112220
301606S	16 AWG/6c	0.413	10.5	141	53112230
301608S	16 AWG/8c	0.448	11.4	181	53112240
301610S	16 AWG/10c	0.512	13.0	209	53112240
301615S	16 AWG/15c	0.577	14.7	342	53112250
301620S	16 AWG/20c	0.654	16.6	401	53112250
301625S	16 AWG/25c	0.727	18.5	496	53112260

ÖLFLEX® VFD SLIM

Reduced-Diameter VFD Cable; 600/1000V; UL & c(UL) TC Approval



MOTOR &
DRIVE



Construction

Conductors: Finely stranded tinned copper
Insulation: "Lapp Surge Guard" insulation system
Shielding: Barrier tape; triple layer foil tape (100% coverage);
 tinned copper braid (85% coverage)
Jacket: Specially formulated black PVC

Technical Data

	Minimum Bend Radius:	7.5 x cable diameter
	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
	Nominal Voltage:	
	- UL/CSA TC:	600V
	- UL WTTC:	1000V
	- UL Flexible	
	Motor Supply:	1000V
	- UL/CSA AWM:	1000V

Conductor Stranding:
 - 18-6 AWG*: Class 5 fine wire
 - 4-2 AWG: Class K fine wire

Color Code: Black with white numbers,
 plus green/yellow ground

Approvals:
 UL: TC-ER per UL 1277
 MTW per UL 1063
 WTTC per UL 2277
 AWM 20886

* 18 AWG meets only the Class 5 cross section
 and DC resistance

Attributes: UL Oil Res I/II
 75°C Wet; 90°C Dry
 -40°C Cold Bend;
 -25°C Cold Impact
 Sunlight Resistant
 Submersible Pump
 (14 AWG & larger)
 Direct Burial
 NFPA 79 2012
NEC: Class 1 Division 2 per NEC
 Articles 336, 501
Canada: c(UL) CIC/TC FT4
 CSA AWM I/II A/B 1000V FT4
Additional: MSHA P-07KA050013-MSHA
 CE & RoHS

Part Number	Size / Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	SKINTOP® MS-M BRUSH
761804	18 AWG/4c	0.394 10.0	112	53112230	—
761604*	16 AWG/4c	0.465 11.8	154	53112240	53112676
761404	14 AWG/4c	0.514 13.1	194	53112240	53112676
761204	12 AWG/4c	0.583 14.8	254	53112250	53112676
761004	10 AWG/4c	0.697 17.7	346	53112260	53112677
760804	8 AWG/4c	0.829 21.1	596	53112260	53112678
760604	6 AWG/4c	1.002 25.5	785	53112270	53112678
760404	4 AWG/4c	1.186 30.1	965	53112270	53112679
760204	2 AWG/4c	1.395 35.4	1339	—	53112680

Cable Attributes, page 73			
OIL	FLAME	MOTION	MECH

* 16 AWG cable has a drain wire

ÖLFLEX® VFD XL

Precision Control VFD Cable; 600/1000V; UL & c(UL) TC Approval



MOTOR &
DRIVE



Construction

Conductors: Finely stranded tinned copper
Insulation: XLPE
Shielding: Barrier tape; triple layer foil tape (100% coverage);
 tinned copper braid (85% coverage)
Jacket: Specially formulated black PVC

Technical Data

	Minimum Bend Radius:	7.5 x cable diameter
	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
	Nominal Voltage:	
	- UL/CSA TC:	600V
	- UL WTTC:	1000V
	- UL Flexible	
	Motor Supply:	1000V

Conductor Stranding:
 - 16-8 AWG: Class 5 fine wire
 - 6-2 AWG: Class K fine wire

Color Code: Black with white numbers,
 plus green/yellow ground

Approvals:
 UL: TC-ER per UL 1277
 WTTC per UL 2277

Attributes: UL Oil Res I/II
 90°C Wet or Dry
 -40°C Cold Bend;
 -25°C Cold Impact
 Sunlight Resistant
 Direct Burial
 NFPA 79 2012
NEC: Class 1 Division 2 per NEC
 Articles 336, 501
Canada: c(UL) CIC/TC FT4
Additional: CE & RoHS

Part Number	Size / Number of Conductors (incl. ground)	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	SKINTOP® MS-M BRUSH Metric Thread
731604	16 AWG/4c	0.508 12.9	167	53112240	53112676
731404	14 AWG/4c	0.581 14.8	214	53112250	53112676
731204	12 AWG/4c	0.649 16.5	274	53112250	53112677
731004	10 AWG/4c	0.700 17.8	361	53112260	53112677
730804	8 AWG/4c	0.887 22.5	571	53112260	53112678
730604	6 AWG/4c	1.022 25.9	885	53112270	53112678
730404	4 AWG/4c	1.158 29.4	1136	53112270	53112679
730204	2 AWG/4c	1.332 33.8	1460	—	53112679

Cable Attributes, page 73			
OIL	FLAME	MOTION	MECH

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.

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LAPP GROUP



ÖLFLEX® VFD with Signal

Flexible VFD Cable with a Pair for Signal or Temperature Sensor; 600/1000V; UL & c(UL) TC Approval

LAPP KABEL STUTTGART

ÖLFLEX® VFD with Signal



Technical Data

Minimum Bend Radius: 7.5 x cable diameter

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

Nominal Voltage:
 - UL/CSA TC: 600V
 - UL WTTC: 1000V
 - UL Flexible Motor Supply: 1000V
 - UL/CSA AWM: 1000V

Conductor Stranding:

- 18 - 6 AWG: Class 5 fine wire
 - 4 AWG: Class K fine wire

Color Code: Black with white numbers, plus green/yellow ground; one black pair with white numbers

Approvals:
 UL: TC-ER per UL 1277
 MTW per UL 1063
 WTTC per UL 2277
 AWM 20886

Attributes: UL Oil Res I/II
 75°C Wet; 90°C Dry
 -40°C Cold Bend;
 -25°C Cold Impact
 Sunlight Resistant
 Direct Burial
 Submersible Pump
 (14 AWG & larger)
 Bus Drop
 NFPA 79 2012
NEC: Class 1 Division 2 per NEC
 Articles 336, 501
Canada: c(UL) CIC/TC FT4
 CSA AWM I/II A/B 1000V FT4
Additional: MSHA P-07-KA050011-MSHA
 CE & RoHS

Part Number	Size / Number of Conductors	1 Shielded Pair for Signal	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	SKINTOP® MS-M BRUSH Metric Thread
7416048	16 AWG/4c	18 AWG	0.519	13.2	180	53112240	53112676
7414048	14 AWG/4c	18 AWG	0.573	14.6	216	53112250	53112676
7414044	14 AWG/4c	14 AWG	0.600	15.2	254	53112250	53112676
7412048	12 AWG/4c	18 AWG	0.632	16.1	286	53112250	53112677
7412044	12 AWG/4c	14 AWG	0.662	16.8	326	53112250	53112677
7410044	10 AWG/4c	14 AWG	0.745	18.9	406	53112260	53112677
7408044	8 AWG/4c	14 AWG	0.896	22.8	617	53112260	53112678
7406044	6 AWG/4c	14 AWG	1.026	26.1	848	53112270	53112678

Cable Attributes, page 73



V 2000

VFD Symmetrical 2kV Motor Supply Cable for Large HP VFD Drives; UL TC-ER Approval



Technical Data

Minimum Bend Radius: 15 x cable diameter

Temperature Range: -25°C to +90°C

Nominal Voltage:
 - UL TC: 600/2000V

Conductor Stranding: Class B stranded wire

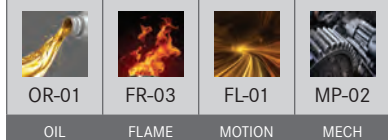
Color Code: Black with white numbers: 1, 2, 3, plus 3 bare symmetrical grounds

Approvals:

UL: TC-ER per UL 1277
 Attributes: 90°C Wet or Dry
 Sunlight Resistant
 Direct Burial
 NFPA 79 2012
NEC: Class 1 Division 2 per NEC
 Articles 336, 501

Part Number	Size / Number of Conductors	3 Symmetrical Grounds	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-M BRUSH Metric Thread
812984	1 AWG/3c	8 AWG	1.26	32.0	1427	53112679
812985	1/0 AWG/3c	6 AWG	1.35	34.3	1836	53112679
812986	2/0 AWG/3c	6 AWG	1.44	36.6	2137	53112680
812987	3/0 AWG/3c	5 AWG	1.55	39.4	2609	53112680
812988	4/0 AWG/3c	4 AWG	1.73	43.4	3254	53112680
812989	250 KCMIL/3c	2 AWG	1.90	48.3	3988	53112681
812990	350 KCMIL/3c	2 AWG	2.12	53.8	5106	53112681
812991	500 KCMIL/3c	1 AWG	2.40	61.0	6886	53112501

Cable Attributes, page 73





Construction

Conductors: Extra fine bare copper

Pairs: 1 pair: twisted together; tinned copper braid (85% coverage);
2 pair: laminated foil shield; drain wire; tinned copper braid (85% coverage)

Insulation: Polypropylene

Jacket: Black polyurethane

Cable Attributes, page 73

Acceleration: up to 50m/s²
Travel speed: up to 5m/s
Travel length: up to 100m



OR-05

OIL



FR-02

FLAME



CF-04A

MOTION



MP-05

MECH

Technical Data



Minimum Bend Radius:

- for continuous flexing: 7.5 x cable diameter
- for stationary use: 4 x cable diameter



Temperature Range:

- for continuous flexing: -40°C to +80°C
- for stationary use: -50°C to +80°C



Nominal Voltage:

- UL/CSA: 1000V
- IEC: 600/1000V



Test Voltage:

4000V



Conductor Stranding:

Class 6 super fine wire



Color Code:

- Power: Black with white print:
U/L1/C/L+; V/L2;
W/L3/D/L-
plus green/yellow ground
- 1 pair: Black & white
- 2 pair: Black with white numbers:
5, 6, 7, 8



Approvals:

- UL: AWM 20234
- Attributes: VW-1
- Canada: cRU AWM I/II A/B 1kV FT1
- Additional: VDE Reg. no 8591 (16 AWG & larger)
- CE & RoHS

Part Number	Size / Number of Conductors Power Conductors + Control Pairs		Max. Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-SC	SKINTOP® MS-M BRUSH
						PG Thread	Metric Thread
0025319	16 AWG/4c +	(16 AWG/1pr)	0.461	11.7	146	53112240	53112676
0025320	14 AWG/4c +	(16 AWG/1pr)	0.516	13.1	181	53112240	53112676
0025321	12 AWG/4c +	(16 AWG/1pr)	0.559	14.2	224	53112250	53112676
0025322	10 AWG/4c +	(16 AWG/1pr)	0.630	16.0	271	53112250	53112676
0025323	8 AWG/4c +	(16 AWG/1pr)	0.724	18.4	390	53112260	53112677
0025324	6 AWG/4c +	(16 AWG/1pr)	0.870	22.1	596	53112650	53112678
0025326	19 AWG/4c +	2 x (22 AWG/1pr)	0.429	10.9	96	53112230	53112676
0025327	16 AWG/4c +	2 x (19 AWG/1pr)	0.484	12.3	140	53112240	53112676
0025328	14 AWG/4c +	2 x (18 AWG/1pr)	0.563	14.3	206	53112250	53112676
0025312	12 AWG/4c +	2 x (18 AWG/1pr)	0.606	15.4	256	53112250	53112676
0025329	12 AWG/4c +	(18 AWG/1pr) + (16 AWG/1pr)	0.614	15.6	261	53112250	53112676
0025330	10 AWG/4c +	(18 AWG/1pr) + (16 AWG/1pr)	0.673	17.1	309	53112260	53112677

() = shielded pairs





ÖLFLEX® SERVO FD 796 CP

High-Acceleration Continuous Flex Servo Cable with PUR Jacket; Shielded

LAPP KABEL STUTTGART

ÖLFLEX® SERVO FD 796 CP



Technical Data



Minimum Bend Radius:

- for continuous flexing: see table below
- for stationary use: 4 x cable diameter



Temperature Range:

- for continuous flexing: -40°C to +80°C
- for stationary use: -50°C to +80°C



Nominal Voltage:

- UL/CSA: 1000V
- IEC U0/U: 600/1000V



Conductor Stranding:

Class 6 super fine wire



Color Code:

- Power: Black conductors with white letters: U/L1/C/L+; V/L2; W/L3/D/L- plus green/yellow ground
- 1 pair: Black & white
- 2 pair: Black with white numbers: 5, 6, 7, 8



Approvals:

- UL: AWM 20234
- Attributes: Flame Retardant VW-1
- Canada: cRU AWM I/II A/B 1kV FT1
- Additional: VDE Reg. no 8591 CE & RoHS

Construction

Conductors: Extra fine bare copper

Pairs: One pair: shielded with tinned copper serve wires; non-woven wrapping; Two core pairs arranged as pair: shielded with foil, drain wire, tinned copper serve wires; non-woven wrapping twisted together

Insulation: Power and pair conductors: polypropylene

Shielding: Overall non woven wrapping; overall tinned copper braid

Jacket: Orange polyurethane

Cable Attributes, page 73

- Acceleration: up to 50m/s²
- Travel speed: up to 5m/s
- Travel length: up to 100m



OR-05



FR-02



CF-04A



MP-05

OIL

FLAME

MOTION

MECH

Part Number	Size / Number of Conductors		Min. Bend Radius for Cont. Flexing (x cable diameter)	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	SKINTOP® MS-M BRUSH Metric Thread
	Power Conductors	Control Pairs						
0027950	16 AWG/4c	—	7.5	0.362	9.2	94	53112220	—
0027951	14 AWG/4c	—	7.5	0.418	10.6	132	53112230	53112676
0027952	12 AWG/4c	—	7.5	0.469	11.9	180	53112240	53112676
0027953	10 AWG/4c	—	7.5	0.567	14.4	267	53112250	53112676
0027954	8 AWG/4c	—	7.5	0.693	17.6	397	53112260	53112677
0027955	6 AWG/4c	—	7.5	0.867	22.0	642	53112260	53112678
0027956	4 AWG/4c	—	10	0.993	25.2	898	53112270	53112678
0027957	2 AWG/4c	—	10	1.131	28.7	1189	53112270	53112679
0027958	1 AWG/4c	—	10	1.316	33.4	1658	—	53112679
0027959	16 AWG/4c	+	7.5	0.473	12.0	175	53112240	53112676
0027960	14 AWG/4c	+	7.5	0.544	13.8	214	53112240	53112676
0027961	12 AWG/4c	+	7.5	0.587	14.9	259	53112250	53112676
0027962	10 AWG/4c	+	7.5	0.670	17.0	327	53112250	53112677
0027963	8 AWG/4c	+	7.5	0.764	19.4	471	53112260	53112677
0027964	6 AWG/4c	+	7.5	0.938	23.8	704	53112260	53112678
0027965	4 AWG/4c	+	10	1.064	27.0	1030	53112270	53112678
0027966	2 AWG/4c	+	10	1.229	31.2	1409	53112270	53112679
0027967	1 AWG/4c	+	10	1.367	34.7	1829	—	53112679
0027969	16 AWG/4c	+	7.5	0.481	12.2	210	53112240	53112676
0027970	14 AWG/4c	+	7.5	0.575	14.6	265	53112250	53112676
0027971	12 AWG/4c	+	7.5	0.642	16.3	326	53112250	53112676
0027972	10 AWG/4c	+	7.5	0.713	18.1	395	53112260	53112677
0027973	8 AWG/4c	+	7.5	0.859	21.8	550	53112260	53112678
0027974	6 AWG/4c	+	7.5	1.005	25.5	763	53112270	53112678
0027975	4 AWG/4c	+	10	1.139	28.9	1048	53112270	53112679
0027976	2 AWG/4c	+	10	1.237	31.4	1406	53112270	53112679
0027977	1 AWG/4c	+	10	1.450	36.8	1962	—	53112680

() = shielded pairs



LAPP KABEL STUTTGART

ÖLFLEX® SERVO FD 798 CP



Construction

Conductors: Extra fine tinned copper
Pairs: Twisted and bundled; shielded (see chart)
Insulation: Polypropylene
Shielding: Tinned copper braid (85% coverage)
Jacket: Green polyurethane

Technical Data

- Minimum Bend Radius:**
- for continuous flexing: 7.5 x cable diameter
 - for installation: 4 x cable diameter
- Temperature Range:**
- for stationary use: -50°C to +80°C
 - for continuous flexing: -40°C to +80°C

- Nominal Voltage:** 30V
- Conductor Stranding:** Extra fine wire
- Color Code:** See following color chart

- Approvals:**
- UL: AWM 20236
 - Attributes: VW-1
 - Canada: CSA AWM I/II A/B FT1
 - Additional: RoHS
 - MUD acc. to IEC 61892-4 Annex D

Part Number	Size / Number of Conductors		Maximum Outer Diameter		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	SKINTOP® MS-M BRUSH Metric Thread
	Power Conductors	Control Pairs	(in)	(mm)			
0036910	20 AWG/4c	+ 22 AWG/4pr	0.350	8.9	84	53112220	—
0036911	2 x (20 AWG/1c)	+ 3 x (26 AWG/1pr)	0.350	8.9	81	53112220	—
0036912	26 AWG/4c	+ 3 x (26 AWG/1pr) + 20 AWG/1pr	0.346	8.8	74	53112220	—
0036913	26 AWG/4c + 26 AWG/4c	+ 3 x (26 AWG/1pr) + 20 AWG/1pr	0.370	9.4	87	53112220	53112676
0036914	20 AWG/9c	—	0.346	8.8	74	53112220	—
0036915	18 AWG/2c	+ 24 AWG/4pr	0.346	8.8	73	53112230	53112676
0036916	20 AWG/2c	+ 24 AWG/6pr	0.406	10.3	81	53112220	—
0036917	26 AWG/10c	+ 20 AWG/1pr	0.303	7.7	55	53112220	—
0036918	26 AWG/10c + 20 AWG/4c	—	0.319	8.1	66	53112220	—
0036920	20 AWG/4c	+ 26 AWG/4pr	0.323	8.2	64	53112220	—
0036921	—	24 AWG/4pr	0.299	7.6	50	53112220	—
0036923	—	26 AWG/8pr	0.307	7.8	57	53112210	—
0036924	—	26 AWG/4pr	0.252	6.4	35	53112210	—
0036926	24 AWG/12c	—	0.272	6.9	49	53112210	—
0036927	20 AWG/2c	+ 24 AWG/4pr	0.335	8.5	66	53112220	—
0036928	20 AWG/4c + (26 AWG/4c)	+ 26 AWG/2pr + 2 x (26 AWG/1pr)	0.358	9.1	91	53112220	—
0036929	20 AWG/2c	+ 2 x (24 AWG/1pr)	0.343	8.7	66	53112210	—
0036930	20 AWG/2c	+ 24 AWG/2pr	0.287	7.3	48	53112210	—

() = shielded pairs/conductors

Cable Attributes, page 73	
OIL	OR-05
FLAME	FR-02
MOTION	CF-04A
MECH	MP-05

Part Number	Power Cores		Control Pairs	
	Size	Color Code & Shielding	Size	Color Code & Shielding
0036910	20 AWG/4c	bl/w — bk/w — r/w — y/w	22 AWG/4pr	bk & br — r & o — y & gn — bl & v
0036911	20 AWG/2c	w — br	26 AWG/3pr	y & gn — r & bl — gy & pk
0036912	26 AWG/4c	gy — bl — w/y — w/bk	26 AWG/3pr	y & gn — bk & br — r & o
0036913	26 AWG/4c	gy — bl — w/y — w/bk	20 AWG/1pr	br/r & br/bl
0036914*	26 AWG/4c	br/y — br/gy — gn/bk — gn/r	26 AWG/3pr	y & gn — bk & br — r & o
0036914*	20 AWG/9c	bl — w — r — pk — gn — y — br — bk — gy	20 AWG/1pr	br/r & br/bl
0036915*	18 AWG/2c	w — br	—	—
0036916*	20 AWG/2c	w — br	24 AWG/4pr	br & gn — gy & pk — bl & v — r & bk
0036917	26 AWG/10c	w — br — gn — y — gy — pk — bl — r — bk — v	24 AWG/6pr	w & br — gn & y — gy & pk — bl & r — bk & v — gy/pk & r/bl
0036918	26 AWG/10c	w — br — gn — y — gy — pk — bl — r — bk — v	20 AWG/1pr	w & br
0036918	20 AWG/4c	w — br — bl — bk	—	—
0036920	20 AWG/4c	w — bl — w/gn — br/gn	26 AWG/4pr	r & bk — br & gn — y & v — gy & pk
0036921	—	—	24 AWG/4pr	w & br — gn & y — gy & pk — bl & r
0036923	—	—	26 AWG/8pr	w/y & w/gn — w/r & w/o — w/bk & w/br — gy & w — bl & v — y & gn — r & o — bk & br
0036924	—	—	26 AWG/4pr	bk & br — r & o — y & gn — bl & v
0036926	26 AWG/12c	bk — br — r — o — y — gn — bl — v — gy — w — w/bk — w/br	—	—
0036927*	20 AWG/2c	w — br	24 AWG/4pr	br & gn — gy & pk — bl & v — r & bk
0036928	26 AWG/4c	w — br — gn — y	26 AWG/2pr	bl & r — gy & pk
0036928	20 AWG/4c	w — br — gn — y	26 AWG/2pr	w & br — gn & y
0036929*	20 AWG/2c	pk — gy	24 AWG/2pr	w & br — gn & y
0036930*	20 AWG/2c	w — br	24 AWG/2pr	r & bk — gy & pk



ÖLFLEX® CHAIN 896 P

High-Acceleration Continuous Flexing Control Cable with PUR Jacket

LAPP KABEL STUTTGART

ÖLFLEX® CHAIN 896 P



Construction

Conductors: Extra fine bare copper conductors

Insulation: Polypropylene; non-woven wrapping

Jacket: Black polyurethane



Cable Attributes, page 73

Acceleration: up to 50m/s²

Travel speed: up to 5m/s

Travel length: up to 100m



OR-05



FR-02



CF-04A



MP-05

OIL

FLAME

MOTION

MECH

Technical Data



Minimum Bend Radius:

- for flexible use:

- 16 - 6 AWG: 7.5 x cable diameter

- 4 AWG: 10 x cable diameter

- for stationary use:

4 x cable diameter



Temperature Range:

- for flexible use: -40°C to +80°C

- for stationary use: -50°C to +80°C



Nominal Voltage:

- UL/CSA:

1000V

- IEC:

600/1000V



Conductor Stranding:

Class 6 super fine

wire



Color Code:

Black with white numbers



Approvals:

UL: AWM 20234

Attributes: VW-1

Canada: cRU AWM I/II A/B 1kV FT1

Additional: VDE Reg. no. 8661

MUD acc. to

IEC 61892-4 Annex D

CE & RoHS

Part Number	Size / Number of Conductors (incl. ground)	Nominal Outer Diameter		Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread
		(in)	(mm)		
1023229	16 AWG/4c	0.378	9.6	81	S2113
1023230	16 AWG/5c	0.394	10.0	96	S2113
1023238	14 AWG/4c	0.433	11.0	117	S2113
1023239	14 AWG/5c	0.473	12.0	141	S2116
1023245	12 AWG/4c	0.493	12.5	163	S2116
1023246	12 AWG/5c	0.540	13.7	212	S2121
1023248	10 AWG/4c	0.563	14.3	225	S2121
1023249	10 AWG/5c	0.619	15.7	295	S2121
1023250	8 AWG/4c	0.670	17.0	338	S2121
1023251	8 AWG/5c	0.745	18.9	446	S2129
1023252	6 AWG/4c	0.835	21.2	544	S2129
1023253	6 AWG/5c	0.938	23.8	843	S2129
1023254	4 AWG/4c	1.020	25.9	843	S2136
1023255	4 AWG/5c	1.143	29.0	1063	S2136



Servo Cable according to SIEMENS® Standard 6FX 8 Plus

Highly Flexible Servo Cable for High-Acceleration Continuous Flexing Motion



MOTOR &
DRIVE



Construction

Conductors: Signal cables: tinned copper;

Power cables: bare copper

Pairs: Twisted together; shielded with tinned copper braid and non-woven wrap

Insulation: Polypropylene

Shielding: Overall tinned copper braid and non-woven wrap

Jacket: Feedback/signal: green polyurethane;

Servo/motor: orange polyurethane

Technical Data



Minimum Bend Radius:

- for continuous flexing: see table below
- for stationary use: 4 x cable diameter



Temperature Range:

- for continuous flexing: -20°C to +60°C
- for stationary use: -50°C to +80°C



Nominal Voltage:

- Signal conductors: 30V
- Power/control conductors: 1000V



Conductor Stranding:

Class 6 super fine wire



Color Code:

- Feedback/signal: see color chart below
- Motor/servo: Black with white print:
- 16-14 AWG: V/L2
- U/L1/C/L+ W/L3/D/L- plus green/yellow ground

- 12-1 AWG:

U/L1/C/L+
V/L2
W/L3/D/L-
plus green/yellow ground



Approvals:

- UL: AWM 21223
AWM 20236 (sensor leads)
- Canada: CSA AWM I/II A/B 1kV 80°C FT1
- Additional: Based on VDE specifications
CE & RoHS

Part Number	Cable Type	Size / Number of Conductors	Min. Bend Radius Continuous Flexing (x cable diameter)	SIEMENS® Part Number	Nominal Outer Diameter (in) (mm)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC PG Thread	SKINTOP® MS-M BRUSH Metric Thread
00277101	Feedback/Signal	26 AWG/8pr	8	6FX8008-1BD11	0.307 7.8	57	53112210	—
00277111	Feedback/Signal	22 AWG/4pr + 20 AWG/4c	8	6FX8008-1BD21	0.350 8.9	81	53112220	—
00277121	Feedback/Signal	3 x (26 AWG/1pr) + 2 x (20 AWG/1c)	8	6FX8008-1BD31	0.350 8.9	76	53112220	—
00277131	Feedback/Signal	3 x (26 AWG/1pr) + 26 AWG/4c + 20 AWG/1pr	8	6FX8008-1BD41	0.346 8.8	68	53112220	—
00277141	Feedback/Signal	3 x (26 AWG/1pr) + 26 AWG/4c + 20 AWG/2c + 26 AWG/4c	8	6FX8008-1BD51	0.370 9.4	93	53112220	53112676
00277151	Feedback/Signal	26 AWG/4pr	8	6FX8008-1BD61	0.252 6.4	36	53112220	—
00277161	Feedback/Signal	26 AWG/2pr	8	6FX8008-1BD71	0.197 5.0	24	53112210	—
00277171	Feedback/Signal	26 AWG/12c	8	6FX8008-1BD81	0.272 6.9	51	53112210	—
00277992	Feedback/Signal	26 AWG/2pr + 21 AWG/1pr	8	6FX8008-2DC00	0.283 7.2	50	53112210	—
0027784	Motor	16 AWG/4c	7.5	6FX8008-1BB11-Plus	0.359 9.1	101	53112220	53112676
0027785	Motor	14 AWG/4c	7.5	6FX8008-1BB21-Plus	0.418 10.6	148	53112230	53112676
0027786	Motor	12 AWG/4c	7.5	6FX8008-1BB31-Plus	0.469 11.9	202	53112240	53112676
0027787	Motor	10 AWG/4c	7.5	6FX8008-1BB41-Plus	0.571 14.5	302	53112250	53112676
0027788	Motor	8 AWG/4c	7.5	6FX8008-1BB51-Plus	0.690 17.5	444	53112260	53112677
0027789	Motor	6 AWG/4c	7.5	6FX8008-1BB61-Plus	0.851 21.6	679	53112260	53112678
0027790	Servo	16 AWG/4c + (16 AWG/1pr)	7.5	6FX8008-1BA11-Plus	0.457 11.6	155	53112230	53112676
0027791	Servo	14 AWG/4c + (16 AWG/1pr)	7.5	6FX8008-1BA21-Plus	0.528 13.4	202	53112240	53112676
0027792	Servo	12 AWG/4c + (16 AWG/1pr)	7.5	6FX8008-1BA31-Plus	0.583 14.8	255	53112250	53112676
0027793	Servo	10 AWG/4c + (16 AWG/1pr)	7.5	6FX8008-1BA41-Plus	0.662 16.8	356	53112250	53112676
0027794	Servo	8 AWG/4c + (16 AWG/1pr)	7.5	6FX8008-1BA51-Plus	0.764 19.4	514	53112260	53112677
0027795	Servo	6 AWG/4c + (16 AWG/1pr)	7.5	6FX8008-1BA61-Plus	0.910 23.1	732	53112660	53112678
0027796	Servo	4 AWG/4c + (16 AWG/1pr)	10	6FX8008-1BA25-Plus	1.048 26.6	1028	53112270	53112678
0027797	Servo	2 AWG/4c + (16 AWG/1pr)	10	6FX8008-1BA35-Plus	1.217 30.9	1371	53112270	53112679
0027798	Servo	1 AWG/4c + (16 AWG/1pr)	10	6FX8008-1BA50-Plus	1.340 34.0	1855	—	53112679

Part Number	Size / Number of Conductors	Color Code
00277101	26 AWG/8pr	w/y & w/gn — w/r & w/o — w/bk & w/br — gy & w — bl & v — y & gn — r & o — bk & br
00277111	22 AWG/4pr 20 AWG/4c	br & bk — r & o — y & gn — bl & v w/bl — w/bk — w/r — w/y
00277121	26 AWG/3pr 20 AWG/2c	y & gn — bk & br — r & o bk — r
00277131	26 AWG/3pr 26 AWG/4c 20 AWG/1pr	y & gn — bk & br — r & o gy — bl — w/y — w/bk br/r & br/bl
00277141	26 AWG/3pr 26 AWG/4c 20 AWG/4c 20 AWG/2c	y & gn — bk & br — r & o gy — bl — w/y — w/bk br/y — br/gy — gn/bk — gn/r br/r — br/bl
00277151	26 AWG/4pr	bk & br — r & o — y & gn — bl & v
00277161	26 AWG/2pr	r & o — bk & br
00277171	26 AWG/12c	bk — br — r — o — y — gn — bl — v — gy — w — w/bk — w/br

() = shielded pairs

Cable Attributes, page 73

Acceleration: up to 50m/s²
Travel speed: up to 5m/s
Travel length: up to 100m



OR-05



FR-02



CF-04A



MP-05

OIL

FLAME

MOTION

MECH

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.

800-774-3539 • www.lappusa.com
www.lappcanada.com • www.lappmexico.com



LAPP GROUP



Servo Cable according to INDRAMAT® Standard INK

Continuous Flex Cable according to INDRAMAT® Standard INK



Technical Data



Minimum Bend Radius:

- Feedback/signal cables: 10 x cable diameter
- Servo/motor cables: 7.5 x cable diameter



Temperature Range:

- for continuous flexing: -30°C to +80°C
- for stationary use: -50°C to +80°C



Nominal Voltage:

- Feedback/signal cond.: 300V
- Power/control cond.: 1000V



Conductor Stranding:

Class 6 fine wire



Color Code:

- Feedback cables: See color chart below
- Power conductors: Black with white numbers: 1, 2, 3 plus green/yellow ground
- Control pairs: Black with white numbers: 5/6, 7/8



Approvals:

UL: AWM 20234 (servo/motor)
AWM 20236 (signal)
Canada: CSA AWM I/II A/B FT1
Additional: CE & RoHS

Part Number	Cable Type	Size / Number of Conductors	INDRAMAT® Part Number	Nominal Outer Diameter (in) (mm)		Approx. Weight (lbs/mft)	SKINTOP® MS-MC PG Thread	SKINTOP® MS-M BRUSH Metric Thread
7072400	Feedback/Signal	24 AWG/4pr + 18 AWG/2c	INK-0209	0.347	8.8	81	53112220	—
7072401	Feedback/Signal	24 AWG/4pr + 20 AWG/2c	INK-0448	0.335	8.5	67	53112220	—
7072402	Feedback/Signal	20 AWG/9c	INK-0208	0.347	8.8	85	53112220	—
7072414	Feedback/Signal	18 AWG/4c + 26 AWG/4pr + (26 AWG/4c)	INK-0532	0.382	9.7	94	53112220	53112676
7072415	Feedback/Signal	2 x (24 AWG/1pr) + 20 AWG/2c	INK-0234	0.343	8.7	60	53112220	—
7072416	Feedback/Signal	24 AWG/2pr + 20 AWG/2c	INK-0750	0.299	7.6	62	53112210	—
7072417	Servo/Motor	19 AWG/4c + 20 AWG/1pr	INK-0670	0.394	10.0	89	53112230	53112676
7072403	Servo/Motor	18 AWG/4c + 2 x (19 AWG/1pr)	INK-0653	0.453	11.5	152	53112240	53112676
7072404	Servo/Motor	16 AWG/4c + 2 x (19 AWG/1pr)	INK-0650	0.481	12.2	180	53112240	53112676
7072405	Servo/Motor	14 AWG/4c + 2 x (18 AWG/1pr)	INK-0602	0.595	15.1	215	53112250	53112676
7072406	Servo/Motor	12 AWG/4c + (18 AWG/1pr) + (16 AWG/1pr)	INK-0603	0.630	16.0	316	53112250	53112676
7072407	Servo/Motor	10 AWG/4c + (18 AWG/1pr) + (16 AWG/1pr)	INK-0604	0.741	18.8	403	53112260	53112677
7072408	Servo/Motor	8 AWG/4c + (18 AWG/1pr) + (16 AWG/1pr)	INK-0605	0.867	22.0	571	53112260	53112678
7072409	Servo/Motor	6 AWG/4c + 2 x (16 AWG/1pr)	INK-0606	0.993	25.2	685	53112270	53112678
7072410	Servo/Motor	4 AWG/4c + 2 x (16 AWG/1pr)	INK-0607	1.103	28.0	954	53112270	53112679

() = shielded pairs

Part Number	Size / Number of Conductors	Color Code
7072400	24 AWG/4pr 18 AWG/2c	brown & green — gray & pink — blue & violet — red & black white — brown
7072401	24 AWG/4pr 20 AWG/2c	brown & green — gray & pink — blue & violet — red & black white — brown
7072402	20 AWG/9c	green — brown — gray — yellow — black — blue — red — white — pink
7072414	26 AWG/4c 26 AWG/4pr 18 AWG/4c	yellow/black — blue/black — green/black — red/black red & black — brown & green — yellow & violet — gray & pink white — brown/green — white/green — blue
7072415	2 x (24 AWG/1pr) 20 AWG/2c	white & brown — green & yellow pink — gray
7072416	24 AWG/2pr 20 AWG/2c	red & black — gray & pink white — brown

INDRAMAT® is a registered trademark of Bosch Rexroth AG. INDRAMAT part numbers are supplied for informational purposes only.

Cable Attributes, page 73





All raw cable is Lapp product; datasheets are available on our website or by contacting sales. Assembly drawings are available on our website. Custom versions are available upon request.

■ Cable Technical Data

 **Cable Type:** see table below

Minimum Bend Radius:

Feedback:

- for stationary use:
- cable P/N 812308: 10 x cable diameter
- cable P/N 602206TP: 8 x cable diameter
- for continuous flex: 12 x cable diameter

Power:

- for stationary use: 4 x cable diameter
- for continuous flex: 10 x cable diameter

Power with brake:

- for stationary use: 7.5 x cable diameter
- for continuous flex: 10 x cable diameter

Nominal Voltage:

- MP series:
 - Feedback: 300V (stationary)
600V (cont. flex)
 - Power/
power with brake: 600V
- TLY series:
 - Feedback: 300V
 - Power/
power with brake: 600V

■ Connector Technical Data

Connector Type:

- MP series motors: M23 series
Speedtec type M7
(M4 still available)
- MPF series motors: M23 series
Speedtec type M7
(M4 still available)
- TLY series motors: Tyco CPC; tab-locking

Cable Construction

Motion Type	Application	Jacket Color	Jacket Material		Approvals	Cable Part Number
MP Series Motors						
Stationary	Feedback	Gray	PVC	PVC	UL/CSA CMG	602206TP
Stationary	Feedback	Gray	PVC	TPE	UL/CSA	812308
Stationary	Power	Black	PVC	PVC/Nylon	UL/CSA TC-ER	2216040, 2214040, 2210040
Stationary	Power with brake	Black	PVC	PVC/Nylon	UL/CSA TC-ER	7416048, 7414048, 7410044
Continuous Flex	Feedback	Green	TPE	PVC	UL/CSA CMG, PLTC*	812876*, 812872
Continuous Flex	Power/ Power with brake	Orange	TPE	PVC	UL/CSA TC-ER	812866, 812867, 812868, 812869, 812870, 812871
TLY Series Motors						
Stationary	Feedback	Gray	PVC	TPE	UL/CSA	812308
Stationary	Power	Black	PVC	PVC/Nylon	UL/CSA TC-ER	2216040
Stationary	Power with brake	Black	PVC	PVC/Nylon	UL/CSA TC-ER	7416048
Continuous Flex	Feedback	Black	PVC	PVC	UL/CSA CMG	812701
Continuous Flex	Power	Black	PVC	PVC	UL/CSA	891604CY
Continuous Flex	Power with brake	Orange	TPE	PVC	UL/CSA TC-ER	812866

* Lapp cable 812876 is PLTC.



MP Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number	Motion Type	Lapp Part Number	Rockwell Part Number
Power			Flexing	93579xxx-10-E	2090-CPBM7E7-10AFxx
Flexing	93577xxx-16	2090-CPWM7DF-16AFxx	Flexing	93579xxx-8	2090-CPBM7DF-8AFxx
Flexing	93547xxx-16	2090-CPWM4DF-16AFxx	Flexing	93549xxx-8	2090-CPBM4DF-8AFxx
Flexing	93577xxx-14	2090-CPWM7DF-14AFxx	Flexing	93579xxx-8-E	2090-CPBM7EF-8AFxx
Flexing	93547xxx-14	2090-CPWM4DF-14AFxx	Stationary	83579xxx-16	2090-CPBM7DF-16AAxx
Flexing	93577xxx-10	2090-CPWM7DF-10AFxx	Stationary	83549xxx-16	2090-CPBM4DF-16AAxx
Flexing	93547xxx-10	2090-CPWM4DF-10AFxx	Stationary	83579xxx-14	2090-CPBM7DF-14AAxx
Flexing	93577xxx-8	2090-CPWM7DF-8AFxx	Stationary	83549xxx-14	2090-CPBM4DF-14AAxx
Flexing	93547xxx-8	2090-CPWM4DF-8AFxx	Stationary	83579xxx-10	2090-CPBM7DF-10AAxx
Stationary	83577xxx-16	2090-CPWM7DF-16AAxx	Stationary	83549xxx-10	2090-CPBM4DF-10AAxx
Stationary	83547xxx-16	2090-CPWM4DF-16AAxx	Stationary	83579xxx-8	2090-CPBM7DF-8AAxx
Stationary	83577xxx-14	2090-CPWM7DF-14AAxx	Stationary	83549xxx-8	2090-CPBM4DF-8AAxx
Stationary	83547xxx-14	2090-CPWM4DF-14AAxx	Feedback		
Stationary	83577xxx-10	2090-CPWM7DF-10AAxx	Flexing	93572xxx	2090-CFBM7DF-CEAFxx
Stationary	83547xxx-10	2090-CPWM4DF-10AAxx	Flexing	93574xxx	2090-CFBM7DD-CEAFxx
Stationary	83577xxx-8	2090-CPWM7DF-8AAxx	Flexing	93542xxx	2090-CFBM4DF-CEAFxx
Stationary	83547xxx-8	2090-CPWM4DF-8AAxx	Flexing	93572xxx-E	2090-CFBM7E7-CEAFxx
Power with Brake			Flexing	93576xxx	2090-CFBM7DF-CDAFxx
Flexing	93579xxx-16	2090-CPBM7DF-16AFxx	Flexing	93578xxx	2090-CFBM7DD-CDAFxx
Flexing	93549xxx-16	2090-CPBM4DF-16AFxx	Flexing	93546xxx	2090-CFBM4DF-CDAFxx
Flexing	93579xxx-16E	2090-CPBM7E7-16AFxx	Flexing	93576xxx-E	2090-CFBM7E7-CDAFxx
Flexing	93579xxx-14	2090-CPBM7DF-14AFxx	Stationary	83572xxx	2090-CFBM7DF-CEAAxx
Flexing	93549xxx-14	2090-CPBM4DF-14AFxx	Stationary	83574xxx	2090-CFBM7DD-CEAAxx
Flexing	93579xxx-14-E	2090-CPBM7E7-14AFxx	Stationary	83576xxx	2090-CFBM7DF-CDAxx
Flexing	93579xxx-10	2090-CPBM7DF-10AFxx	Stationary	83546xxx	2090-CFBM4DF-CDAxx
Flexing	93549xxx-10	2090-CPBM4DF-10AFxx			

Replace "xxx" with desired cable length in feet.

TLY Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number	Motion Type	Lapp Part Number	Rockwell Part Number
Power			Feedback		
Flexing	72505xxx	2090-CPWM6DF-16AFxx	Flexing	72515xxx	2090-CFBM6DD-CCAFxx
Stationary	62505xxx	2090-CPWM6DF-16AAxx	Flexing	72514xxx	2090-CFBM6DF-CBAFxx
Power with Brake			Stationary	62515xxx	2090-CFBM6DD-CCAAxx
Flexing	74505xxx	2090-CPBM6DF-16AAxx	Stationary	62514xxx	2090-CFBM6DF-CBAAxx
Stationary	64505xxx	2090-CPBM6DF-16AAxx			

Replace "xxx" with desired cable length in feet.



Cable Construction

Jacket: Feedback: gray or black PVC
 Power with brake: gray or black PVC (ÖLFLEX® 190 CY & ÖLFLEX® FD 890 CY); orange polyurethane or PVC (ÖLFLEX® SERVO cable)



All raw cable is Lapp product; datasheets are available on our website or via sales. Assembly drawings are available on our website.
 All overmolded products are molded with UL 94 V-0 PVC.

Cable Technical Data

- Cable Type:**
- Feedback P/N: 812090, 812308, 812701, 892206TP, 602208TP
 - Power/
power with brake: ÖLFLEX® 190 CY
ÖLFLEX® FD 890 CY
ÖLFLEX® servo cables

- Nominal Voltage:**
- Feedback: 300V
 - Power/
power with brake: 600V

Minimum Bend Radius:

- Feedback:**
- for stationary use:
 - Cable 812090, 812308: 10 x cable diameter
 - Cable 602208TP: 8 x cable diameter
 - for continuous flex:
 - Cable 812701: 12 x cable diameter
 - Cable 892206TP: 10 x cable diameter
- Power/
power with brake:** see specific cable catalog page

Connector Technical Data

- Connector Type:**
- MP series motors: ITT Cannon TNM; bayonet
 - MPF series motors: M23 series; threaded
 - N series motors: M26482 series; bayonet
 - H & F series motors: M5015 series; threaded
 - Y series motors: Tyco CPC black plastic; threaded
 - TL series motors: Tyco MATE-N-LOK, tab-locking

MP Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number	Motion Type	Lapp Part Number	Rockwell Part Number
Power: 230V			Stationary	63529xxx-8	2090-XXNPMP-8Sxx
Flexing	73529xxx-10	2090-UXNPAMP-10Sxx	Stationary	63529xxx-10	2090-XXNPMP-10Sxx
Flexing	73529xxx-14	2090-UXNPAMP-14Sxx	Stationary	63529xxx-14	2090-XXNPMP-14Sxx
Flexing	73529xxx-16	2090-UXNPAMP-16Sxx	Stationary	63529xxx-16	2090-XXNPMP-16Sxx
Flexing	73529xxx-10	2090-XXNPMP-10Sxx	Power: 460V 1394C-SJTX-D (D29)		
Flexing	73529xxx-14	2090-XXNPMP-14Sxx	Flexing	73529xxx-8	2090-CDNPBMP-8Sxx
Flexing	73529xxx-16	2090-XXNPMP-16Sxx	Flexing	73529xxx-10	2090-CDNPBMP-10Sxx
Stationary	63529xxx-10	2090-UXNPAMP-10Sxx	Flexing	73529xxx-14	2090-CDNPBMP-14Sxx
Stationary	63529xxx-14	2090-UXNPAMP-14Sxx	Flexing	73529xxx-16	2090-CDNPBMP-16Sxx
Stationary	63529xxx-16	2090-UXNPAMP-16Sxx	Stationary	63529xxx-8	2090-CDNPBMP-8Sxx
Stationary	63529xxx-10	2090-XXNPMP-10Sxx	Stationary	63529xxx-10	2090-CDNPBMP-10Sxx
Stationary	63529xxx-14	2090-XXNPMP-14Sxx	Stationary	63529xxx-14	2090-CDNPBMP-14Sxx
Stationary	63529xxx-16	2090-XXNPMP-16Sxx	Stationary	63529xxx-16	2090-CDNPBMP-16Sxx
Power: 460V			Feedback: 230/460V		
Flexing	73529xxx-8	2090-UXNPBMP-8Sxx	Flexing	73528xxx	2090-UXNFBMP-Sxx
Flexing	73529xxx-10	2090-UXNPBMP-10Sxx	Flexing	73526xxx	2090-UXNFBMP-Sxx
Flexing	73529xxx-14	2090-UXNPBMP-14Sxx	Flexing	75926xxx	2090-XXNFMP-Sxx
Flexing	73529xxx-16	2090-UXNPBMP-16Sxx	Stationary	63528xxx	2090-UXNFBMP-Sxx
Flexing	73529xxx-8	2090-XXNPMP-8Sxx	Stationary	63526xxx	2090-UXNFBMP-Sxx
Flexing	73529xxx-10	2090-XXNPMP-10Sxx	Stationary	65926xxx	2090-XXNFMP-Sxx
Flexing	73529xxx-14	2090-XXNPMP-14Sxx	1394 (D29)		
Flexing	73529xxx-16	2090-XXNPMP-16Sxx	Flexing	71100125-xxx	2090-CDNFDMP-Sxx
Stationary	63529xxx-8	2090-UXNPBMP-8Sxx	Stationary	61100125-xxx	2090-CDNFDMP-Sxx
Stationary	63529xxx-10	2090-UXNPBMP-10Sxx	ULTRA 3000/5000 with 1394 Brake		
Stationary	63529xxx-14	2090-UXNPBMP-14Sxx	Flexing	73524xxx	2090-UXNBMP-18Sxx
Stationary	63529xxx-16	2090-UXNPBMP-16Sxx	Stationary	63524xxx	2090-UXNBMP-18Sxx

Replace "xxx" with desired cable length in feet.

For a 90° connector on the motor end, add "-R" to end of Lapp P/N.

For an extension assembly (male-female), add "-E" to end of Lapp P/N.



H/F Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number
Power		
Flexing	73502xxx	2090-UXNPAHF-14SXX
Flexing	73502xxx	2090-XXNPHF-14SXX
Flexing	73503xxx	2090-UXNPAHF-10SXX
Flexing	73506xxx	2090-UXNPAHF-8SXX
Stationary	63502xxx	2090-UXNPAHF-14SXX
Stationary	63502xxx	2090-XXNPHF-14SXX
Stationary	63503xxx	2090-UXNPAHF-10SXX
Stationary	63506xxx	2090-UXNPAHF-8SXX
Feedback		
Flexing	73513xxx	2090-UXNFBHF-SXX
Flexing	73525xxx	2090-UXNFDHF-SXX
Flexing	75925xxx	2090-XXNFHF-SXX
Stationary	63513xxx	2090-UXNFBHF-SXX
Stationary	63525xxx	2090-UXNFDHF-SXX
Stationary	65925xxx	2090-XXNFHF-SXX
Brake		
Flexing	73544xxx	—
Stationary	63544xxx	—

TL Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number
Power		
Flexing	71529xxx-16	2090-XXNPT-16Sxx
Flexing	71529xxx-16	2090-DANPT-16Sxx
Stationary	61529xxx-16	2090-XXNPT-16Sxx
Stationary	61529xxx-16	2090-DANPT-16Sxx
Feedback		
Flexing	71526xxx	Flying lead configuration
Flexing	71528xxx	2090-XXNFT-Sxx
Flexing	72528xxx	2090-DANFCT-Sxx
Stationary	61526xxx	Flying lead configuration
Stationary	61528xxx	2090-XXNFT-Sxx
Stationary	62528xxx	2090-DANFCT-Sxx
Brake		
Flexing	500058xxx	2090-DANBT-18Sxx
Stationary	300058xxx	2090-DANBT-18Sxx

For a 90° connector on the motor end, add “-R” to end of Lapp P/N.

For an extension assembly (male-female), add “-E” to end of Lapp P/N.

Y Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number	Motion Type	Lapp Part Number	Rockwell Part Number
Power with Brake			Feedback		
Flexing	73505xxx	2090-UXNPAY-16Sxx	Flexing	73515xxx	2090-UXNFBN-Sxx
Flexing	73505xxx	2090-XXNPY-16Sxx	Flexing	73514xxx	2090-UXNFD4-Sxx
Stationary	63505xxx	2090-UXNPAY-16Sxx	Flexing	75914xxx	2090-XXNF4-Sxx
Stationary	63505xxx	2090-XXNPY-16Sxx	Stationary	63515xxx	2090-UXNFBY-Sxx
			Stationary	63514xxx	2090-UXNFDY-Sxx
			Stationary	65914xxx	2090-XXNFY-Sxx

Ultra 100/200 Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number	Motion Type	Lapp Part Number	Rockwell Part Number	Motion Type	Lapp Part Number	Rockwell Part Number
F Series: Power with Brake & Feedback			Flexing	71118xxx	9101-2027	Stationary	61107xxx	9101-1467
Flexing	71103xxx	9101-1383	Stationary	61101xxx	9101-1381	Stationary	61116xxx	9101-1468
Flexing	71121xxx	9101-1365	Stationary	61102xxx	9101-1382	Stationary	61117xxx	9101-1474
Stationary	61103xxx	9101-1383	Stationary	61106xxx	9101-1399	Y Series: Power with Brake & Feedback		
Stationary	61121xxx	9101-1365	Stationary	61113xxx	9101-1366	Flexing	71105xxx	9101-1385
F/H Series: Power with Brake & Feedback			Stationary	61118xxx	9101-2027	Flexing	71114xxx	9101-1373
Flexing	71101xxx	9101-1381	N Series: Power with Brake & Feedback			Flexing	71115xxx	9101-1375
Flexing	71102xxx	9101-1382	Flexing	71107xxx	9101-1467	Stationary	61105xxx	9101-1385
Flexing	71106xxx	9101-1399	Flexing	71116xxx	9101-1468	Stationary	61114xxx	9101-1373
Flexing	71113xxx	9101-1366	Flexing	71117xxx	9101-1474	Stationary	61115xxx	9101-1375

Replace “xxx” with desired cable length in feet.

H Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number
Power		
Flexing	73501xxx	2090-XXNPH-16Sxx
Stationary	63501xxx	2090-XXNPH-16Sxx

N Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number (Stationary)
Power with Brake		
Flexing	73507xxx	2090-UXNPAN-16Sxx
Flexing	73507xxx	2090-XXNPN-16Sxx
Stationary	63507xxx	2090-UXNPAN-16Sxx
Stationary	63507xxx	2090-XXNPN-16Sxx
Feedback		
Flexing	73516xxx	2090-UXNFBN-Sxx
Flexing	73527xxx	2090-UXNFDN-Sxx
Flexing	75927xxx	2090-XXNFN-Sxx
Stationary	63516xxx	2090-UXNFBN-Sxx
Stationary	63527xxx	2090-UXNFDN-Sxx
Stationary	65927xxx	2090-XXNFN-Sxx
Brake		
Flexing	73534xxx	—
Stationary	63534xxx	—

MPF Series Motors

Motion Type	Lapp Part Number	Rockwell Part Number
Power		
Flexing	400270-xxx-10	2090-XXNPMF-10Sxx
Flexing	400270-xxx-10NB	Without brake
Flexing	400270-xxx-14	2090-XXNPMF-14Sxx
Flexing	400270-xxx-14NB	Without brake
Flexing	400270-xxx-16	2090-XXNPMF-16Sxx
Flexing	400270-xxx-16NB	Without brake
Stationary	300270-xxx-10	2090-XXNPMF-10Sxx
Stationary	300270-xxx-10NB	Without brake
Stationary	300270-xxx-14	2090-XXNPMF-14Sxx
Stationary	300270-xxx-14NB	Without brake
Stationary	300270-xxx-16	2090-XXNPMF-16Sxx
Stationary	300270-xxx-16NB	Without brake
Feedback		
Flexing	400271-xxx-15P	With drive connector
Flexing	400271-xxx	2090-XXNFMF-SXX
Stationary	300271-xxx-15P	With drive connector
Stationary	300271-xxx	2090-XXNFMF-SXX



Technical Data: 6FX 8002



Minimum Bend Radius:

Power cable:

- for continuous flex: 7.5 x cable diameter
- 16 - 6 AWG: 10 x cable diameter
- 4 - 1 AWG: 4 x cable diameter
- for stationary use: 4 x cable diameter

Signal cable:

- for continuous flex: 8 x cable diameter
- for stationary use: 4 x cable diameter



Nominal Voltage:

- Power cable, power conductors:
 - UL/CSA: 1000V
 - IEC: 600/1000V
- Power cables, control conductors:
 - UL/CSA: 1000V
 - IEC: 250V AC
- Signal cable:
 - UL/CSA: 30V AC/DC
 - IEC: 30V AC



Temperature Range:

- for continuous flex: -20°C to +60°C
- for stationary use: -50°C to +80°C



Approvals:

- UL: AWM 21223
AWM 20236
- Canada: AWM I/II A/B FT1
- Additional: Based on VDE specifications
CE & RoHS

Technical Data: 6FX 5002



Minimum Bend Radius:

- for flexible use: 12 x cable diameter
- for stationary use: 5 x cable diameter



Nominal Voltage:

- Power cable, power conductors:
 - UL/CSA: 1000V
 - IEC: 600/1000V
- Power cables, control conductors:
 - UL/CSA: 750V
 - IEC: 30V AC
- Signal cable:
 - UL/CSA: 30V AC/DC
 - IEC: 30V AC



Temperature Range:

- for flexible use: 0°C to +60°C
- for stationary use: -20°C to +60°C



Approvals:

- UL: AWM 2570 (power)
AWM 2502 (signal)
- Additional: Based on VDE specifications
CE & RoHS

SIEMENS® Standard 6FX 8002

Lapp Part Number	SIEMENS® Part Number	Lapp Cable
Assemblies for Feedback		
335100xxx	6FX8002-1AD00-XXXX	00277131
335104xxx	6FX8002-1AD04-XXXX	00277131
335500xxx	6FX8002-2AD00-XXXX	00277131
335304xxx	6FX8002-2AD04-XXXX	00277131
335200xxx	6FX8002-2AH00-XXXX	00277131
335211xxx	6FX8002-2CA11-XXXX	00277111
335231xxx	6FX8002-2CA31-XXXX	00277141
335234xxx	6FX8002-2CA34-XXXX	00277141
335331xxx	6FX8002-2CB31-XXXX	00277171
335201xxx	6FX8002-2CF01-XXXX	00277131
335202xxx	6FX8002-2CF02-XXXX	00277131
335204xxx	6FX8002-2CF04-XXXX	00277131
335300xxx	6FX8002-2CG00-XXXX	00277111
335400xxx	6FX8002-2CH00-XXXX	00277131
335600xxx	6FX8002-2DC00-XXXX	see note
335310xxx	6FX8002-2DC10-XXXX	see note
335220xxx	6FX8002-2DC20-XXXX	see note
335210xxx	6FX8002-2EQ10-XXXX	00277141
335214xxx	6FX8002-2EQ14-XXXX	00277141
335421xxx	6FX8002-4AA21-XXXX	00277151
Assemblies for Power		
335501xxx	6FX8002-5CA01-XXXX	0027784
335505xxx	6FX8002-5CA05-XXXX	0027784
335531xxx	6FX8002-5CA31-XXXX	0027785
335541xxx	6FX8002-5CA41-XXXX	0027786
335551xxx	6FX8002-5CA51-XXXX	0027787
335601xxx	6FX8002-5CS01-XXXX	0027784
335511xxx	6FX8002-5CS11-XXXX	0027785
Assemblies for Power with Brake		
335601xxx	6FX8002-5DA01-XXXX	0027790
335605xxx	6FX8002-5DA05-XXXX	0027790
335631xxx	6FX8002-5DA31-XXXX	0027791
335641xxx	6FX8002-5DA41-XXXX	0027791
335651xxx	6FX8002-5DA51-XXXX	0027793
335701xxx	6FX8002-5DS01-XXXX	0027790
335611xxx	6FX8002-5DS11-XXXX	0027791

* Replace "xxx" with the desired cable length in meters.

Note: Made with a special Lapp cable design. Specs are available upon request.

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.

SIEMENS® Standard 6FX 5002

Lapp Part Number	SIEMENS® Part Number	Lapp Cable
Assemblies for Feedback		
235100xxx	6FX5002-1AD00-XXXX	0025725
235104xxx	6FX5002-1AD04-XXXX	0025725
235500xxx	6FX5002-2AD00-XXXX	0025725
235304xxx	6FX5002-2AD04-XXXX	0025725
235200xxx	6FX5002-2AH00-XXXX	0025725
235211xxx	6FX5002-2CA11-XXXX	0025724
235231xxx	6FX5002-2CA31-XXXX	0025726
235234xxx	6FX5002-2CA34-XXXX	0025726
235331xxx	6FX5002-2CB31-XXXX	0025725
235201xxx	6FX5002-2CF01-XXXX	0025725
235202xxx	6FX5002-2CF02-XXXX	0025725
235204xxx	6FX5002-2CF04-XXXX	0025725
235300xxx	6FX5002-2CG00-XXXX	0025724
235400xxx	6FX5002-2CH00-XXXX	0025725
235600xxx	6FX5002-2DC00-XXXX	see note
235310xxx	6FX5002-2DC10-XXXX	see note
235220xxx	6FX5002-2DC20-XXXX	see note
235210xxx	6FX5002-2EQ10-XXXX	0025726
235214xxx	6FX5002-2EQ14-XXXX	0025726
Assemblies for Power		
235501xxx	6FX5002-5CA01-XXXX	00257001
235505xxx	6FX5002-5CA05-XXXX	00257001
235531xxx	6FX5002-5CA31-XXXX	00257011
235541xxx	6FX5002-5CA41-XXXX	00257021
235551xxx	6FX5002-5CA51-XXXX	00257031
235601xxx	6FX5002-5CS01-XXXX	00257001
235511xxx	6FX5002-5CS11-XXXX	00257011
Assemblies for Power with Brake		
235601xxx	6FX5002-5DA01-XXXX	00257151
235605xxx	6FX5002-5DA05-XXXX	00257151
235631xxx	6FX5002-5DA31-XXXX	00257161
235641xxx	6FX5002-5DA41-XXXX	00257171
235651xxx	6FX5002-5DA51-XXXX	00257181
235701xxx	6FX5002-5DS01-XXXX	00257151
235611xxx	6FX5002-5DS11-XXXX	00257161

Custom configurations are available upon request.



Servo LK-INX Assemblies according to INDRAMAT® Standards

INDRAMAT® Standard IKG/RKL



Technical Data

	Minimum Bend Radius:	
	- for stationary use:	6 x cable diameter
	- for continuous flex:	10 x cable diameter
	Nominal Voltage:	
	- Power conductors:	
	- UL/CSA:	1000V
	- IEC:	600/1000V
	- Control conductors:	
	- UL/CSA:	1000V
	- IEC:	250V AC

	Temperature Range:	
	- for stationary use:	-50 °C to +80 °C
	- for continuous flex:	-30 °C to +60 °C
	Approvals:	
	UL:	AWM 20234

INDRAMAT® Standard IKG

Lapp Part Number	Length (m)	INDRAMAT Part Number	Lapp Cable
70345476	10	IKG4009-010	7072403
70345503	10	IKG4087-010	7072406
70345521	10	IKG4163-010	7072408
70345522	10	IKG4170-010	7072408
70345541	10	IKG4020-010	7072403
70345542	10	IKG4018-010	7072403
70345543	10	IKG4016-010	7072403
70345545	10	IKG4050-010	7072404

INDRAMAT® Standard RKL

Lapp Part Number	Length (m)	INDRAMAT Part Number	Lapp Cable
70410000	10	RKL4330-010	7072409
70392839	10	RKL4302-010	7072403
70410001	10	RKL4303-010	7072403

Listed part numbers are for 10m lengths.
Other lengths are available.

INDRAMAT® Standard IKS/RKG



Technical Data

	Minimum Bend Radius:	
	- for stationary use:	5 x cable diameter
	- for continuous flex:	10 x cable diameter
	Temperature Range:	
	- for stationary use:	-30 °C to +90 °C
	- for continuous flex:	-30 °C to +80 °C

	Nominal Voltage:	300V
	Approvals:	
	UL:	AWM 20234

INDRAMAT® Standard IKS

Lapp Part Number	Length (m)	INDRAMAT Part Number	Lapp Cable
70335583	10	IKS4374-010	7072401
70335584	10	IKS4376-010	7072401
70335595	10	IKS4103-010	7072401
70665596	10	IKS4153-010	7072401

INDRAMAT® Standard RKG

Lapp Part Number	Length (m)	INDRAMAT Part Number	Lapp Cable
70392984	10	RKG4200-010	7072401
70410002	10	RKG4201-010	7072401

Listed part numbers are for 10m lengths.
Other lengths are available.

Servo Assemblies according to LENZE® Standard



MOTOR &
DRIVE



Technical Data



Minimum Bend Radius:

- for stationary use: 7.5 x cable diameter
- for continuous flex: 10 x cable diameter



Temperature Range:

- for stationary use: -25°C to +80°C
- for continuous flex: -5°C to +70°C



Nominal Voltage:

- Resolver & encoder cable:
 - UL/CSA: 300V
 - VDE: 30V
- Motor cable, power conductors:
 - UL/CSA: 600V
 - VDE: 600/1000V



Test Voltage:

- Resolver & encoder cable: 1500V
- Motor cable:
 - Power conductors: 4000V
 - Control conductors: 2000V



Approvals:

- UL: AWM 21165
(resolver/encoder cable, flexing)
- AWM 2464
(resolver/encoder cable, stationary)
- AWM 20940
(motor cable, flexing)
- AWM 2570
(motor cable, stationary)

Lapp Part Number	Cable Type	Application Type	Length (m)	Size / Number of Conductors	LENZE Assembly Part Number
74321272	Servo Cable	Flexing	10	16 AWG/4c + (20 AWG/1pr)	EWLM-010GMS-015
74321426	Servo Cable	Flexing	10	14 AWG/4c + (20 AWG/1pr)	EWLM-010GMS-025
74320320	Servo Cable	Stationary	10	16 AWG/4c + (20 AWG/1pr)	EWLM-010GM-015
74320499	Servo Cable	Stationary	10	14 AWG/4c + (20 AWG/1pr)	EWLM-010GM-025
70415002	Servo Cable	Stationary	10	16 AWG/4c	EYP-0003-A-0100-M01-A00
74322629	Fan Cable	Flexing	10	20 AWG/5c	EWLL-010GMS
70415001	Fan Cable	Flexing	10	19 AWG/5c	EYL-0001-V-0100L02-J02
74322480	Fan Cable	Stationary	10	20 AWG/5c	EWLL-010GM
74323073	Resolver Cable	Flexing	10	3x(26 AWG/1pr) + (20 AWG/1pr)	EWLR-010GMS-T
70415005	Resolver Cable	Flexing	10	26 AWG/3c + 26 AWG/3pr	EYF-0020-A-0100-F01-S04
74320540	Resolver Cable	Stationary	10	3x(26 AWG/1pr) + (20 AWG/1pr)	EWLR-010GM-T
74323672	Encoder Cable	Flexing	10	4x(26 AWG/1pr) + (18 AWG/1pr)	EWLE-010GMS-T
74323522	Encoder Cable	Stationary	10	4x(26 AWG/1pr) + (18 AWG/1pr)	EWLE-010GM-T

() = shielded pairs

Servo Assemblies according to SEW® Standard



MOTOR &
DRIVE



Technical Data



Minimum Bend Radius:

- Power cable: 15 x cable diameter
- Signal cable: 15 x cable diameter



Temperature Range:

- Power cable: -10°C to +80°C
- Signal cable: -5°C to +70°C



Nominal Voltage:

- Power cable, power conductors:
 - UL: 600V
 - IEC: 750V
- Power cable, signal conductors:
 - UL: 600V
 - IEC: 350V
- Signal cable: 250V



Test Voltage:

- Power cable: 2000V
- Signal cable: 1500V



Approvals:

- UL: AWM 2587

Lapp Part Number	Cable Type	Application Type	Length (m)	Size / Number of Conductors	SEW Assembly Part Number
70430251	Power Cable	Stationary	10	16 AWG/4c	05904544
70430250	Power Cable	Stationary	10	16 AWG/4c + 18 AWG/3c	13324853
70430252	Signal Cable	Flexing	10	24 AWG/6pr	1995405
70430249	Signal Cable	Stationary	10	24 AWG/6pr	13324535

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.

800-774-3539 • www.lappusa.com
www.lappcanada.com • www.lappmexico.com





	Connector Type	Application			Number of Contacts	Rated Voltage	Rated Current	Termination Type*	Wire Range (AWG)	IP/NEMA Rating	Approvals
		Power	Control/Signal	Data							
RECTANGULAR	HBE	✓	✓		6, 10, 16, 24, 32, 48 (+PE)	600V	16A	SC, CR, CC	20 - 14, 20 - 12	IP65, NEMA 4, 4X, 12	UL SP DVE
	HA	✓	✓		3, 4, 10, 16, 32, 48, 64 (+PE)	600V	10A, 14A	SC	20 - 14	IP65, NEMA 4, 12	UL SP DVE
	HQ	✓	✓		5 (+PE)	600V	16A	CR	20 - 12	IP65, NEMA 4, 12	UL SP DVE
	STA		✓		6, 14, 20, 40	48V	10A	SC, SOL	20 - 16	IP65, NEMA 4, 12	UL SP DVE
	HEE	✓	✓		10, 18, 32, 46, 64, 92 (+PE)	600V	16A	CR	20 - 12	IP65, NEMA 4, 4X, 12	UL SP DVE
	HBS	✓			6, 12 (+PE)	600V	35A	SC	20 - 10	IP65, NEMA 4, 4X, 12	UL SP DVE
	HBVE	✓			3, 6, 10 (+PE)	600V	16A	SC	20 - 14	IP65, NEMA 4, 4X, 12	UL SP DVE
	HD		✓		7, 8, 15, 25, 40, 50, 64, 80, 128 (+PE)	600V	10A	CR	26 - 14	IP65, NEMA 4, 4X, 12	UL SP DVE
	HDD		✓		24, 42, 72, 108, 144, 216 (+PE)	600V	8.5A	CR	26 - 14	IP65, NEMA 4, 4X, 12	UL SP DVE
	MC	✓	✓	✓	2 - 280, Data Bus (+PE), Pneumatic	30V - 1000V	1A - 82A	SC, CR, CC, HO	28 - 4	IP65, NEMA 4, 4X, 12	UL SP DVE
	MP	✓	✓		4/0, 4/2, 4/8 (+PE)	600V	16A, 80A	SC	12 - 6, 20 - 14	IP65, NEMA 4, 4X, 12	UL SP DVE
CIRC(UL)AR	EAB	✓			3, 14	500V	13A, 23A	CR	18 - 16, 14 - 12	up to IP67	MIL-C-5015
	EAC	✓			4, 6, 17	200V, 500V, 900V	13A, 23A	CR	18 - 16, 14 - 12	up to IP67	MIL-C-5015
	EPT	✓	✓		5, 6, 8+4, 10, 19	600V, 1000V	7.5A, 13A	CR	24 - 20, 20 - 16	up to IP67	MIL-C-26482
	LS1	✓			5+PE, 3+PE+4	600V	26A, 27A	CR	20 - 12, 24 - 18	IP67, IP68	cUL US DVE
	M23	✓	✓		6, 7, 8+1, 9, 12, 16, 17	50V, 100V, 150V	7A, 14A	CR, SOL	18 - 14, 26 - 18	IP67, IP68	cUL US DVE
PIN & SLEEVE	MULTIMAX	✓			1+N+PE, 2+PE, 3+PE, 3+N+PE	125V - 600V	16A - 32A	SC	16 - 12, 12 - 8	IP44	cUL US
	CEE	✓			1+N+PE, 2+PE, 3+PE, 3+N+PE	125V - 500V	16A - 125A	SC	16 - 12, 12 - 8, 10 - 6, 4 - 1	IP67	cUL US
	ULYSSE	✓			1+N+PE, 2+PE, 3+PE, 3+N+PE	125V - 500V	16A - 63A	SC	16 - 12, 12 - 8, 10 - 6	IP66, IP67	cUL US
	ALUPRES	✓			1+N+PE, 2+PE, 2+N+PE, 3+PE, 3+N+PE	125V - 500V	16A - 63A	SC	6 - 12, 12 - 8, 10 - 6	IP67, IP55	cUL US

* Termination Type: SC = Screw, CR = Crimp, CC = Cage Clamp, SOL = Solder, HO = Hose



UNITRONIC® 300 S

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Part Number	Size / Number of Conductors	Outer Diameter	Rectangular Connectors, page 56					Circular Connectors, page 63	
			HA 3/4 Max OD 13.5 mm	HD 7/8 Max OD 13.5 mm	HD 15 Max OD 20 mm	HD 25 Max OD 20 mm	Modular Max OD 17 mm	CIRCON M23 Max OD 13.5 mm	ZYLIN 3.0 Max OD 16 mm
302002S	20 AWG/2c	6.3 mm	✓						
302003S	20 AWG/3c	6.6 mm	✓						
302004S	20 AWG/4c	7.3 mm	✓	✓				✓	
302006S	20 AWG/6c	8.4 mm		✓				✓	
302008S	20 AWG/8c	9.0 mm		✓			✓ ULTRA	✓	
302010S	20 AWG/10c	10.8 mm			✓		✓ ULTRA	✓	
302015S	20 AWG/15c	12.3 mm			✓		✓ ULTRA	✓	
302020S	20 AWG/20c	13.4 mm				✓	✓ ULTRA		✓
302025S	20 AWG/25c	14.9 mm				✓	✓ ULTRA		✓
301802S	18 AWG/2c	6.8 mm	✓						
301803S	18 AWG/3c	7.3 mm	✓						
301804S	18 AWG/4c	7.9 mm	✓	✓				✓	
301806S	18 AWG/6c	9.1 mm		✓				✓	
301808S	18 AWG/8c	9.7 mm		✓			✓ ULTRA	✓	
301810S	18 AWG/10c	11.9 mm			✓		✓ ULTRA	✓	
301815S	18 AWG/15c	13.3 mm			✓		✓ ULTRA	✓	
301820S	18 AWG/20c	14.6 mm				✓	✓ ULTRA		✓
301825S	18 AWG/25c	16.8 mm				✓	✓		

ULTRA = Inserts in EPIC® ULTRA HB Housing

ÖLFLEX® VFD SLIM

page 35

Part Number	Size / Number of Conductors*	Outer Diameter	Rectangular Connectors, page 56				Circular Connectors, page 63	
			HBE 6 Max OD 17 mm	HBS 6 Max OD 21 mm	MP 4/0 Max OD 25 mm	Modular Max OD 25 mm	CIRCON LS1 Max OD 15.5 mm	CIRCON M23 Max OD 13.5 mm
761804	18 AWG/4c	10.0 mm	✓ ULTRA				✓	✓
761604	16 AWG/4c	11.6 mm	✓ ULTRA	✓ ULTRA			✓	✓
761404	14 AWG/4c	12.6 mm	✓ ULTRA	✓ ULTRA			✓	✓
761204	12 AWG/4c	14.1 mm	✓ ULTRA	✓ ULTRA				
761004	10 AWG/4c	17.2 mm		✓ ULTRA	✓ ULTRA			
760804	8 AWG/4c	22.3 mm			✓	✓		
760604	6 AWG/4c	25.2 mm			✓*	✓*		
760404	4 AWG/4c	30.1 mm				✓*		

* Select an appropriate SKINTOP® gland to accommodate the cable OD

ULTRA = Inserts in EPIC® ULTRA HB Housing

ÖLFLEX® VFD XL

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Part Number	Size / Number of Conductors*	Outer Diameter	Rectangular Connectors, page 56				page 63
			HBE 6 Max OD 17 mm	HBS 6 Max OD 21 mm	MP 4/0 Max OD 25 mm	Modular Max OD 25 mm	CIRCON LS1 Max OD 15.5 mm
731604	16 AWG/4c	12.9 mm	✓ ULTRA	✓ ULTRA			✓
731404	14 AWG/4c	14.8 mm	✓ ULTRA	✓ ULTRA			✓
731204	12 AWG/4c	16.5 mm	✓ ULTRA	✓ ULTRA			✓**
731004	10 AWG/4c	17.8 mm		✓ ULTRA	✓ ULTRA		
730804	8 AWG/4c	22.5 mm			✓	✓	
730604	6 AWG/4c	26.2 mm			✓*	✓*	
730404	4 AWG/4c	29.4 mm				✓*	
730204	2 AWG/4c	33.8 mm					

* Select an appropriate SKINTOP® gland to accommodate the cable OD

** Styles D6 & F6 only

ULTRA = Inserts in EPIC® ULTRA HB Housing



EPIC® Connectors to Cable Cross Reference

Find the Right Connector for Your Cable

ÖLFLEX® VFD with Signal page 36

Part Number	Size / Number of Conductors *	Outer Diameter	Rectangular Connectors, page 56				page 63
			HBE 6 Max OD 17 mm	HBS 6 Max OD 21 mm	MP 4/2 Max OD 25 mm	Modular Max OD 25 mm	CIRCON LS1 Max OD 15.5 mm
7416048	16 AWG/4c + 18 AWG/2c	13.1 mm	✓ ULTRA	✓ ULTRA			✓
7414044	14 AWG/4c + 18 AWG/2c	14.1 mm	✓ ULTRA	✓ ULTRA			✓
7414048	14 AWG/4c + 14 AWG/2c	14.8 mm	✓ ULTRA	✓ ULTRA			✓
7412044	12 AWG/4c + 18 AWG/2c	15.5 mm	✓ ULTRA	✓ ULTRA			
7412048	12 AWG/4c + 14 AWG/2c	16.1 mm	✓ ULTRA	✓ ULTRA			
7410044	10 AWG/4c + 14 AWG/2c	18.4 mm		✓ ULTRA	✓ ULTRA		
7408044	8 AWG/4c + 14 AWG/2c	24.2 mm			✓	✓	
7406044	6 AWG/4c + 14 AWG/2c	27.5 mm			✓ *	✓ *	
7404044	4 AWG/4c + 14 AWG/2c	33.6 mm				✓ *	

* Select an appropriate SKINTOP® gland to accommodate the cable OD

ULTRA = Inserts in EPIC® ULTRA HB Housing

ÖLFLEX® SERVO FD 796 P page 37

Part Number	Size / Number of Conductors *	Outer Diameter	Rectangular Connectors, page 56				page 63
			ULTRA HBE 6 Max OD 17 mm	ULTRA HBS 6 Max OD 21 mm	MP 4/2, 4/8 Max OD 25 mm	Modular Max OD 25 mm	CIRCON LS1 Max OD 15.5 mm
0025319	16 AWG/4c + 16 AWG/1pr	11.7 mm	✓	✓		✓	✓
0025320	14 AWG/4c + 16 AWG/1pr	13.1 mm	✓	✓		✓	✓
0025321	12 AWG/4c + 16 AWG/1pr	14.2 mm	✓	✓	✓	✓	✓ **
0025322	10 AWG/4c + 16 AWG/1pr	16.0 mm		✓	✓	✓	
0025323	8 AWG/4c + 16 AWG/1pr	18.4 mm			✓	✓	
0025324	6 AWG/4c + 16 AWG/1pr	22.1 mm			✓	✓	
0025326	19 AWG/4c + 22 AWG/2pr	10.9 mm				✓	✓
0025327	16 AWG/4c + 19 AWG/2pr	12.3 mm				✓	✓
0025328	14 AWG/4c + 18 AWG/2pr	14.3 mm				✓	✓
0025312	12 AWG/4c + 18 AWG/2pr	15.4 mm			✓	✓	✓ **
0025329	12 AWG/4c + 18 AWG/1pr + 16 AWG/1pr	15.6 mm			✓	✓	
0025330	10 AWG/4c + 18 AWG/1pr + 16 AWG/1pr	17.1 mm			✓	✓	

* Pairs are individually shielded

** Styles D6 & F6 only

ÖLFLEX® CHAIN 896 P page 40

Part Number	Size / Number of Conductors *	Outer Diameter	Rectangular Connectors, page 56						page 63
			HA 3 Max OD 13.5 mm	HA 4 Max OD 13.5 mm	HBE 6 Max OD 25 mm	HBS 6 Max OD 25 mm	MP 4/0 Max OD 25 mm	Modular Max OD 25 mm	CIRCON LS1 Max OD 15.5 mm
1023229	16 AWG/4c	9.6 mm	✓	✓	✓	✓		✓	✓
1023230	16 AWG/5c	10.0 mm		✓	✓	✓		✓	✓
1023238	14 AWG/4c	11.0 mm	✓	✓	✓	✓		✓	✓
1023239	14 AWG/5c	12.0 mm		✓	✓	✓		✓	✓
1023245	12 AWG/4c	12.5 mm			✓	✓	✓	✓	
1023246	12 AWG/5c	13.7 mm			✓	✓	✓	✓	
1023248	10 AWG/4c	14.3 mm				✓	✓	✓	
1023249	10 AWG/5c	15.7 mm				✓	✓	✓	
1023250	8 AWG/4c	17.0 mm					✓	✓	
1023251	8 AWG/5c	18.9 mm					✓	✓	
1023252	6 AWG/4c	21.2 mm					✓	✓	
1023253	6 AWG/5c	23.8 mm					✓	✓	
1023254	4 AWG/4c	25.9 mm						✓ *	
1023255	4 AWG/5c	29.0 mm						✓ *	

* Select an appropriate SKINTOP® gland to accommodate the cable OD



ÖLFLEX® SERVO FD 798 CP page 39

Part Number	Size / Number of Conductors*	Outer Diameter	Rectangular Connectors, page 56				page 63
			HD 7 Max OD 13.5 mm	HD 8 Max OD 13.5 mm	HD 15 Max OD 20 mm	Modular Max OD 25 mm	CIRCON M23 Max OD 13.5 mm
0036910	20 AWG/4c + 22 AWG/4pr	8.9 mm			✓	✓	✓
0036911	2 x 20 AWG/1c + 3 x (26 AWG/1pr)	8.9 mm		✓		✓	✓
0036912	26 AWG/4c + 3 x 26 AWG/1pr + 20 AWG/1pr	8.8 mm			✓	✓	✓
0036913	26 AWG/4c + 26 AWG/4c + 3 x 26 AWG/1pr + 20 AWG/1pr	9.4 mm				✓	✓
0036914	20 AWG/9c	8.8 mm			✓	✓	✓
0036915	18 AWG/2c + 24 AWG/4pr	8.8 mm			✓	✓	✓
0036916	20 AWG/2c + 24 AWG/6pr	10.3 mm			✓	✓	✓
0036917	26 AWG/10c + 20 AWG/1pr	7.7 mm			✓	✓	✓
0036918	26 AWG/10c + 20 AWG/4c	8.1 mm			✓	✓	✓
0036920	20 AWG/4c + 26 AWG/4pr	8.2 mm			✓	✓	✓
0036921	24 AWG/4pr	7.6 mm		✓		✓	✓
0036923	26 AWG/8pr	7.8 mm				✓	✓
0036924	26 AWG/4pr	6.4 mm		✓		✓	
0036926	24 AWG/12c	6.9 mm			✓	✓	
0036927	20 AWG/2c + 24 AWG/4pr	8.5 mm			✓	✓	✓
0036928	20 AWG/4c + 26 AWG/4c + 26 AWG/2pr + 2 x 26 AWG/1pr	9.1 mm				✓	✓
0036929	20 AWG/2c + 2 x 24 AWG/1pr	8.7 mm	✓			✓	✓
0036930	20 AWG/2c + 24 AWG/2pr	7.3 mm	✓			✓	✓

* See cable catalog page for shielding configuration

INDRAMAT® INK page 42

Part Number	Size / Number of Conductors	Outer Diameter	Circular Connectors, page 63	
			CIRCON LS1 Max OD 15.5 mm	CIRCON M23 Max OD 13.5 mm
7072400	18 AWG/2c + 24 AWG/4pr	8.8 mm		✓
7072401	20 AWG/2c + 24 AWG/4pr	8.5 mm		✓
7072402	20 AWG/9c	8.8 mm		✓
7072403	18 AWG/4c + 19 AWG/2pr	11.5 mm	✓	
7072404	16 AWG/4c + 19 AWG/2pr	12.2 mm	✓	
7072405	14 AWG/4c + 18 AWG/2pr	15.1 mm	✓	
7072406	12 AWG/4c + 18 AWG/1pr + 16 AWG/1pr	16.0 mm		
7072407	10 AWG/4c + 18 AWG/1pr + 16 AWG/1pr	18.8 mm		
7072408	8 AWG/4c + 18 AWG/1pr + 16 AWG/1pr	22.0 mm		



EPIC® Connectors to Cable Cross Reference

Find the Right Connector for Your Cable

SIEMENS® 6FX 8 Plus

page 41

SIEMENS® 6FX 8 Plus

page 41

Rectangular Connectors, page 56

Circular Connectors, page 63

Part Number	Size / Number of Conductors	Outer Diameter	ULTRA HBE 6 MOD 17 mm	ULTRA HBS 6 MOD 21 mm	MP 4/0 MOD 25 mm	CIRCON LS1 MOD 15.5 mm	CIRCON M23 MOD 13.5 mm
Motor Cables							
0027789	6 AWG/4c	21.6 mm			✓		
0027788	8 AWG/4c	17.5 mm			✓		
0027787	10 AWG/4c	14.5 mm		✓	✓ ULTRA		
0027786	12 AWG/4c	11.9 mm	✓	✓			
0027785	14 AWG/4c	10.6 mm	✓			✓	✓
0027784	16 AWG/4c	9.1 mm	✓			✓	✓
Servo Cables							
0027798	1 AWG/4c + 16 AWG/1pr	34.0 mm					
0027797	2 AWG/4c + 16 AWG/1pr	30.9 mm					
0027796	4 AWG/4c + 16 AWG/1pr	26.6 mm					
0027795	6 AWG/4c + 16 AWG/1pr	23.4 mm			✓		
0027794	8 AWG/4c + 16 AWG/1pr	19.4 mm			✓		
0027793	10 AWG/4c + 16 AWG/1pr	16.8 mm		✓	✓ ULTRA		
0027792	12 AWG/4c + 16 AWG/1pr	14.8 mm	✓	✓			
0027791	14 AWG/4c + 16 AWG/1pr	13.4 mm	✓	✓		✓	✓
0027790	16 AWG/4c + 16 AWG/1pr	11.6 mm	✓	✓		✓	✓
Feedback/Signal Cables							
00277101	26 AWG/8pr	7.8 mm				✓	
00277111	20 AWG/4c + 22 AWG/4pr	8.9 mm				✓	
00277121	20 AWG/4c + (26 AWG/3pr)	9.0 mm				✓	
00277131	26 AWG/4c + (26 AWG/3pr) + 20 AWG/1pr	8.9 mm				✓	
00277141	26 AWG/4c + (26 AWG/3pr) + 24 AWG/4c + 20 AWG/1pr	9.5 mm				✓	
00277151	26 AWG/4pr	6.4 mm					
00277161	26 AWG/2pr	5.0 mm					
00277171	22 AWG/12pr	6.9 mm					
00277991	24 AWG/2pr + 21 AWG/1pr	7.2 mm				✓	

ULTRA = Inserts in EPIC® ULTRA HB Housing



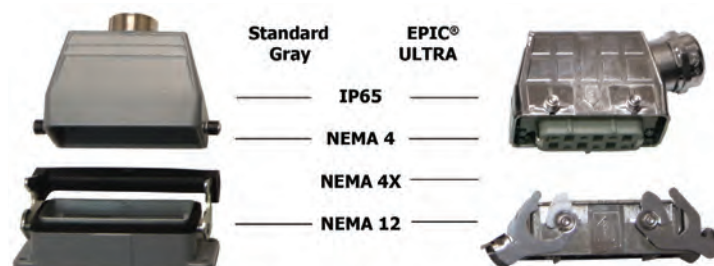
EPIC® rectangular connectors comply with all applicable requirements of Underwriters Laboratory (UL) Standards 1977 and 498, VDE Standard 0110 for creepage and clearance distances, and VDE Standard 0627 for the connector design.

The recognized UL file number and Canadian Standards Association (CSA) for EPIC® connectors are UL #E75770 and CSA #LR53004-1.

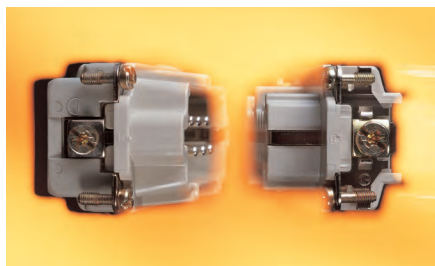
EPIC® connectors meet IP65, NEMA 4, 4X, and NEMA 12 standards only when in the mated condition.

Housing		Plugs & Receptacles										
Standard Gray	ULTRA HB	HBE	HA	HQ	STA	HEE	HBS	HBVE	HD	HDD	MC	Mixed Power
HB 6	HB 6	HBE 6				HEE 10				HDD 24	MC 2	
HB 10	HB 10	HBE 10				HEE 18		HBVE 3		HDD 42	MC 3	
HB 16	HB 16	HBE 16				HEE 32	HBS 6	HBVE 6	HD 40	HDD 72	MC 5	4+0, 4+2
HB 24	HB 24	HBE 24				HEE 46		HBVE 10	HD 64	HDD 108	MC 7	4+8
HB 32		HBE 32				HEE 64	HBS 12		HD 80	HDD 144	MC 10	
HB 48		HBE 48				HEE 92			HD 128	HDD 216	MC 14	
HA 3/4			HA 3/4	HQ 5	STA 6				HD 7/8			
HA 10			HA 10		STA 14				HD 15			
HA 16			HA 16		STA 20				HD 25			
HA 32			HA 32		STA 40				HD 50			
HA 48			HA 48									
HA 64			HA 64									

	Housing Size	EPIC® Standard Gray Housing	EPIC® ULTRA HB Housing
Specification		DIN 43652	DIN 43652
Temperature Range		-40°C to +100°C (short term up to +125°C)	-40°C to +100°C
Protection Class		IP65, NEMA 4 & 12	IP65, NEMA 4, 4X & 12
Material	HA 3/4	Powder-coated zinc or thermoplastic with zinc-plated steel hardware	—
	HA 10 - 64	Powder-coated aluminum with zinc-plated steel hardware	—
	HB 6 - 24	Powder-coated aluminum with zinc-plated steel hardware	Nickel-plated zinc with stainless steel hardware
	HB 32 - 48	Powder-coated aluminum with zinc-plated steel hardware	—
Seal		NBR	NBR



EPIC® HBE



Technical Data

of Contacts: 6, 10, 16, 24, 32, 48 (+PE)
Rated Voltage: 600V
Rated Current: 16A
Termination: Screw, crimp, cage clamp
Wire Size: 20-14 AWG (0.5-2.5 mm²)
 Crimp available in 12 AWG (4 mm²)

EPIC® HA



Technical Data

of Contacts: 3, 4, 10, 16, 32, 48, 64 (+PE)
Rated Voltage: 600V
Rated Current:
 - HA 3/4: 10A
 - HA 10-64: 14A
Termination: Screw
Wire Size: 20-14 AWG (0.5-2.5 mm²)

EPIC® HQ



Technical Data

of Contacts: 5 (+PE)
Rated Voltage: 600V
Rated Current: 16A
Termination: Crimp
Wire Size: 20-14 AWG (0.5-2.5 mm²)

EPIC® STA



Technical Data

of Contacts: 6, 14, 20, 40 (+PE)
Rated Voltage: 48V
Rated Current: 10A
Termination: Screw, solder
Wire Size: 20-16 AWG (0.5-1.5 mm²)

EPIC® HEE



Technical Data

of Contacts: 10, 18, 32, 46, 64, 92 (+PE)
Rated Voltage: 600V
Rated Current: 16A
Termination: Crimp
Wire Size: 20-12 AWG (0.5-4 mm²)

EPIC® HBS



Technical Data

of Contacts: 6, 12 (+PE)
Rated Voltage: 600V
Rated Current: 35A
Termination: Screw
Wire Size: 20-10 AWG (0.5-6 mm²)

EPIC® HBVE



Technical Data

of Contacts: 3, 6, 10 (+PE)
Rated Voltage: 600V
Rated Current: 16A
Termination: Screw
Wire Size: 20-14 AWG (0.5-2.5 mm²)

EPIC® HD



Technical Data

of Contacts: 7, 8, 15, 25, 40, 50, 64, 80, 128 (+PE)
Rated Voltage: 600V
Rated Current: 10A
Termination: Crimp
Wire Size: 22-14 AWG (0.14-2.5 mm²)

EPIC® HDD



Technical Data

of Contacts: 24, 42, 72, 108, 144, 216 (+PE)
Rated Voltage: 600V
Rated Current: 8.5A
Termination: Crimp
Wire Size: 22-14 AWG (0.14-2.5 mm²)

EPIC® MC



Technical Data

of Contacts: 2-280 (+PE)
Rated Voltage: 30-1000V
Rated Current: 1-82A
Termination: Screw, crimp, coax, cage clamp
Wire Size: 28-4 AWG (0.06-25 mm²)

EPIC® Mixed Power



Technical Data

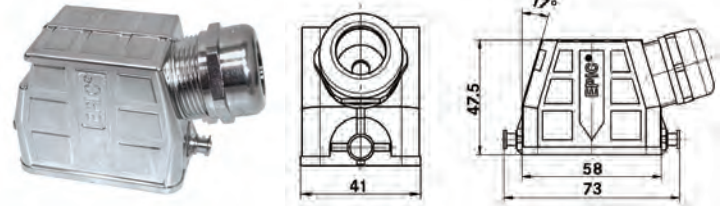
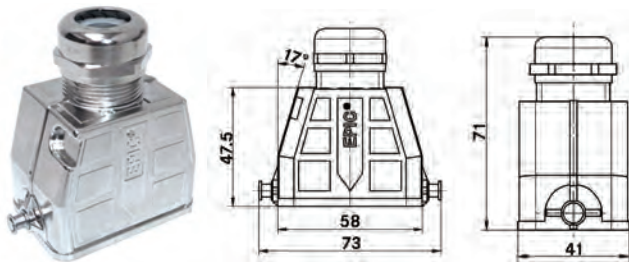
of Contacts: 4 pwr, 4 pwr/2 sig, 4 pwr/8 sig
Rated Voltage: 600V
Rated Current: 16A, 80A
Termination: Screw
Wire Size:
 - Power ≤ 6 AWG (16 mm²)
 - Signal ≤ 14 AWG (2.5 mm²)

EPIC® ULTRA HB 6

Hood & Panel Mount Base; Single Lever

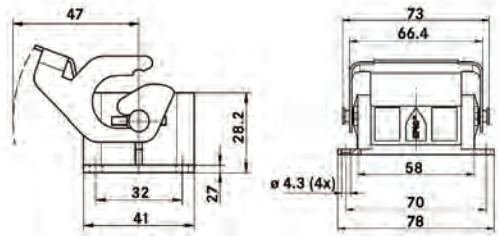


CONNECTORS



Part Number	Cable OD Range	Min. OD for Braided Shield	Brush
Top Entry			
70250200	6 - 13 mm	—	No
70250201	9 - 17 mm	—	No
70250202	9 - 17 mm	6 mm	Yes

Part Number	Cable OD Range	Min. OD for Braided Shield	Brush
Side Entry			
70250203	6 - 13 mm	—	No
70250204	9 - 17 mm	—	No
70250205	9 - 17 mm	6 mm	Yes



Part Number
70250206

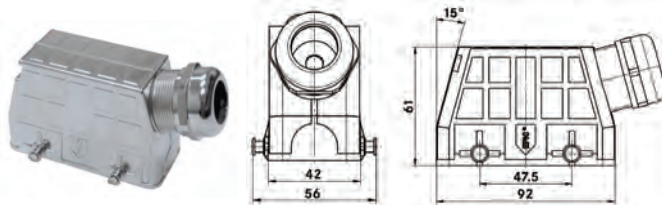
All dimensions are in mm.

EPIC® ULTRA HB 16

Hood & Panel Mount Base; Double Lever



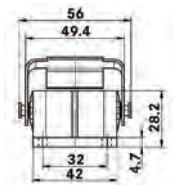
CONNECTORS



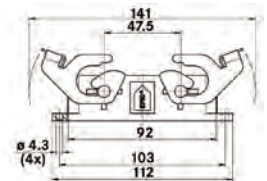
Part Number	Cable OD Range	Brush
70250216	11 - 21 mm	Yes



All dimensions are in mm.



Part Number
70250217

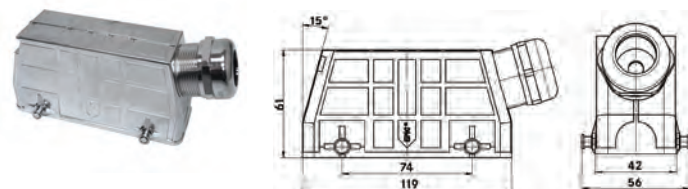


EPIC® ULTRA HB 24

Hood & Panel Mount Base; Double Lever



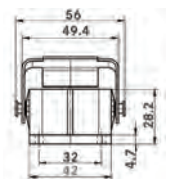
CONNECTORS



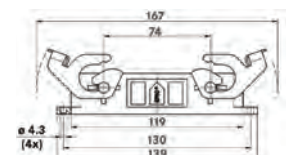
Part Number	Cable OD Range	Brush
70250221	11 - 21 mm	Yes



All dimensions are in mm.



Part Number
70250222



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.

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www.lappcanada.com • www.lappmexico.com



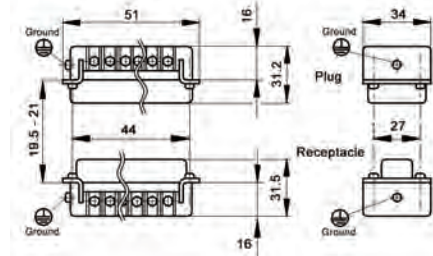
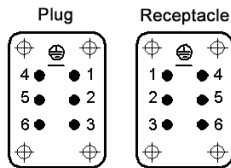


EPIC® HBE 6 Inserts

Screw-terminated Rectangular Inserts for EPIC® HB 6 Housings



View from cable side



Plug	Receptacle	Compatible Housing
10190000	10191000	HB 6

All dimensions are in mm.

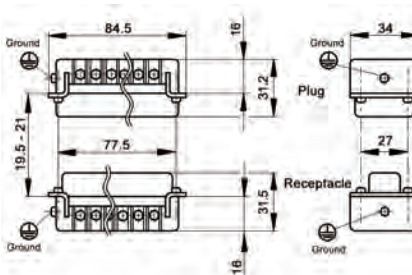
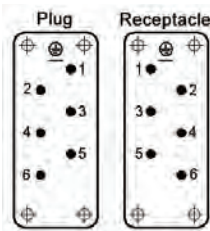


EPIC® HBS 6 Inserts

Screw-terminated Rectangular Inserts for EPIC® HB 16 Housings



View from cable side



Plug	Receptacle	Compatible Housing
10170000	10171000	HB 16

All dimensions are in mm.

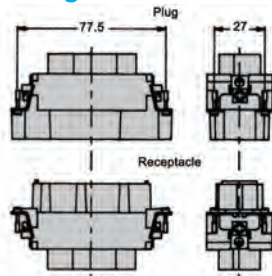
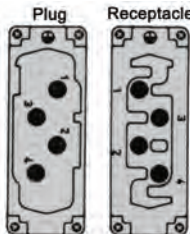


EPIC® Mixed Power Inserts

4 Power/0 Signal Rectangular Inserts for EPIC® HB 16 Housings



View from cable side



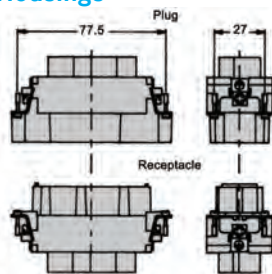
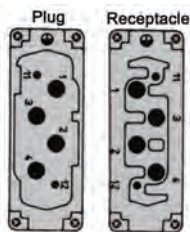
Plug	Receptacle	Compatible Housing
MP/M400	MP/F400	HB 16

All dimensions are in mm.

4 Power / 2 Signal Rectangular Inserts for EPIC® HB 16 Housings



View from cable side



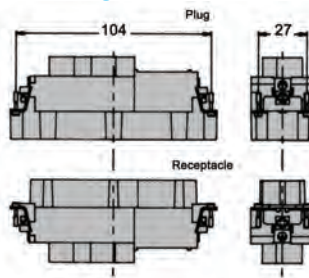
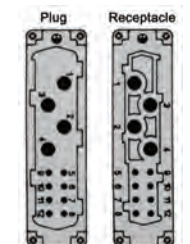
Plug	Receptacle	Compatible Housing
MP/M402	MP/F402	HB 16

All dimensions are in mm.

4 Power / 8 Signal Rectangular Inserts for EPIC® HB 24 Housings



View from cable side



Plug	Receptacle	Compatible Housing
11/2408	11/1408	HB 24

All dimensions are in mm.



Note: PROFIBUS, Ethernet, and Universal Bus modules are not UL Recognized.

The EPIC® MC Modular Series connector can be custom-configured to meet application requirements by combining a variety of standard plug-and-play modules within various size support frames. Configurations include contacts for power and control, thermocouple contacts, data modules for Profibus and Ethernet, and pneumatic modules.

For more information and additional configurations, see page 347 in our full line catalog or visit our website at www.lappusa.com/catalog/EPICInserts-MC.htm.

Module Configuration	Plug	Receptacle	Rated Voltage	Rated Current	Catalog Page
2 Contact Module: 2 Working Contacts*	10344100	10345100	1000V	82A	348
2 Contact Module: 1 Working Contact + 1 Ground*	10344600	10345600	1000V	82A	348
3 Contact Module	10382000	10382100	630V	40A	350
3 Contact Module: High Voltage	10399800	10399900	1000V	50A	351
5 Contact Module	10382200	10382300	400V	20A	354
10 Contact Module: Machined Contacts	10382400	10382500	250V	10A	355
20 Contact Module	10383600	10383700	100V	4A	357
Dummy Module	10399400	10399500	—	—	358
PROFIBUS DP Module	10390400	10390500	30V	1A	358
Ethernet Module: RJ45 Connectors + 4 Power Contacts*	10344300	10345300	600V	10A	359
Universal Bus Modules	10390600	10390700	30V	1A	359

* Module takes up two positions in frame.

Module Frames



Plug	Receptacle	Compatible Housing
2 Module Frame		
10381000	10381100	HB 6
5 Module Frame		
10381400	10381500	HB 16

MC2 Modules



Plug	Receptacle	Wire Size
2 Working Contacts		
10344100	10345100	8 - 4 AWG
1 Working Contact + Ground		
10344600	10345600	8 - 4 AWG

MC3 Modules



Plug	Receptacle	Wire Size
3 Contacts		
10382000	10382100	16 - 8 AWG
3 Contact High Voltage		
10399800	10399900	16 - 8 AWG

MC5 Modules



Plug	Receptacle	Wire Size
5 Contacts		
10382200	10382300	20 - 12 AWG

MC10 Modules



Plug	Receptacle	Wire Size
10 Contacts		
10382400	10382500	26 - 14 AWG

MC20 Modules & Dummy Module



Plug	Receptacle	Wire Size
20 Contacts		
10383600	10383700	28 - 20 AWG
Dummy Module		
10399400	10399500	—

PROFIBUS DP Modules



Plug	Receptacle	Wire Size
2 Contact + Shield		
10390400	10390500	22 AWG per PROFIBUS DP

Mount in high profile housings only

Ethernet Modules



Plug	Receptacle	Wire Size
4 Power Contacts		
10344300	10345300	26 - 24 AWG
RJ 45 Connector		
CE6326	—	26 - 24 AWG

Use standard HD Series machined crimp contacts for power

Universal Bus Modules



Plug	Receptacle	Wire Size
4 Contacts + Shield		
10390600	10390700	28 - 16 AWG



EPIC® Rectangular Insert Contacts

3.6 mm Silver Machined Contacts for EPIC® MC3 Modules



Part number = 1 contact,
sold in bags of 100

AWG	mm ²	Pin	Socket
16	1.5	1121070C	1121570C
14	2.5	1121060C	1121560C
12	4.0	1121000C	1121500C
10	6.0	1121010C	1121510C
8	10	1121020C	1121520C

Accessories

Crimp Tool: 11147000

Crimp Dies:

- 16 - 14 AWG: 11147110
- 12 - 8 AWG: 11147120

Contact Locator: 11147210

Removal Tool: 11171100

1.6 mm Stamped & Formed Contacts for EPIC® MC5 Modules



Part number = 1 contact,
sold in bags of 100

AWG	mm ²	Pin	Socket
20	0.5	1121300C	1121800C
18	0.75 - 1.0	1121310C	1121810C
16	1.5	1121320C	1121820C
14	2.5	1121330C	1121830C
12	4.0	1121340C	1121840C

Accessories

Crimp Tool: 11147000

Crimp Die: 11147100

Contact Locator: 11147200

Removal Tool: 11171000

1.6 mm Machined Contacts for EPIC® MC10 Modules



Part number = 1 contact,
sold in bags of 100

AWG	mm ²	Silver		Gold	
		Pin	Socket	Pin	Socket
26-22	0.14-0.37	13162000	13163000	13162500	13163500
20	0.5	13162100	13163100	13162600	13163600
18	0.75 - 1.0	13162200	13163200	13162700	13163700
16	1.5	13162300	13163300	13162800	13163800
14	2.5	13162400	13163400	13162900	13163900

Accessories

Crimp Tool: 11147000

Crimp Die: 11147100

Contact Locator: 11147200

Removal Tool: 11161000

1.0 mm Gold Stamped & Formed D-Sub Contacts for EPIC® MC20 Modules



AWG	mm ²	Reel of 500: Left Hand Feed	
		Pin	Socket
28 - 25	0.08-0.2	44429013	44429009
25-20	0.2-0.52	44429014	44429010

Accessories

Crimp Tool: 11158400

Removal Tool: 11132500





Crimp Tool & Case



Crimp Tool



Crimp Die



Contact Locator



Removal Tool

Description	Part Number	EPIC® Series
Crimp tool & case	11147000	All rectangular series
Crimp tool for reel	11158400	MC20
Crimp die	11147110	MC3 (16 - 14 AWG)
Crimp die	11147120	MC3 (12 - 8 AWG)
Crimp die	11147100	MC5, MC10
Contact locator	11147210	MC3
Contact locator	11147200	MC5, MC10
Removal tool	11171100	MC3
Removal tool	11171000	MC5
Removal tool	11161000	MC10
Removal tool	11132500	MC20

EPIC® Rectangular Hole Punch For EPIC® HB Panel Mount Bases & SKINTOP® CUBE



EPIC® rectangular hole punches provide a quick, accurate means of cutting clearance holes for mounting EPIC® HB series rectangular panel mount bases and SKINTOP® CUBE multi-cable bushing systems without sawing or filing. The dies include four drill guide holes for the base's screw mounting holes. Centering alignment marks are also included for easy squaring of the die with the panel cabinet. The unique 2-piece die configuration simplifies scrap slug removal.

The EPIC® hole punches can be used with mild steel up to 14 GA (2.0 mm) thickness or aluminum up to 10 GA (2.54 mm). These punches are intended for manual use with a ratchet or other suitable wrench or with a hand- or foot-operated hydraulic driver and ram using a 3/4" draw stud.

3/4" x 7" Draw Stud Set



Description	Part Number
3/4" x 7" Draw Stud Set	61U00197
3/4" x 7" Draw Stud	61U00198

Set includes:
draw stud, drive nut, counter nut, ball bearing, and spacer

Punch & Die Sets



Size	Part Number	Max. Panel Thickness
HB 6	61U00199	Mild Steel: 14 GA (2.0 mm) Aluminum: 10 GA (2.54 mm)
HB 10	61U00200	
HB 16	61U00201	
HB 24	61U00203	



OSHA, in conjunction with NFPA, defines safe work practices for employees working on or around live voltage. Personnel who have not been trained and certified and who are not wearing approved personal protective equipment shall not open panels over 50V DC to program a device within the panel.



UL E211786

Remote access ports provide programming access without opening the panel to allow you to comply with:

- OSHA 29 CRF 1910.147
- NFPA 70E and NFPA 79 Electrical Machinery Safety
- Standard 2002 Edition, Sections 16.1.1 (6), 16.1.2

Standard and custom configurations are available.

These include: AC outlets, circuit breakers, DIN couplers, ethernet couplers, D-sub connectors, USB ports, key lock switches, computer data storage devices, and just about any component that can fit in the available port housings.



Part Number: 6-9XP

- EPIC® HB 6 enclosure
- DB 9 gender-to-gender coupler



Part Number: 6-45CS

- EPIC® HB 6 enclosure
- RJ45 CAT.5e shielded coupler



Part Number: 10-1-45CS

- EPIC® HB 10 enclosure
- Single AC outlet
 - RJ45 CAT.5e shielded coupler



Part Number: 10-45CS-UABP

- EPIC® HB 10 enclosure
- RJ45 CAT.5e shielded coupler
 - USB A-B port



Part Number: 16-1-MD8P

- EPIC® HB 16 enclosure
- Single AC outlet
 - 8-position mini DIN coupler



Part Number: 16-1-9XP

- EPIC® HB 16 enclosure
- Single AC outlet
 - DB 9 gender-to-gender coupler



Part Number: 24-1-3A-9XP-MD8P

- EPIC® HB 24 enclosure
- Single AC outlet
 - 3 amp circuit breaker
 - DB 9 gender-to-gender coupler
 - 8-position mini DIN coupler



Part Number: 24-1-3A-9XP

- EPIC® HB 24 enclosure
- Single AC outlet
 - 3 amp circuit breaker
 - DB 9 gender-to-gender coupler



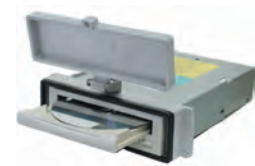
Part Number: 32-2-3A-9XP

- EPIC® HB 32 enclosure
- Duplex AC outlet
 - 3 amp circuit breaker
 - DB 9 gender-to-gender coupler



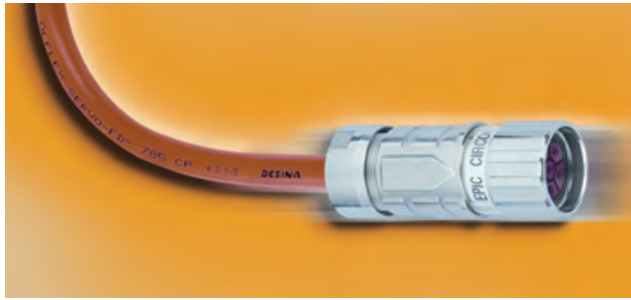
Part Number: 32-G2-3A-45CS

- EPIC® HB 32 enclosure
- GFCI outlet
 - 3 amp circuit breaker
 - RJ45 CAT.5e shielded coupler



Part Number: 109000NCDR

- Custom enclosure bracket
- CD-ROM or 5 1/4" protocol



EPIC® CIRCON LS1 5+PE

View from contact side



Male Insert



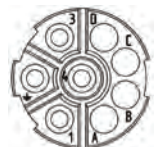
Female Insert

EPIC® CIRCON LS1 3+PE+4

View from contact side



Male Insert



Female Insert

Technical Data

Number of Contacts: 5+PE, 3+PE+4

Temperature Range: -25°C to +125°C

Rated Voltage:

- UL: 600V
- VDE: 630V
- 2 mm contacts: 250V
- 1 mm contacts: 250V

Rated Current:

- 2 mm contacts: 25A (5+PE)
26A (3+PE+4)
- 1 mm contacts: 7A

Impulse Voltage:

- 2 mm contacts: 6kV
- 1 mm contacts: 4kV

Protection Class:

- IP67 / 68 (10h/1m)
- Style A3: IP65

Wire Gauge (Crimp Termination):

- 2 mm contacts:
- Styles A1, A3, G5: 20 - 14 AWG (0.5 - 2.5 mm²)
- Styles D, F, A6: 20 - 12 AWG (0.5 - 4.0 mm²)
- 1 mm contacts: 24 - 18 AWG (0.14 - 1.0 mm²)

Cable Diameter:

- Styles D & F: 7.5 - 15.5 mm
14 - 17 mm (12 AWG contacts)

Mating Cycles:

500

Materials:

- Housing: Nickel-plated die-cast zinc
- Insulation body: PA, PBT, V-0 per UL 94
- Contacts: Gold-plated copper alloy
- Gaskets & seals: FPM

Contact Resistance:

< 4 mΩ

Approvals:

DIN EN 61984
cRUus #E75770



Style A1
Straight Panel Mount

Contact Configuration	Part Number
5+PE	76003000
3+PE+4	76004000



Style A3
Angled Panel Mount

Contact Configuration	Part Number
5+PE	24420058
3+PE+4	24420056



Style A6
Panel Mount Socket

Contact Configuration	Part Number
5+PE	76083000
3+PE+4	76084000



Crimp Tool & Locator

Description	Part Number
Crimp tool	11148000
Locator	11148200



Style D6
Cable Connector

Contact Configuration	Part Number		
	20 - 14 AWG	12 AWG	Short Body
5+PE	76123000	44420091	76123100
3+PE+4	76124000	44420089	76124100



Style F6
Cable Coupler

Contact Configuration	Part Number		
	20 - 14 AWG	12 AWG	
5+PE	76133000	44420095	
3+PE+4	76134000	44420093	



Technical Data

Number of Contacts: 6, 7, 8+1, 9, 12, 16, 17

Temperature Range: -25°C to +125°C

Rated Voltage:

- 6, 7, 8+1 & 9 poles: 150V
- 12 & 16 poles: 100V
- 17 poles: 50V

Rated Current:

- 6 & 7 poles: 14A
- 8+1, 9, 12, 16 & 17 poles: 7A

Impulse Voltage:

- 6 & 7 poles: 4kV
- 8+1 poles: 2.5kV
- 9, 12 & 16 poles: 1.5kV
- 17 poles: 0.8kV

Protection Class:

- Style A3: IP67/68 (10h/1m)
IP65

Wire Gauge:

- Crimp termination:
- 1 mm contacts: 26 - 18 AWG (0.14 - 1.0 mm²)
- 2 mm contacts: 18 - 14 AWG (1.0 - 2.5 mm²)
- Solder termination:
- 1 mm contacts: up to 18 AWG (1.0 mm²)
- 2 mm contacts: up to 14 AWG (2.5 mm²)

Cable Diameter:

7.0 - 13.5 mm

Mating Cycles:

100 minimum

Materials:

- Housing: Nickel-plated die-cast zinc
- Style C2: Nickel-plated copper alloy
- Insulation body: PA, PBT, V-0 per UL 94
- Contacts: Gold-plated copper alloy
- Gaskets & seals: FPM

Contact Resistance:

< 4 mΩ

Approvals:

DIN EN 61984
cRUus #E75770



Style A1
Straight Panel Mount

Keying	Part Number
N	72004000
-20°	72004100
+20°	72004200



Style A3
Angled Panel Mount

Part Number
24420055



Style D6
Cable Connector

Keying	Part Number
N	44420037
-20°	44420036
+20°	44420038



Style F6
Cable Coupler

Keying	Part Number
N	44420040
-20°	44420039
+20°	44420041



Connector inserts will accept both male and female contacts.
A complete connection requires one E-Type insert and one P-Type insert.

# of contacts	6	7	8+1	9	12	16	17
E-Type Inserts							
without contacts	73002766	44420154	73002742	73002730	73002718	73002706	73008500
with male solder contacts	73002768	44420156	73002744	73002732	73002720	73002708	73028500
with female solder contacts	73002770	44420158	73002746	73002734	73002722	73002710	73018500
E-Type Inserts							
	2 mm contacts	2 mm contacts	1 & 2 mm contacts	1 mm contacts	1 mm contacts	1 mm contacts	1 mm contacts
Clockwise numbered contacts viewed from the mating side							
P-Type Inserts							
without contacts	73002760	44420148	73002736	73002724	73002712	73002700	73008000
with male solder contacts	73002762	44420150	73002738	73002726	73002714	73002702	73028000
with female solder contacts	73002764	44420152	73002740	73002728	73002716	73002704	73018000
P-Type Inserts							
	2 mm contacts	2 mm contacts	1 & 2 mm contacts	1 mm contacts	1 mm contacts	1 mm contacts	1 mm contacts
Counter-clockwise numbered contacts viewed from the mating side							

Note: 12 & 17 pole inserts for PCB soldering are available on request (non-stock)

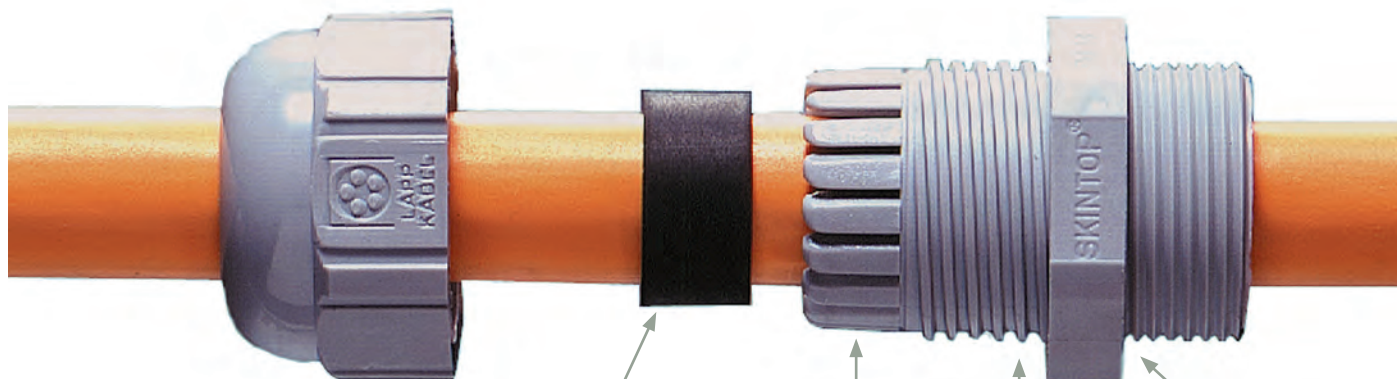
1 mm & 2 mm Contacts for EPIC® M23 Series Connectors

Size AWG	mm ²	Description	Termination Type	Part Number	Standard Pack Size
1 mm M23 Contacts					
26 - 18	0.14 - 1.0	M23 gold male contacts	Crimp	72400000	100
26 - 18	0.14 - 1.0	M23 gold female contacts	Crimp	74200600	100
26 - 18	0.14 - 1.0	M23/LS1 HYP gold female contacts	Crimp	74034500	100
up to 18	up to 1.0	M23 gold male contacts	Solder	72402000	100
up to 18	up to 1.0	M23 gold female contacts	Solder	72402600	100
2 mm M23 Contacts					
18 - 14	1.0 - 2.5	M23 gold male contacts	Crimp	72401000	100
18 - 14	1.0 - 2.5	M23 gold female contacts	Crimp	72401600	100
up to 14	up to 2.5	M23 gold male contacts	Solder	72403000	100
up to 14	up to 2.5	M23 gold female contacts	Solder	72404000	100



SKINTOP® Cable Glands

Strain Relief Cable Glands: Secured by a Single Turn of the Hand



Cap nut with ergonomically designed gripping grooves. The gripping surfaces are generously dimensioned for wrenches. Integral locking feature for vibration-resistant assembly.

Neoprene sealing for a hermetic seal. A reducing seal insert for smaller cable diameters is available.

Lamellar design for optimum strain relief and protection of the cable. A widely variable clamping range makes only a few gland sizes necessary.

Multiple trapezoidal thread for secure and instant assembly.

Integral sealing ridges for a watertight junction with the housing.

Shown here are the carefully matched components of the SKINTOP® screw-type cable glands. These parts guarantee maximum reliability.

With SKINTOP® you can install the cable in an instant: just feed the cable in and turn the nut until tight. Your cable is centered, hermetically sealed, and completely strain relieved with a turn of the hand. If you do not wish to use your hands, you can work with a spanner wrench or SKINMATIC® RZ tool. Either way, with SKINTOP® you can achieve maximum reliability. SKINTOP® quality is continuously monitored to ensure a level of reliability that has resulted in many international approvals.

Resistance Properties

Rated Temperature:

- SKINTOP® NPT & PG: -20°C to +80°C
- SKINTOP® Metric:
 - Static: -40°C to +100°C
 - Dynamic: -20°C to +100°C

Testing:

- SKINTOP® Incandescent wire test to IEC 695, Part 2-1:
- Test temperature: 750°C
- Strain relief: to DIN VDE 0619
- Protection class: IP68*
- Tested to DIN 40050 & 40052

Approvals:

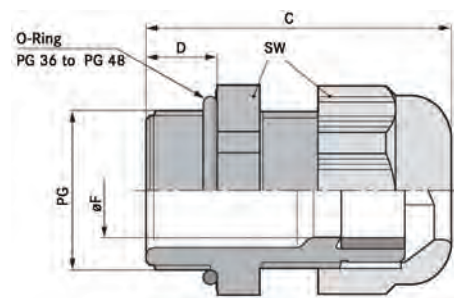
UL #E146370
CSA #LR50370-10
VDE #57986 (metric threads)
SEV #100989

Chemical Resistance:*

- + : resistant
- o : limited resistance
- : not resistant

- + Alcohols
- + Aromatic hydrocarbons
- + Ethers
- + Benzene
- o Chlorinated hydrocarbons
- + Esters
- + Grease, animal/vegetable
- + Fluorinated hydrocarbons
- + Ketones
- + Motor fuels
- + Weak alkali solutions
- Strong alkali solutions
- + Petroleum oils
- + Weak acids
- Strong acids
- + Trichloroethylene

* Additional and more detailed information on chemical resistance of plastics can be found on page 713 of our full line catalog.



Technical Data

Material:

- Body: Polyamide
- Bushing: CR

Locknuts:

Included for "S" part numbers

Temperature Range:

- Static: -40°C to +80°C
- Dynamic: -20°C to +80°C

RAL Color:

Black (RAL 9005), UV resistant
Gray (RAL 7001)

IP Protection:

- Seal: 70 PSI
IP68, 5 bar
(Exceeds NEMA 6/6P pressure rating)

Part Number with Locknut		Part Number without Locknut*		Thread Type & Size	UL Status	øF Clamping Range		SW Wrenching Flats (in)	C Overall Length (in)	D Thread Length (in)	Standard Pack Size
Black	Gray	Black	Gray			(in)	(mm)				
SKINTOP® SL: Standard											
S2107	S1107	53015200	53015000	PG 7	Recognized	0.098 - 0.256	2.5 - 6.5	0.591	1.260	0.315	100
S2109	S1109	53015210	53015010	PG 9	Recognized	0.138 - 0.315	3.5 - 8.0	0.748	1.417	0.315	100
S2111	S1111	53015220	53015020	PG 11	Recognized	0.157 - 0.394	4.0 - 10.0	0.866	1.496	0.315	100
S2113	S1113	53015230	53015030	PG 13	Listed	0.236 - 0.472	6.0 - 12.0	0.945	1.614	0.354	100
S2116	S1116	53015240	53015040	PG 16	Listed	0.354 - 0.551	9.0 - 14.0	1.063	1.732	0.394	50
S2121	S1121	53015250	53015050	PG 21	Listed	0.512 - 0.709	13.0 - 18.0	1.299	1.929	0.433	50
S2129	S1129	53015260	53015060	PG 29	Recognized	0.551 - 0.984	14.0 - 25.0	1.654	2.205	0.433	25
S2136	S1136	53015270	53015070	PG 36	Listed	0.945 - 1.260	24.0 - 32.0	2.087	2.598	0.512	10
S2142	S1142	53015280	53015080	PG 42	Recognized	1.378 - 1.496	35.0 - 38.0	2.362	2.677	0.512	5
S2148	S1148	53015290	53015090	PG 48	Listed	1.535 - 1.732	39.0 - 44.0	2.559	2.717	0.551	5
SKINTOP® SLR: Reducer Bushing											
S2207	S1207	53015300	53015100	PG 7	Recognized	0.059 - 0.197	1.5 - 5.0	0.591	1.260	0.315	100
S2209	S1209	53015310	53015110	PG 9	Recognized	0.079 - 0.236	2.0 - 6.0	0.748	1.417	0.315	100
S2211	S1211	53015320	53015120	PG 11	Recognized	0.079 - 0.276	2.0 - 7.0	0.866	1.496	0.315	100
S2213	S1213	53015330	53015130	PG 13	Listed	0.157 - 0.354	4.0 - 9.0	0.945	1.614	0.354	100
S2216	S1216	53015340	53015140	PG 16	Listed	0.236 - 0.472	6.0 - 12.0	1.063	1.732	0.394	50
S2221	S1221	53015350	53015150	PG 21	Listed	0.354 - 0.630	9.0 - 16.0	1.299	1.929	0.433	50
S2229	S1229	53015360	53015160	PG 29	Recognized	0.433 - 0.787	11.0 - 20.0	1.654	2.205	0.433	25
S2236	S1236	53015370	53015170	PG 36	Listed	0.669 - 1.024	17.0 - 26.0	2.087	2.598	0.512	10
S2242	S1242	53015380	53015180	PG 42	Recognized	0.866 - 1.220	22.0 - 31.0	2.362	2.677	0.512	5
S2248	S1248	53015390	53015190	PG 48	Listed	1.024 - 1.378	26.0 - 35.0	2.559	2.717	0.551	5

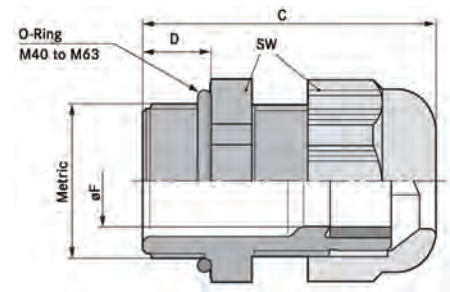
Orders of 2000 pieces or more per item will be bulk packaged unless otherwise requested.

* If the end-use application consists of inserting the SKINTOP® cable gland through a non-threaded hole, then the use of a locknut is required per UL.



SKINTOP® SLM/SLRM

Strain Relief with Metric Thread



Technical Data



Material:

- Body: Polyamide
- Bushing: CR



Locknuts:

Included for "S" part numbers



Temperature Range:

- Static: -40°C to +100°C
- Dynamic: -20°C to +100°C



Color:

Black (RAL 9005),
UV resistant
Gray (RAL 7001)

IP Protection:

- Seal:

70 PSI
IP69K
IP68, 5 bar
(Exceeds NEMA 6/6P
pressure rating)

Part Number with Locknut		Part Number without Locknut**		Thread Type & Size	UL Status	øF Clamping Range		SW Wrenching Flats (in)	C Overall Length (in)	D Thread Length (in)	Standard Pack Size
Black	Gray	Black	Gray			(in)	(mm)				
SKINTOP® SLM: Standard											
S2507	S1507	53111200	53111000	M12 x 1.5	Recognized	0.138 - 0.276	3.5 - 7.0	0.591	1.181	0.315	100
S2509	S1509	53111210	53111010	M16 x 1.5*	Recognized	0.177 - 0.394	4.5 - 10.0	0.748	1.339	0.315	100
S2513	S1513	53111220	53111020	M20 x 1.5*	Listed	0.276 - 0.512	7.0 - 13.0	0.984	1.457	0.354	100
S2516	S1516	53111230	53111030	M25 x 1.5*	Listed	0.354 - 0.669	9.0 - 17.0	1.181	1.575	0.394	50
S2521	S1521	53111240	53111040	M32 x 1.5	Listed	0.433 - 0.827	11.0 - 21.0	1.417	1.850	0.394	25
S2529	S1529	53111250	53111050	M40 x 1.5	Listed	0.748 - 1.102	19.0 - 28.0	1.811	2.047	0.394	10
S2536	S1536	53111260	53111060	M50 x 1.5	Listed	1.063 - 1.378	27.0 - 35.0	2.165	2.441	0.472	5
S2542	S1542	53111270	53111070	M63 x 1.5	Listed	1.339 - 1.772	34.0 - 45.0	2.598	2.795	0.472	5
SKINTOP® SLRM: Reducer Bushing											
S2607	S1607	53111300	53111100	M12 x 1.5	Recognized	0.039 - 0.197	1.0 - 5.0	0.591	1.181	0.315	100
S2609	S1609	53111310	53111110	M16 x 1.5*	Recognized	0.079 - 0.276	2.0 - 7.0	0.748	1.339	0.315	100
S2613	S1613	53111320	53111120	M20 x 1.5*	Listed	0.197 - 0.394	5.0 - 10.0	0.984	1.457	0.354	100
S2616	S1616	53111330	53111130	M25 x 1.5*	Listed	0.236 - 0.512	6.0 - 13.0	1.181	1.575	0.394	50
S2621	S1621	53111340	53111140	M32 x 1.5	Listed	0.276 - 0.591	7.0 - 15.0	1.417	1.850	0.394	25
S2629	S1629	53111350	53111150	M40 x 1.5	Listed	0.591 - 0.906	15.0 - 23.0	1.811	2.047	0.394	10
S2636	S1636	53111360	53111160	M50 x 1.5	Listed	0.866 - 1.142	22.0 - 29.0	2.165	2.441	0.472	5
S2642	S1642	53111370	53111170	M63 x 1.5	Listed	1.102 - 1.535	28.0 - 39.0	2.598	2.795	0.472	5

Orders of 2000 pieces or more per item will be bulk packaged unless otherwise requested.

* Metric sizes M16, M20, and M25 also available in an extended thread version. To maintain UL rating, please use a locknut.

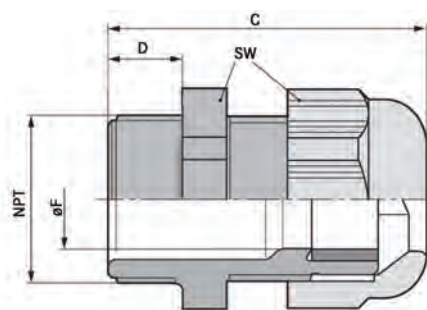
** If the end-use application consists of inserting the SKINTOP® cable gland through a non-threaded hole, then the use of a locknut is required per UL.

SKINTOP® SLN/SLRN

Strain Relief with NPT Thread



STRAIN
RELIEF



Technical Data

Material:

- Body: Polyamide
- Bushing: CR

Locknuts:

Not included,
add GMP Locknuts*

Temperature Range:

- Static: -40°C to +80°C
- Dynamic: -20°C to +80°C

RAL Color:

Black (RAL 9005),
UV resistant
Gray (RAL 7001)

IP Protection:

- Seal: 70 PSI
IP68, 5 bar
(Exceeds NEMA 6/6P
pressure rating)

* see main catalog page 544

Part Number	Thread Type & Size	UL Status	øF Clamping Range	SW Wrenching Flats	C Overall Length	D Thread Length	Standard Pack Size
Black	Gray		(in)	(mm)	(in)	(in)	
SKINTOP® SLN: Standard							
S2138	S1138	Recognized	0.138 - 0.315	3.5 - 8.0	0.748	1.693	100
S2112	S1112	Listed	0.197 - 0.472	5.0 - 12.0	0.945	1.772	100
S2134	S1134	Listed	0.512 - 0.709	13.0 - 18.0	1.299	2.087	50
S2101	S1101	Listed	0.748 - 1.000	19.0 - 25.4	1.654	2.362	25
SKINTOP® SLRN: Reducer Bushing							
S2238	S1238	Recognized	0.079 - 0.236	2.0 - 6.0	0.748	1.693	100
S2212	S1212	Listed	0.157 - 0.354	4.0 - 9.0	0.945	1.772	100
S2234	S1234	Listed	0.354 - 0.630	9.0 - 16.0	1.299	2.087	50
S2201	S1201	Listed	0.551 - 0.827	14.0 - 21.0	1.654	2.362	25

Orders of 2000 pieces or more per item will be bulk packaged unless otherwise requested.

STRAIN
RELIEF



SKINTOP® CUBE

Multi-Cable Bushing System



UL Pending

Technical Data

Material:

- Frame: Glass fiber reinforced polyamide
- Frame seal: CR
- Clip module: Special polypropylene
- Clip module seal: LSE 2

Temperature Range:

-20°C to +80°C

RAL Color:

Black

IP Protection:

IP64

Part Number	Size	Clamping Range ø	Max. Number of Modules	Standard Pack Size
		(in)	(mm)	
Frame				
52220000	16 Panel Cut-out (36 x 86 mm)	—	8	1
52220001	24 Panel Cut-out (36 x 112 mm)	—	10	1
Module				
52220004	20x20 Blank Module	0.039 - 0.118	1 - 3	5
52220002	20x20 Small Module	0.157 - 0.236	4 - 6	5
52220003	20x20 Large Module	0.236 - 0.354	6 - 9	5
52220040	20x20 AS-i Module	ASi bus cable	ASi bus cable	5
52220005	40x40 Small Module	0.354 - 0.472	9 - 12	5
52220006	40x40 Large Module	0.472 - 0.630	12 - 16	5
52220007	40x40 Blank Module	—	—	5

Use together with
EPIC® Rectangular hole punch, page 61

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.

800-774-3539 • www.lappusa.com
www.lappcanada.com • www.lappmexico.com



LAPP GROUP

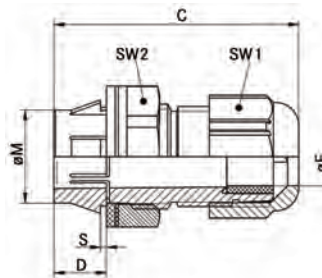


SKINTOP® CLICK/CLICK-R

Strain Relief with Quick "Click" Insertion System



1 disassembly tool
included per pack



Technical Data

Material:

- Body: Special polyamide
- Seal: Special elastomer

Temperature Range:

- Static: -40°C to +100°C
- Dynamic: -20°C to +100°C

RAL Color:

Black (RAL 9005), UV resistant
Gray (RAL 7001)

IP Protection:

- M12: IP68, 4 bar
- M16 to M32: IP68, 5 bar
(Exceeds NEMA 6/6P pressure rating)

Part Number*		Mounting Hole Size	UL Status	øF Clamping Range		SW1/SW2 Wrenching Flats	C Overall Length	D Thread Length	øM Hole	Standard Pack Size
Black	Gray			(in)	(mm)					
SKINTOP® CLICK: Standard										
53112923	53112921	M12	Recognized	0.138 - 0.276	3.5 - 7.0	0.591/0.709	1.576	0.315	0.484 (-.008)	50
53112882	53112876	M16	Recognized	0.197 - 0.354	5.0 - 9.0	0.748/0.866	1.654	0.315	0.642 (-.008)	50
53112883	53112877	M20	Listed	0.276 - 0.512	7.0 - 13.0	0.985/1.063	1.792	0.315	0.799 (-.008)	25
53112884	53112878	M25	Listed	0.354 - 0.669	9.0 - 17.0	1.182/1.339	1.910	0.315	0.996 (-.008)	25
53112924	53112922	M32	Listed	0.433 - 0.827	11.0 - 21.0	1.417/1.576	2.167	0.315	1.272 (-.008)	25
SKINTOP® CLICK-R: Reducer Bushing										
53112929	53112927	M12	Recognized	0.039 - 0.197	1.0 - 5.0	0.591/0.709	1.576	0.315	0.484 (-.008)	50
53112885	53112879	M16	Recognized	0.157 - 0.276	4.0 - 7.0	0.748/0.866	1.654	0.315	0.642 (-.008)	50
53112886	53112880	M20	Listed	0.197 - 0.394	5.0 - 10	0.985/1.063	1.792	0.315	0.799 (-.008)	25
53112887	53112881	M25	Listed	0.236 - 0.512	6.0 - 13	1.182/1.339	1.910	0.315	0.996 (-.008)	25
53112931	53112928	M32	Listed	0.276 - 0.591	7.0 - 15	1.417/1.576	2.167	0.315	1.272 (-.008)	25

* Suitable for wall thickness of 1 - 4 mm (0.039 - 0.157 inches)



SKINTOP® INOX/INOX-R

Stainless Steel Strain Relief with Metric Thread



Technical Data

Material:

- Body: Stainless steel:
V4.A (1.4404/316L)
- Insert: Polyamide
- Sealing ring: Silicone
- O-ring: Silicone



Temperature Range: -40°C to +100°C

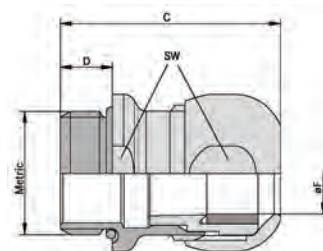
IP Protection:

IP68, 5 bar
(Exceeds NEMA 6/6P pressure rating)
IP69K

Approvals:

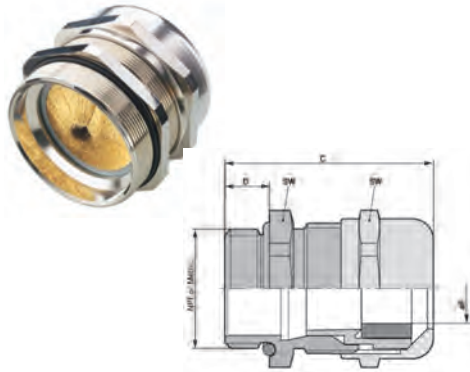
According to DIN EN ISO 14 159
According to DIN EN 1672-2
EHEDG

Part Number	Thread Type & Size	øF Clamping Range		SW Wrenching Flats	C Overall Length	D Thread Length	Standard Pack Size
		(in)	(mm)	(in)	(in)	(in)	
SKINTOP® INOX							
53806739	M12 x 1.5	0.157 - 0.275	4.0 - 7.0	0.630	1.154	0.256	5
53806740	M16 x 1.5	0.197 - 0.394	5.0 - 10.0	0.788	1.276	0.275	5
53806741	M20 x 1.5	0.275 - 0.512	7.0 - 13.0	0.945	1.398	0.315	5
53806742	M25 x 1.5	0.354 - 0.669	9.0 - 17.0	1.142	1.544	0.315	5
53806743	M32 x 1.5	0.433 - 0.827	11.0 - 21.0	1.418	1.757	0.354	5
SKINTOP® INOX-R							
53806749	M12 x 1.5	0.118 - 0.197	3.0 - 5.0	0.630	1.154	0.256	5
53806750	M16 x 1.5	0.177 - 0.275	4.5 - 7.0	0.788	1.276	0.275	5
53806751	M20 x 1.5	0.236 - 0.394	6.0 - 10.0	0.945	1.398	0.315	5
53806752	M25 x 1.5	0.275 - 0.512	7.0 - 13.0	1.142	1.544	0.315	5
53806753	M32 x 1.5	0.315 - 0.591	8.0 - 15.0	1.418	1.757	0.354	5



SKINTOP® BRUSH

Nickel-Plated Brass Strain Relief for EMC Applications with NPT or Metric Thread



Technical Data

- Material:**
- Body: Nickel-plated brass
 - Brush: Brass
 - Insert: Polyamide
 - Bushing: Special elastomer
 - O-ring: Special elastomer
- Locknuts:** Add SM-PE-M metric locknuts, below

Temperature Range: -30°C to +100°C

IP Protection:

- M25 - M63: IP69K
- M63 plus & larger: IP68, 5 bar (Exceeds NEMA 6/6P pressure rating)

SKINTOP® MS-NPT BRUSH: NPT Threads



Part Number	Thread Type & Size	øF Clamping Range		SW Wrenching Flats	C Overall Length	D Thread Length	Min. ø Above Braiding	Standard Pack Size
		(in)	(mm)	(in)	(in)	(in)	(in)	
53112037	NPT ¾"	0.354 - 0.669	9.0 - 17.0	1.142	1.694	0.591	0.236	10
53112047	NPT 1"	0.433 - 0.827	11.0 - 21.0	1.418	1.891	0.591	0.315	1
53112057	NPT 1¼"	0.748 - 1.103	19.0 - 28.0	1.773	2.265	0.669	0.394	1
53112067*	NPT 1½"	1.063 - 1.379	27.0 - 35.0	2.127	2.323	0.669	0.551	1
53112077*	NPT 2"	1.339 - 1.773	34.0 - 45.0	2.639	2.482	0.669	0.787	1
53112087*	NPT 2"	1.733 - 2.167	44.0 - 55.0	2.955	2.836	0.669	0.984	1

* Available upon request

SKINTOP® MS-M BRUSH: Metric Threads



Part Number	Thread Type & Size	øF Clamping Range		SW Wrenching Flats	C Overall Length	D Thread Length	Min. ø Above Braiding	Standard Pack Size
		(in)	(mm)	(in)	(in)	(in)	(in)	
53112676	M25 x 1.5	0.354 - 0.669	9.0 - 17.0	1.142	1.418	0.315	0.236	10
53112677	M32 x 1.5	0.433 - 0.827	11.0 - 21.0	1.418	1.663	0.354	0.315	1
53112678	M40 x 1.5	0.748 - 1.103	19.0 - 28.0	1.773	2.344	0.354	0.394	1
53112679	M50 x 1.5	1.063 - 1.379	27.0 - 35.0	2.127	2.049	0.394	0.551	1
53112680	M63 x 1.5	1.339 - 1.773	34.0 - 45.0	2.639	2.415	0.591	0.788	1
53112681	M63 x 1.5, plus	1.733 - 2.167	44.0 - 55.0	2.955	2.719	0.591	0.985	1
53112501	M75 x 1.5	2.088 - 2.482	53.0 - 63.0	3.743	4.137	0.591	1.379	1
53112500	M75 x 1.5, plus	2.285 - 2.679	58.0 - 68.0	3.743	4.137	0.591	1.379	1
53112503**	M90 x 2.0	2.600 - 3.073	66.0 - 78.0	4.531	5.339	0.788	1.773	1
53112505**	M110 x 2.0	2.994 - 3.467	76.0 - 88.0	5.319	6.068	0.985	2.167	1
53112504**	M110 x 2.0, plus	3.388 - 3.861	86.0 - 98.0	5.319	6.068	0.985	2.167	1

** UL and VDE approvals pending on sizes M90 x 2.0 to M110 x 2.0

SKINDICHT® SM-PE Locknuts

Nickel-Plated Brass Grounding Locknuts for PG & Metric Cable Glands



Technical Data

Material: Nickel-plated brass

SKINTOP® SM-PE: for PG Glands

Part Number	Thread Type & Size	Wrenching Flats	Nut Thickness (in)	Standard Pack Size
52103200	PG 7	0.591	0.185	100
52103210	PG 9	0.709	0.185	100
52103220	PG 11	0.827	0.185	100
52103230	PG 13	0.906	0.185	100
52103240	PG 16	1.024	0.185	100
52103250	PG 21	1.260	0.204	50
52103260	PG 29	1.615	0.224	50
52103270	PG 36	2.009	0.263	50

SKINTOP® SM-PE: for Metric Glands

Part Number	Thread Type & Size	Wrenching Flats	Nut Thickness (in)	Standard Pack Size
52103300	M12 x 1.5	0.591	0.137	100
52103310	M16 x 1.5	0.748	0.137	100
52103320	M20 x 1.5	0.945	0.145	100
52103330	M25 x 1.5	1.182	0.165	50
52103340	M32 x 1.5	1.418	0.185	50
52103350	M40 x 1.5	1.812	0.216	25
52103360	M50 x 1.5	2.364	0.216	10
52103370	M63 x 1.5	2.758	0.275	10
52103371	M75 x 1.5	3.349	0.315	5
52103372	M90 x 2.0	4.018	0.394	1
52103373	M110 x 2.0	4.885	0.472	1

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.

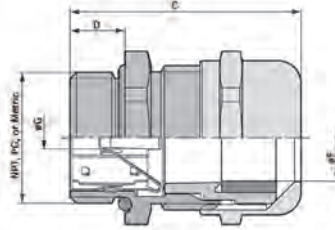
800-774-3539 • www.lappusa.com
www.lappcanada.com • www.lappmexico.com





SKINTOP® MS-SC/MS-SC-XL

Nickel-Plated Brass Strain Relief for EMC Applications with NPT, PG & Metric Thread



Technical Data



Material:

- Body: Nickel-plated brass
- Insert: Polyamide
- Bushing: CR
- O-ring: NBR



Locknuts:

Add SM-PE locknuts,
page 71



Temperature Range:

-30°C to +100°C



IP Protection:

IP68, 5 bar
(Exceeds NEMA 6/6P
pressure rating)
when used with an O-ring

SKINTOP® MS-SC: NPT Threads



Part Number	Thread Type & Size	øF Clamping Range		SW Wrenching Flats (in)	C Overall Length (in)	D Thread Length (in)	Min. ø Above Braiding (in)	Standard Pack Size
		(in)	(mm)					
53112910	NPT 3/8"	0.177 - 0.394	4.5 - 10.0	0.788	1.564	0.591	0.158	100
53112920	NPT 1/2"	0.275 - 0.512	7.0 - 13.0	0.945	1.674	0.591	0.197	50
53112930	NPT 3/4"	0.354 - 0.669	9.0 - 17.0	1.142	1.753	0.591	0.296	25
53112940	NPT 1"	0.433 - 0.827	11.0 - 21.0	1.418	1.930	0.591	0.355	25
53112950	NPT 1 1/4"	0.748 - 1.103	19.0 - 28.0	1.773	2.264	0.669	0.591	10
53112960	NPT 1 1/2"	1.063 - 1.379	27.0 - 35.0	2.127	2.423	0.669	0.827	5

SKINTOP® MS-SC: PG Threads



Part Number	Thread Type & Size	øF Clamping Range		SW Wrenching Flats	C Overall Length	D Thread Length	Min ø Above Braiding	Standard Pack Size
		(in)	(mm)					
SKINTOP® MS-SC: Standard PG Thread								
53112210	PG 9	0.118 - 0.315	3.0 - 8.0	0.669	1.142	0.236	0.158	50
53112220	PG 11	0.157 - 0.394	4.0 - 10.0	0.787	1.260	0.236	0.158	50
53112230	PG 13	0.197 - 0.472	5.0 - 12.0	0.866	1.339	0.256	0.158	25
53112240	PG 16	0.315 - 0.551	8.0 - 14.0	0.945	1.378	0.256	0.236	25
53112250	PG 21	0.433 - 0.689	11.0 - 17.5	1.181	1.575	0.275	0.315	25
53112260	PG 29	0.630 - 0.985	16.0 - 25.0	1.575	1.890	0.315	0.512	10
53112270	PG 36	0.748 - 1.260	19.0 - 32.0	1.969	2.441	0.591	0.630	5
SKINTOP® MS-SCL: Long PG Thread								
53112310	PG 9	0.118 - 0.315	3.0 - 8.0	0.669	1.378	0.472	0.158	50
53112320	PG 11	0.157 - 0.394	4.0 - 10.0	0.787	1.496	0.472	0.158	50
53112330	PG 13	0.197 - 0.472	5.0 - 12.0	0.866	1.555	0.472	0.158	25
53112340	PG 16	0.315 - 0.551	8.0 - 14.0	0.945	1.594	0.472	0.236	25
53112350	PG 21	0.433 - 0.689	11.0 - 17.5	1.181	1.772	0.472	0.315	25
53112360	PG 29	0.630 - 0.985	16.0 - 25.0	1.575	2.047	0.591	0.512	10

SKINTOP® MS-SC: PG Threads



Part Number	Thread Type & Size	øF Clamping Range		SW Wrenching Flats	C Overall Length	D Thread Length	Min ø Above Braiding	Standard Pack Size
		(inches)	(mm)					
SKINTOP® MS-M-SC: Standard Metric Thread								
53112610	M12 x 1.5	0.137 - 0.275	3.5 - 7.0	0.630	1.043	0.256	0.079	50
53112620	M16 x 1.5	0.177 - 0.354	4.5 - 9.0	0.788	1.299	0.275	0.158	50
53112630	M20 x 1.5	0.275 - 0.492	7.0 - 12.5	0.945	1.457	0.315	0.197	25
53112640	M25 x 1.5	0.354 - 0.650	9.0 - 16.5	1.142	1.516	0.315	0.296	25
53112650	M32 x 1.5	0.433 - 0.827	11.0 - 21.0	1.418	1.791	0.354	0.355	25
53112660	M40 x 1.5	0.748 - 1.103	19.0 - 28.0	1.773	1.890	0.354	0.591	10
53112670	M50 x 1.5	1.063 - 1.379	27.0 - 35.0	2.127	2.185	0.394	0.827	5
SKINTOP® MS-M-SCL: Long Metric Thread								
53112625	M16 x 1.5	0.177 - 0.354	4.5 - 9.0	0.788	1.496	0.472	0.158	50
53112635	M20 x 1.5	0.275 - 0.492	7.0 - 12.5	0.945	1.614	0.472	0.197	25
53112645	M25 x 1.5	0.354 - 0.650	9.0 - 16.5	1.142	1.673	0.472	0.296	25
53112655	M32 x 1.5	0.433 - 0.827	11.0 - 21.0	1.418	2.028	0.591	0.355	25
53112665	M40 x 1.5	0.748 - 1.103	19.0 - 28.0	1.773	2.126	0.591	0.591	10
53112675	M50 x 1.5	1.063 - 1.379	27.0 - 35.0	2.127	2.382	0.591	0.827	5

	OIL RESISTANCE		FLAME RESISTANCE		MOTION TYPE		MECHANICAL PROTECTION
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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	—	—

Note: 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.

Note: 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.



Cable Attributes

Motion Type & Mechanical Properties



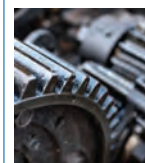
**OIL
RESISTANCE**



**FLAME
RESISTANCE**



**MOTION
TYPE**



**MECHANICAL
PROTECTION**

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 $\pm 150^\circ$ /m Application temperature: -40°C	up to 2,000 cycles
CF-01	Continuous Flexing: Basic	Designed for basis 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 PROTECTION								
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.

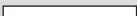
** Testing is not required. If tested, these groups would meet or exceed UL 1277 impact and crush requirements by virtue of their superior mechanical properties.

*** Lapp standard.

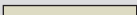
Note: Lapp mechanical protection test values for each level meet or exceed the requirements of the standards referenced.



ÖLFLEX® 590 P/CP, C 304, C 304 S, D304 OS

Conductor	Color
1 black	
2 white	
3 red	
4 green*	

Conductor	Color
5 brown	
6 blue	
7 orange	
8 yellow	

Conductor	Color
9 violet	
10 gray	
11 pink	
12 tan	

* Cables with CE approval have green/yellow conductor for #4
Numbers are spaced 20 - 55 mm apart and are inverted with underline

Chart 2

C 304, C 304 S, UNITRONIC® 190/190 CY

Conductor	Color
1	black
2	white
3	red
4	green
5	orange
6	blue
7	white/black
8	red/black
9	green/black
10	orange/black
11	blue/black
12	black/white
13	red/white
14	green/white
15	blue/white
16	black/red

Conductor	Color
17	white/red
18	orange/red
19	blue/red
20	red/green
21	orange/green
22	black/white/red
23	white/black/red
24	red/black/white
25	green/black/white
26	orange/black/white
27	blue/black/white
28	black/red/green
29	white/red/green
30	red/black/green
31	green/black/orange
32	orange/black/green

Conductor	Color
33	blue/white/orange
34	black/white/orange
35	white/red/orange
36	orange/white/blue
37	white/red/blue
38	black/white/green
39	white/black/green
40	red/white/green
41	green/white/blue
42	orange/red/green
43	blue/red/green
44	black/white/blue
45	white/black/blue
46	red/white/blue
47	green/orange/red
48	orange/red/blue

Conductor	Color
49	blue/orange/red
50	black/orange/red
51	white/black/orange
52	red/orange/black
53	green/red/blue
54	orange/black/blue
55	blue/black/orange
56	black/orange/green
57	white/orange/green
58	red/orange/green
59	green/black/blue
60	orange/green/blue
61	black/orange/blue

Chart 3

D 304 IS, D 304 OS, UNITRONIC® CY (TP) plus

Pair	Color
1	black + red
2	black + white
3	black + green
4	black + blue
5	black + yellow
6	black + brown
7	black + orange
8	red + white
9	red + green
10	red + blue
11	red + yellow
12	red + brown
13	red + orange

Pair	Color
14	green + white
15	green + blue
16	green + yellow
17	green + brown
18	green + orange
19	white + blue
20	white + yellow
21	white + brown
22	white + orange
23	blue + yellow
24	blue + brown
25	blue + orange
26	brown + yellow

Pair	Color
27	brown + orange
28	orange + yellow
29	violet + orange
30	violet + red
31	violet + white
32	violet + dark green
33	violet + light blue
34	violet + yellow
35	violet + brown
36	violet + black
37	gray + white



Color Code Charts

Chart 4

UNITRONIC® 300/300 S (24 - 22 AWG)

Conductor	Color
1	black
2	brown
3	red
4	orange
5	yellow
6	green
7	blue
8	violet
9	gray
10	white
11	white/black
12	white/brown
13	white/red

Conductor	Color
14	white/orange
15	white/yellow
16	white/green
17	white/blue
18	white/violet
19	white/gray
20	white/black/brown
21	white/black/red
22	white/black/orange
23	white/black/yellow
24	white/black/green
25	white/black/blue
26	white/black/violet

Conductor	Color
27	white/black/gray
28	white/brown/red
29	white/brown/orange
30	white/brown/yellow
31	white/brown/green
32	white/brown/blue
33	white/brown/violet
34	white/brown/gray
35	white/red/orange
36	white/red/yellow
37	white/red/green
38	white/red/blue
39	white/red/violet

Conductor	Color
40	white/red/gray
41	white/orange/yellow
42	white/orange/green
43	white/orange/blue
44	white/orange/violet
45	white/orange/gray
46	white/yellow/green
47	white/yellow/blue
48	white/yellow/violet
49	white/yellow/gray
50	white/green/blue

Chart 5

UNITRONIC® 300/300 S (20 - 16 AWG)

Conductor	Color
1	black
2	red
3	white
4	green
5	orange
6	blue
7	brown
8	yellow
9	violet
10	gray
11	pink
12	tan
13	red/green

Conductor	Color
14	red/yellow
15	red/black
16	white/black
17	white/red
18	white/green
19	white/yellow
20	white/blue
21	white/brown
22	white/orange
23	white/gray
24	white/violet
25	white/black/red
26	white/black/green

Conductor	Color
27	white/black/yellow
28	white/black/blue
29	white/black/brown
30	white/black/orange
31	white/black/gray
32	white/black/violet
33	white/black/black
34	white/red/black
35	white/red/red
36	white/red/green
37	white/red/blue
38	white/red/brown
39	white/red/violet

Conductor	Color
40	white/green/black
41	white/green/red
42	white/green/green
43	white/green/blue
44	white/green/brown
45	white/green/violet
46	white/blue/black
47	white/blue/red
48	white/blue/green
49	white/blue/blue
50	white/blue/brown

Chart 8: DIN 47100 Without Color Repetition (for telephone & electronic use only)

UNITRONIC® BUS CAN/CAN FD

Conductor	Color
1	white
2	brown
3	green
4	yellow
5	gray
6	pink
7	blue
8	red
9	black
10	violet
11	gray/pink
12	red/blue
13	white/green
14	brown/green
15	white/yellow
16	yellow/brown

Conductor	Color
17	white/gray
18	gray/brown
19	white/pink
20	pink/brown
21	white/blue
22	brown/blue
23	white/red
24	brown/red
25	white/black
26	brown/black
27	gray/green
28	yellow/gray
29	pink/green
30	yellow/pink
31	green/blue
32	yellow/blue

Conductor	Color
33	green/red
34	yellow/red
35	green/black
36	yellow/black
37	gray/blue
38	pink/blue
39	gray/red
40	pink/red
41	gray/black
42	pink/black
43	blue/black
44	red/black
45	white/brown/black
46	yellow/green/black
47	gray/pink/black
48	red/blue/black

Conductor	Color
49	white/green/black
50	brown/green/black
51	white/yellow/black
52	yellow/brown/black
53	white/gray/black
54	gray/brown/black
55	white/pink/black
56	pink/brown/black
57	white/blue/black
58	brown/blue/black
59	white/red/black
60	brown/red/black
61	black/white



Motor Properties: AWG Size Selection Chart per NEC

Drive HP	230V 3Ø AWG	460V 3Ø AWG	575V 3Ø AWG
1/2 - 3	14	14	14
5	14	14	14
7 1/2	10	14	14
10	8	14	14
15	6	10	12
20	4	8	10
25	2	6	8
30	1	6	8
40	2/0	4	6
50	3/0	2	4

Note: The above table references the suggested wire AWG to use based on horse power (HP) and the full load current (FLC) $\times$ 125% per NEC Art. 430-122 (A). Amperes (FLC) were determined from NEC Art. 430-250:

Example:

To calculate AWG size, three factors must be known: motor HP, motor voltage, and full load current (FLC).

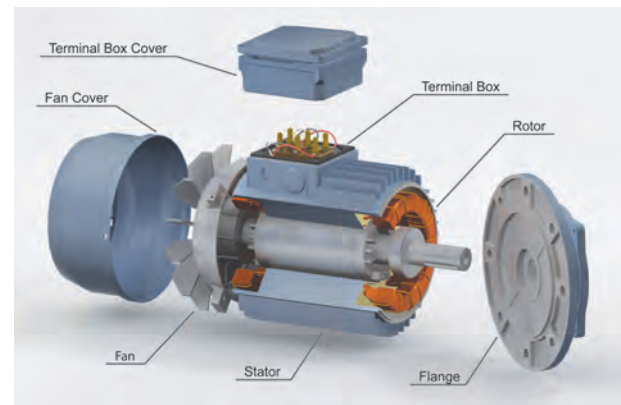
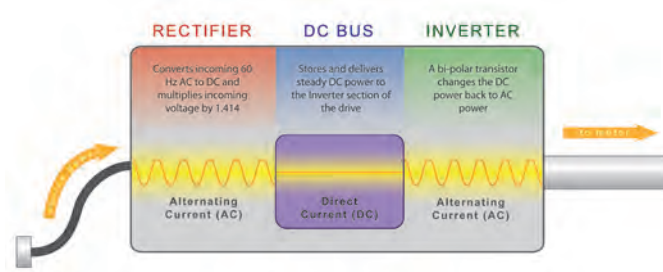
For a 30 HP and 460V motor, the FLC is 40A. Per NEC, FLC $\times$ 125% is required to calculate AWG size.

40A $\times$ 125% = 50 A, therefore the right AWG wire is 6 AWG per NEC Article 310.15.

See NEC table 310.15(B)(16) on previous page. 60°C column ampacities are referenced to avoid safety hazards that can occur when the maximum allowable temperature ratings of equipment and other non-cable components have been exceeded.

Drive HP	230V 3Ø AWG	460V 3Ø AWG	575V 3Ø AWG
60	4/0	1	2
75	300 KCMIL	1/0	1
100	500 KCMIL	3/0	1/0
125	—	4/0	3/0
150	—	300 KCMIL	4/0
200	—	500 KCMIL	300 KCMIL
250	—	—	500 KCMIL
300	—	—	—
350	—	—	—
400 - 500	—	—	—

ADJUSTABLE SPEED DRIVE			
REG No. LAPP MOTOR EXAMPLE			
Power Input	Volts 460V	Power Output	Power 30 HP
	Amps 40A		Volts 500V
	Hertz 60 Hz		Amps 50A
Model No. LAPP MOTOR			
Serial No. LAPP 12345			
ML No. 4DFJKJ48DK			



Voltage Drop Factors, Volts at FLC @ 20°C

Drive HP	Voltage Drop Factor (Vdf)		
	230V 3Ø	460V 3Ø	575V 3Ø
1/2	0.00696	0.00348	0.00285
3/4	0.01013	0.00506	0.00411
1	0.01329	0.00665	0.00538
1 1/2	0.01899	0.00949	0.00759
2	0.02152	0.01076	0.00854
3	0.03038	0.01519	0.01234
5	0.04809	0.02405	0.01930
7 1/2	0.02868	0.03481	0.02848
10	0.02105	0.04430	0.03481
15	0.02009	0.02738	0.03335
20	0.01914	0.02030	0.02868

Drive HP	Voltage Drop Factor (Vdf)		
	230V 3Ø	460V 3Ø	575V 3Ø
25	0.01575	0.01627	0.02030
30	0.01732	0.01914	0.02406
40	0.01203	0.01843	0.01962
50	0.01185	0.01506	0.01843
60	0.01125	0.01667	0.01436
75	0.00872	0.01385	0.01667
100	0.00676	0.01130	0.01429
125	—	0.01139	0.01139
150	—	0.00818	0.01052
200	—	0.00655	0.00872
250	—	—	0.00660

The above table references the voltage drop over distances. It was determined by using selection criteria of the Motor Properties Table. In order to determine the voltage drop, multiply the length by the data above.

Example:

To calculate voltage drop over a specified distance, two factors must be known: the distance to the motor and the voltage drop factor.

For a 30 HP and 460V motor, the voltage drop for a distance of 200 feet would be **200 $\times$ 0.01914 = 3.83 volts**

In keeping with the principles of the Lapp Group, customer education is at the top of the list.

We strive to keep our customers aware of breaking industry changes. For a more detailed technical explanation, please visit Lapp USA's website.

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.

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IP Ratings

Modes of Protection per DIN VDE 0470-1 (IEC EN 60529)

Ingress Protection (IP) is a measure of protection against water and particles for devices. The level of protection offered by a device is laid down in the manufacturer's specification according to DIN 40050.

The first digit of the code states the level of protection against particle ingress. The second digit states the level of protection against penetration of water.

Degrees of protection against solid foreign objects

First digit of code

Digit	Protection
0	No particular protection
1*	Large solid foreign bodies with diameters ≥ 50 mm, and accidental contact with large surfaces of the body, e.g.: the back of the hand.
2*	Medium-sized solid foreign bodies with diameters ≥ 12 mm, e.g.: fingers.
3*°	Small solid foreign bodies with diameters ≥ 2.5 mm, e.g.: some tools, wires.
4*°	Granular foreign bodies with diameters ≥ 1 mm, e.g.: tools, small wires.
5•	Harmful accumulations of dust (dust protection). Penetration of dust is not entirely preventative, but must not penetrate in such quantities that operation is affected. Complete contact protection.
6	Penetration of dust (dust-proof). Complete contact protection.

* Protection levels 1 - 4: Consistently or inconsistently formed foreign bodies with three perpendicular dimensions (i.e.: cubic) larger than the specified diameter are also prevented from entering.

° Protection levels 3 & 4: This table is appropriate for devices with drain holes or cooling air apertures. It complies with the respective expert committee.

• Protection level 5: This table is appropriate for devices with drain holes. It complies with the respective expert committee.

Example:

IP65 provides protection against:

1. Penetration of dust (6)
2. Jets of water from any direction (5)

Degrees of protection against water

Second digit of code

Digit	Protection
0	No particular protection
1	Water falling vertically (water drip).
2	Water sprays up to 15° from vertical (oblique water drip).
3	Water sprays up to 60° from vertical (water spray).
4	Water splashing onto the unit from any direction (water splash). Limited ingress is permitted, but must not affect operation.
5	Jets of water from any direction (water spray). Limited ingress is permitted, but must not affect operation.
6	Strong jets of water from any direction (flooding). Limited ingress is permitted, but must not affect operation, e.g.: ship decks
7	Immersion between 15 cm and 1 m (dipping).
8†	Permanent immersion under conditions defined by the manufacturer (immersion).
9 K	Ingress of water, even high-pressure or steam cleaning, from any direction.

† Protection level 8: This level of protection normally relates to air-tight field-operating devices. For certain devices, however, water may penetrate as long as proper operation is not affected.

IP68, 5 bar provides protection against:

1. Penetration of dust (6)
2. Water protection up to 5 bar, i.e.: 70 psi



Size Conversion

American Wire Gauge (AWG) to mm²

American Wire Gauge (AWG) to mm²

AWG	mm ²	AWG	mm ²	AWG	mm ²
30	0.05	12	4	4/0	120
28	0.08	10	6	250	120
26	0.14	8	10	300	150
24	0.25	6	16	350	185
22	0.34	4	25	400	185
20	0.50	2	35	450	240
19	0.75	1	50	500	240
18	1.0	1/0	50	600	300
16	1.5	2/0	70	750	400
14	2.5	3/0	95		

mm² to American Wire Gauge (AWG)

mm ²	AWG	mm ²	AWG
0.14	26	4	12
0.25	24	6	10
0.34	22	10	8
0.50	20	16	6
0.75	19	25	4
1.0	18	35	2, 1
1.5	16	50	1/0
2.5	14	70	2/0, 3/0



Length			
millimeter (mm)	= inch × 25.40	inch (in)	= millimeter × 0.0394
meter (m)	= foot × 0.3048	foot (ft)	= meter × 3.281
kilometer (km)	= mile × 1.609	mile (mi)	= kilometer × 0.6214
Ω/km	= Ω/mft × 0.3048	Ω/mft	= Ω/km × 3.281

Mass			
gram (g)	= ounce × 28.35	ounce (oz)	= gram × 0.0353
kilogram (kg)	= pound × 0.4536	pound (lb)	= kilogram × 2.205
kg/km	= lb/mft × 1.488	lb/mft	= kg/km × 0.6720

Area			
sq. centimeter (cm ²)	= sq. inch × 6.452	sq. inch (in ²)	= sq. centimeter × 0.1550
sq. meter (m ²)	= sq. foot × 0.0929	sq. foot (ft ²)	= sq. meter × 10.76
sq. kilometer (km ²)	= sq. mile × 2.590	sq. mile (mi ²)	= sq. kilometer × 0.3861
circular mil	= square mil × 1.273	square mil	= circular mil × 0.7854
mm ² = (strand mm) ² × (# strands) × 0.7854			

Volume			
cu. centimeter (cm ³)	= cu. inch × 16.39	cu. inch (in ³)	= cu. centimeter × 0.0610
cu. meter (m ³)	= cu. foot × 0.0283	cu. foot (ft ³)	= cu. meter × 35.31

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tables and design and installation guidelines, can be found in our full line catalog. Our machines and installation tools are where necessary designed in accordance with the machine guidelines and display the CE identification mark. It must be noted, however, that our machines and installation tools must only be used by trained specialized personnel and for the purpose for which they were designed.

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