

Automation Guide

for Servo Motors/Drives and BUS Systems



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 **LAPP GROUP**

GERMAN PRECISION ENGINEERING PROUDLY PRODUCED IN THE USA



The Lapp Group North American headquarters located in Florham Park, NJ houses Lapp USA, Lapp Cable Works and our latest expansion, Lapp Group's Center for Competence and Innovation. This Center is assessed by UL as a Client Test Data Program (CTDP) laboratory for Product Testing, R&D, Quality Validation and New Product Innovation. Lapp Cable Works is our state of the art cable manufacturing plant for ÖLFLEX® brand quality products and custom designed cables. In addition, this facility houses Lapp Systems, which provides complex harnesses, integrated solutions and custom cable assemblies.



2600 PEOPLE, 21 LANGUAGES 1 WORLDWIDE FAMILY

In the late 1950s, Oskar Lapp turned his visionary dream into reality with the invention of the first industrially manufactured control cable, ÖLFLEX®. This was the beginning of his family run and oriented company. Lapp Group produces innovative cables, connectors, accessories, and engineered solutions as a worldwide market leader. Oskar Lapp's vision continues today through his wife, Ursula Ida, and his sons, Andreas and Siegbert Lapp.

Within 50 years, the Lapp Group has grown to 3,000 employees operating around the globe developing, manufacturing and selling more than 40,000 products. With 15 manufacturing sites, 41 company-owned sales operations, more than 100 foreign representations and worldwide headquarters in Stuttgart, Germany, the Lapp Group people are everywhere you need us to be.





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ÖLFLEX® VFD Slim

Reduced Diameter VFD Cable Engineered with “Lapp Surge Guard”, 600V/1000V

LAPP KABEL STUTTGART ÖLFLEX® VFD SLIM (UL) TC-ER/CSA CIC/TC/CE/MSHA/RoHS



(NFPA-79)



Technical Data:



Minimum Bend Radius:
7.5 x cable diameter



Temperature Range:
- UL/CSA TC: -40°C to +90°C
- UL/CSA/AWM: -40°C to +105°C



Nominal Voltage:
- UL/CSA TC: 600V
- Wind Turbine Tray Cable: 1000V



Conductor Stranding:
- 16-6 AWG:
- 4-2 AWG:

Class 5 Fine Wire
Class K Fine Wire



Approvals:

UL: - TC-ER per UL 1277
- MTW per UL 1063
- WTTC per UL 2277
- Submersible Pump
(14 AWG or larger)

Attributes: - UL Oil Res I/II
- 75°C Wet, 90°C Dry
- -40°C Cold Bend; -25°C Cold Impact
- Sunlight Resistant
- Direct Burial
NEC: - Class 1 Division 2 per
NEC Article 501
Canada: - c(UL) CIC/TC FT4
- AWM II A/B FT4
Additional: - MSHA: P-07-KA050013-MSHA
- ICEA-T-24-380 Corona test
- CE & RoHS

Cable Legend Example:

LAPP KABEL STUTTGART ÖLFLEX® VFD SLIM P/N
761604 12AWG (4MM²)/4C VFD CABLE (UL)
TC - ER 90°C 600V SUN RES OIL RES I DIR BUR
E171371 MTW "FLEXING" or WTTC 1000V 90°C
DRY or AWM 90°C 1000V or c(UL) CONTROL
CIC/TC PVC/N SHIELDED FT4 — CSA AWM II A/B
600V 90°C FT4 P-07-KA050013-MSHA CE ROHS

Part Number	Size / Number of Conductors (incl. ground)	Conductor Diameter (in.)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)	SKINTOP® MS-M BRUSH (pg. 43)
761804	18 AWG/4c	.104	.394	111	53112230	-
761604	16 AWG/4c	.117	.470	142	53112240	53112676
761404	14 AWG/4c	.134	.516	179	53112240	53112676
761204	12 AWG/4c	.158	.584	234	53112250	53112676
761004	10 AWG/4c	.200	.698	329	53112250	53112677
760804	8 AWG/4c	.276	.837	508	53112260	53112678
760604	6 AWG/4c	.320	1.001	732	53112270	53112678
760404	4 AWG/4c	.400	1.186	917	53112270	53112679



ÖLFLEX® VFD with Signal

VFD Cable with “Lapp Surge Guard” plus 1 Shielded Pair

LAPP KABEL STUTTGART ÖLFLEX® VFD W/ SIGNAL (UL)/CSA/CE/MSHA/RoHS



(NFPA-79)



Technical Data:



Minimum Bend Radius:
7.5 x cable diameter



Temperature Range:
- UL/CSA TC: -40°C to +90°C
- UL/CSA/AWM: -40°C to +105°C



Nominal Voltage:
- UL/CSA TC: 600 V
- Wind Turbine Tray Cable: 1000 V



Approvals:

UL: - TC-ER per UL 1277
- MTW per UL 1063
- WTTC per UL 2277
Attributes: - UL Oil Res I/II
- 75°C Wet, 90°C Dry
- -40°C Cold Bend;
- -25°C Cold Impact
- Sunlight Resistant

NEC: - Class 1 Division 2
per NEC Article 501

Canada: - c(UL) CIC/TC FT4

Additional: - AWM II A/B FT4
- MSHA: P-07-KA050011-MSHA
- ICEA: T-24-380 Corona Test
- CE & RoHS



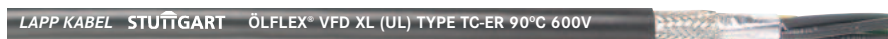
Conductor Stranding: Class 5 Fine Wire

Cable Legend Example:

LAPP KABEL STUTTGART ÖLFLEX® VFD &
SIGNAL P/N 7412044 12AWG (4MM²) 4C +
14AWG 1PR (UL) TC - ER 90°C 600V OIL RES
I/II SUN RES E171371 MTW "FLEXING" or
WTTC 1000V 90°C DRY 1000V or c(UL)
CONTROL CIC/TC PVC/N FT4 — CSA AWM II
A/B 600V 90°C FT4 P-07-KA050011-MSHA
CE ROHS

Part Number	Size / Number of Conductors	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)	SKINTOP® MS-M BRUSH (pg. 43)
7416048	16 AWG/4c + 18 AWG/1pr	.513	176	53112240	53112676
7414048	14 AWG/4c + 18 AWG/1pr	.563	215	53112250	53112676
7414044	14 AWG/4c + 18 AWG/1pr	.584	241	53112250	53112676
7412048	12 AWG/4c + 18 AWG/1pr	.650	279	53112250	53112676
7412044	12 AWG/4c + 14 AWG/1pr	.667	306	53112250	53112677
7410044	10 AWG/4c + 14 AWG/1pr	.762	405	53112260	53112677
7408044	8 AWG/4c + 14 AWG/1pr	.938	598	53112260	53112678
7406044	6 AWG/4c + 14 AWG/1pr	1.082	848	53112270	53112678

Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.



Construction:

Conductors: Finely stranded tinned copper

Insulation: Conductors: XLPE; ground wire: PVC

Shielding: Barrier tape; 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: -40°C to +90°C

- UL/CSA/AWM: -40°C to +105°C

Nominal Voltage:

- UL/CSA TC: 600V

- Wind Turbine Tray Cable: 1000V

Conductor Stranding:

- 16-8 AWG: Class 5 Fine Stranding

- 6-2 AWG: Class K Fine Wire

Color Code:

Three black conductors with white numbers, plus green/yellow ground

Approvals:

UL: - TC-ER per UL 1277

- WTTC per UL 2277

- AWM 90°C Style 2587

Attributes: - UL Oil Res I/II

- 90°C Wet or Dry

- Sunlight Resistant

- Direct Burial

NEC: - Class 1 Division 2 per NEC Article 501

Canada: - c(UL) CIC/TC FT4

Part Number	Size / Number of Conductors (incl. ground)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)	SKINTOP® MS-M BRUSH (pg. 43)
731604	16 AWG/4c	.508	125	53112240	53112676
731404	14 AWG/4c	.581	133	53112250	53112676
731204	12 AWG/4c	.649	180	53112250	53112676
731004	10 AWG/4c	.700	271	53112260	53112677
730804	8 AWG/4c	.887	450	53112260	53112678
730604	6 AWG/4c	1.030	617	53112270	53112678
730404	4 AWG/4c	1.158	917	53112270	53112679
730204	2 AWG/4c	1.332	1339	-	53112679

Cable Legend Example:

LAPP KABEL STUTTGART ÖLFLEX® VFD XL P/N 731204 12AWG (4MM²)/3C (UL) TC-ER RHW-2 90°C WET OR DRY 600V 12AWG (4MM²)/1C GROUND SHIELDED SUN RES OIL RES I/II DIR BUR E171371 OR WTTC 1000V 90°C DRY OR AWM 90°C 600V OR c(UL) CONTROL CIC/TC XLPE FT4 CE ROHS

ÖLFLEX® VFD Symmetrical

Heavy Duty Motor Supply Cable for Large Horse Power VFD Drives 600V/1000V



Construction:

Conductors: Bare stranded copper

Insulation: XLPE

Shielding: Longitudinal corrugated copper tape shield

Jacket: Black PVC

Technical Data:

Minimum Bend Radius: 15 x cable diameter

Temperature Range:

-40°C to +90°C

Nominal Voltage:

- UL/CSA TC: 600V

- Wind Turbine Tray Cable: 1000V

Conductor Stranding:

Class B Stranded Wire

Approvals:

UL: - TC-ER per UL 1277

- WTTC per UL 2277

Attributes: - UL Oil Res I/II

- Sunlight Resistant

- Direct Burial

Canada: - c(UL) CIC/TC FT4

Additional: - MSHA: P-07-KA050010-MSHA

- CE & RoHS

Part Number	Size / Number of Conductors	3 Symmetrical Grounds	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-M BRUSH (pg. 43)
760103	1 AWG/3c	8 AWG	1.25	1427	53112679
761103	1/0 AWG/3c	6 AWG	1.35	1764	53112679
762203	2/0 AWG/3c	6 AWG	1.43	2077	53112680
763303	3/0 AWG/3c	4 AWG	1.55	2599	53112680
764403	4/0 AWG/3c	4 AWG	1.66	3093	53112680
762503	250 KCMIL/3c	4 AWG	1.88	3791	53112681
763503	350 KCMIL/3c	2 AWG	2.00	5020	53112681
765003	500 KCMIL/3c	1/0 AWG	2.43	7012	53112501

Cable Legend Example:

LAPP KABEL STUTTGART ÖLFLEX® VFD SYMMETRICAL 764403 4/0 AWG (107.2MM²)/3C (UL) TYPE TC - ER XHHW-2 90°C WET OR DRY 600V 4 AWG (21.2MM²)/3C GRDING CONDS SHIELDED POWER CABLE SUN RES DIR BUR E171371 or WTTC 1000V 90°C WET OR DRY or c(UL) CONTROL CIC/TC XLPE FT4 P-07-KA050010-MSHA CE ROHS

Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.



ÖLFLEX® SDP TC

Severe Duty Power Cable with Bus Drop Approval

LAPP KABEL STUTTGART ÖLFLEX® SDP TC (UL) TYPE TC-ER OIL RES I/II or Bus Drop



Technical Data:



Minimum Bend Radius:
7.5 x cable diameter



Temperature Range:
- UL TC: -40°C to +90°C
- UL/CSA/AWM: -40°C to +105°C



Nominal Voltage:
- UL TC: 600V
- Wind Turbine Tray Cable: 1000V



Test Voltage: 4000V



Conductor Stranding:
- 14-6 AWG: Class 5 Fine Wire
- 4-2 AWG: Class K Fine Wire



Color Code: Three black conductors with white numbers, plus green/yellow ground



Approvals:
UL: - TC-ER per UL 1277
- WTTC per UL 2277
- Bus Drop Cable
UL AWM: - AWM 20886
Attributes: - UL Oil Res I/II
- 75°C Wet, 90°C Dry
- Sunlight Resistant
- Direct Burial
NEC: - Class 1 Division 2 per NEC Article 501
Canada: - c(UL) CIC/TC FT4
- AWM II A/B FT4
Additional: - CE & RoHS

Part Number	Size / Number of Conductors (incl. ground)	Primary Diameter (in.)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® SLN (pg. 40)
781404	14 AWG/4c	.114	0.39	126	S2111
781204	12 AWG/4c	.138	0.44	171	S2113
781004	10 AWG/4c	.190	0.57	257	S2121
780804	8 AWG/4c	.262	0.76	427	S2129
780604	6 AWG/4c	.296	0.89	586	S2129
780404	4 AWG/4c	.378	1.09	871	S2136
780204	2 AWG/4c	.450	1.28	1272	S2248

Cable Legend Example:

LAPP KABEL STUTTGART ÖLFLEX® SDP TC
P/N 781004 10AWG (6MM²)/3C + GROUND
FLEXIBLE POWER CABLE (UL) TC-ER 90°C
DRY 75°C WET 600V SUN RES OIL RES I/II
DIR BUR E171371 or BUS DROP CABLE or
WTTC 1000V 90°C DRY or c(UL) CONTROL
CIC PVC/N FT4 --- CSA AWM II A/B 1000V
90°C FT4 CE ROHS



ÖLFLEX® SERVO FD LK-INX

Continuous Flexing Servo Motor Power Cable in acc. with Indramat INK Standard

LAPP KABEL STUTTGART ÖLFLEX® SERVO FD LK-INX

LAPP KABEL STUTTGART ÖLFLEX® SERVO FD LK-INX



Construction:

Conductors: Finely stranded copper
Insulation: Pairs: elastomeric material
Power conductors: TPE
Shielding: Servo cables: Pairs- aluminum foil and tinned copper shield
Feedback cables: not all pairs are shielded. Overall tinned copper braid (85% coverage)
Jacket: Specially formulated polyurethane

Technical Data:



Minimum Bend Radius:
- For Continuous Flexing:
- Signal: 10 x cable diameter
- Servo: 7.5 x cable diameter



Temperature Range:
- Continuous Flex: -30°C to +80°C



Nominal Voltage:
- Power/Control: 1000V
- Feedback/Signal Cables: 300V



Conductor Stranding: Class 6 Extra Fine Wire



Color Code:
- Power/Control: Black with white numbers (1,2,3) plus green/ yellow ground
- Signal Pairs: Black with white numbers 5/6, 7/8
- Feedback/Signal: See next page



Approvals:
UL: - AWM 20234 (Servo)
- AWM 20236 (Feedback)
Canada: - AWM II A/B FT1
Additional: - CE & RoHS

Part Number	Size / Number of Conductors	Indramat Part Number	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Feedback/Signal Cables					
7072400	24 AWG/ 4pr + 18 AWG/ 2c	INK-0209	.346	84	53112220
7072401	24 AWG/ 4pr + 20 AWG/ 2c	INK-0448	.335	81	53112220
7072402	20 AWG/ 9c	INK-0208	.346	85	53112220
7072414	18 AWG/ 4c + 26 AWG/ 4pr + 26 AWG/ 4c	INK-0532	.382	94	53112220
7072415	24 AWG/ 2pr + 21 AWG/ 2c	INK-0234	.343	60	53112220
7072416	24 AWG/ 2pr + 21 AWG/ 2c	INK-0750	.299	62	53112210
Servo Cables					
7072417	19 AWG / 4c + 20 AWG/ 2c	INK-0670	.394	89	53112230
7072403	18 AWG/ 4c + 19 AWG/ 2pr	INK-0653	.453	152	53112240
7072404	16 AWG/ 4c + 19 AWG/ 2pr	INK-0650	.480	180	53112240
7072405	14 AWG/ 4c + 18 AWG/ 2pr	INK-0602	.594	215	53112250
7072406	12 AWG/ 4c + 18 AWG/ 1pr + 16 AWG/ 1pr	INK-0603	.630	316	53112250
7072407	10 AWG/ 4c + 18 AWG/ 1pr + 16 AWG/ 1pr	INK-0604	.740	403	53112260
7072408	8 AWG/ 4c + 18 AWG/ 1pr + 16 AWG/ 1pr	INK-0605	.866	571	53112260
7072409	6 AWG/ 4c + 16 AWG/ 2pr	INK-0606	.992	685	53112270
7072410	4 AWG/ 4c + 16 AWG/ 2pr	INK-0607	1.102	954	53112270

Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.

Part Number	Color Code for Feedback Cables
7072400	24 AWG/ 4pr: Brown/Green, Gray/Pink, Blue/Violet, Red/Black; 18 AWG/ 2c: White, Brown
7072401	24 AWG/ 4pr: Brown/Green, Gray/Pink, Blue/Violet, Red/Black; 20 AWG/ 2c: White, Brown
7072402	20 AWG/ 9c: Green, Brown, Gray, Yellow, Black, Blue, Red, White, Pink
7072414	26 AWG/ 4c: Yellow/Black, Brown/Black, Green/Black, Red/Black; 26 AWG/ 4pr: Red & Black, Brown & Green, Yellow & Violet, Gray & Pink; 18 AWG/ 4c: White, Brown/Green, White/Green, Blue
7072415	24 AWG/ 2pr: White & Brown, Gray & Pink; 20 AWG/ 2c: Pink, Gray
7072416	24 AWG/ 2pr: Red & Black, Gray & Pink; 20 AWG/ 2c: White, Brown

ÖLFLEX® SERVO FD 796 CP

Highly Flexible for High Acceleration Continuous Flexing Dynamic Motion



Construction:

Conductors: Extra fine bare copper

Insulation: Pairs and power conductors: polypropylene

Shielding: Pairs are twisted together and shielded with tinned copper braid; overall non-woven wrapping; overall tinned copper braid shield; non-woven wrapping

Jacket: Orange polyurethane

CABLE ATTRIBUTES

- Acceleration : up to 50m/sec²
- Travel speed: up to 5m/s
- Travel length: up to 100m

Technical Data:



Minimum Bend Radius:

- Flexing ≤ 6 AWG: 7.5 x cable diameter
- Flexing ≥ 4 AWG: 10 x cable diameter
- Stationary: 4 x cable diameter



Nominal Voltage:

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



Approvals:

- UL AWM: - AWM 20234
- Attributes: - VW-1
- Canada: - AWM I/II A/B FT1
- Additional: - VDE
- CE & RoHS



Temperature Range:

- Flexing: -40°C to +80°C
- Stationary: -50°C to +80°C



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- and 1
green-yellow ground
Black, white
- 1 Pair:
- 2 Pair: Black with white numbers: 5, 6, 7, 8

Part Number	Size / Number of Conductors	Control Pairs Individually Shielded	Nominal Outer Diameter (in.)	Copper Weight (lbs/mft)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)	SKINTOP® MS-M BRUSH (pg. 43)
0027950	16 AWG / 4c	-	.362	53	94	53112220	53112676
0027951	14 AWG / 4c	-	.417	87	132	53112230	53112676
0027952	12 AWG / 4c	-	.469	125	180	53112240	53112676
0027953	10 AWG / 4c	-	.567	199	267	53112250	53112676
0027954	8 AWG / 4c	-	.693	301	397	53112260	53112677
0027955	6 AWG / 4c	-	.866	481	642	53112260	53112678
0027956	4 AWG / 4c	-	.992	720	898	53112270	53112678
0027957	2 AWG / 4c	-	1.130	993	1189	53112270	53112679
0027958	1 AWG / 4c	-	1.315	1419	1658	-	53112679
0027959	16 AWG / 4c	16 AWG / 1pr	.472	91	175	53112240	53112676
0027960	14 AWG / 4c	16 AWG / 1pr	.543	126	214	53112240	53112676
0027961	12 AWG / 4c	16 AWG / 1pr	.587	158	259	53112250	53112676
0027962	10 AWG / 4c	16 AWG / 1pr	.669	221	327	53112250	53112677
0027963	8 AWG / 4c	16 AWG / 1pr	.764	346	471	53112260	53112677
0027964	6 AWG / 4c	16 AWG / 1pr	.937	508	704	53112260	53112678
0027965	4 AWG / 4c	16 AWG / 1pr	1.063	770	1029	53112270	53112678
0027966	2 AWG / 4c	16 AWG / 1pr	1.228	1032	1409	53112270	53112679
0027967	1 AWG / 4c	16 AWG / 1pr	1.366	1464	1828	-	53112679
0027969	16 AWG / 4c	19 AWG / 2pr	.480	101	204	53112240	53112676
0027970	14 AWG / 4c	18 AWG / 2pr	.575	140	261	53112250	53112676
0027971	12 AWG / 4c	18 AWG / 1pr + 16 AWG / 1pr	.642	226	321	53112250	53112676
0027972	10 AWG / 4c	18 AWG / 1pr + 16AWG / 1pr	.713	294	390	53112260	53112677
0027973	8 AWG / 4c	18 AWG / 1pr + 16AWG / 1pr	.858	404	545	53112260	53112678
0027974	6 AWG / 4c	16 AWG / 2pr	1.004	534	757	53112270	53112678
0027975	4 AWG / 4c	16 AWG / 2pr	1.138	791	1042	53112270	53112679
0027976	2 AWG / 4c	16 AWG / 2pr	1.236	1060	1401	53112270	53112679
0027977	1 AWG / 4c	16 AWG / 2pr	1.449	1509	1957	-	53112680

Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.



Servo Cables acc. to Siemens® Standard 6FX 8PLUS

Highly Flexible For High-Acceleration Continuous Flexing Dynamic Motion



Construction:

Conductors: Extra fine copper

Insulation: Pairs and power conductors insulated with polypropylene

Shielding: Pairs are twisted together and shielded with tinned copper braid; overall non-woven wrapping; overall tinned copper braid shield; non-woven wrapping

Jacket: Servo cables: orange polyurethane
Signal cables: green polyurethane

Technical Data:



Minimum Bend Radius:

Signal cable:

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

Power cable:

- for continuous flexing: 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



Temperature Range:

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



Nominal Voltage:

- Signal cable: 30V AC/DC
- Power cable: 1000V
- UL/CSA: 600/1000V
- IEC: 600/1000V
- Control cable: 1000V
- UL/CSA: 24V AC/DC
- IEC: 24V AC/DC



Test Voltage:

- Cores: 4KV
- Control & Signal: 500V



Conductor Stranding:

- Signal cable: Tinned Class 6 Super Fine Wire
- Power cable: Bare Class 6 Super Fine Wire



Color Code:

- 16-14 AWG: Black with white print
V/L2; U/L1/C/L+; W/L3/D/L-;
green/yellow ground
- 12-1 AWG: U/L1/C/L+; V/L2; W/L3/D/L-;
green/yellow ground



Approvals:

- Power cable: UL AWM: - AWM 21223
Attributes: - VW-1
Canada: - AWM I/II A/B FT 1
- Sensor leads: UL/CSA AWM: - AWM 20236
Additional: - VDE
- CE & RoHS

Part Number	Size / Number of Pairs	SIEMENS® Part Number	Nominal Outer Diameter (in.)	Jacket Color	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)	SKINTOP® MS-M BRUSH (pg. 43)
Feedback/Signal Cables							
00277101	24 AWG/8pr	6FX8008-1BD11	.307	Green	57	53112210	-
00277111	22 AWG/4pr + 20 AWG/4c	6FX8008-1BD21	.350	Green	81	53112220	-
00277121	26 AWG/3pr (ISP) + 20 AWG/2c	6FX8008-1BD31	.354	Green	76	53112220	53112676
00277131	26 AWG/3pr (ISP) + 26 AWG/4c + 20 AWG/1pr	6FX8008-1BD41	.350	Green	68	53112220	-
00277141	26 AWG/3pr (ISP) + 26 AWG/4c + 20 AWG/1pr + 24 AWG/4c	6FX8008-1BD51	.374	Green	93	53112220	53112676
00277151	26 AWG/4pr	6FX8008-1BD61	.252	Green	36	53112220	-
00277161	26 AWG/2pr	6FX8008-1BD71	.197	Green	24	53112210	-
00277171	22 AWG/12pr	6FX8008-1BD81	.272	Green	51	53112210	-
00277992	24 AWG/2pr + 22 AWG/1pr	6FX8008-2DC00	.283	Green	45	53112210	-
Motor Cables							
0027784	16 AWG/4c	6FX8008-1BB11	.358	Orange	101	53112220	53112676
0027785	14 AWG/4c	6FX8008-1BB21	.417	Orange	148	53112230	53112676
0027786	12 AWG/4c	6FX8008-1BB31	.469	Orange	201	53112240	53112676
0027787	10 AWG/4c	6FX8008-1BB41	.571	Orange	302	53112250	53112676
0027788	8 AWG/4c	6FX8008-1BB51	.689	Orange	443	53112260	53112677
0027789	6 AWG/4c	6FX8008-1BB61	.850	Orange	678	53112260	53112678
Servo Cables							
0027790	16 AWG/4c + 16 AWG/1pr	6FX8008-1BA11	.457	Orange	154	53112230	53112676
0027791	14 AWG/4c + 16 AWG/1pr	6FX8008-1BA21	.528	Orange	201	53112240	53112676
0027792	12 AWG/4c + 16 AWG/1pr	6FX8008-1BA31	.583	Orange	255	53112250	53112676
0027793	10 AWG/4c + 16 AWG/1pr	6FX8008-1BA41	.661	Orange	355	53112250	53112676
0027794	8 AWG/4c + 16 AWG/1pr	6FX8008-1BA51	.764	Orange	513	53112260	53112677
0027795	6 AWG/4c + 16 AWG/1pr	6FX8008-1BA61	.921	Orange	731	53112260	53112678
0027796	4 AWG/4c + 16 AWG/1pr	6FX8008-1BA25	1.047	Orange	1026	53112270	53112678
0027797	2 AWG/4c + 16 AWG/1pr	6FX8008-1BA35	1.217	Orange	1369	53112270	53112679
0027798	1 AWG/4c + 16 AWG/1pr	6FX8008-1BA50	1.339	Orange	1852	-	53112679

Servo Cables in acc. to LENZE® Standard

Sensor Leads for Signal Transmission Systems and Motor Connection Cables



Construction:

Conductors: Stranded bare copper
Insulation: Power cores (18-14 AWG): polypropylene; (10-6 AWG): TPE; Control pairs: TPE; Resolver/Encoder cores: polypropylene
Shielding: Tinned copper braid
Jacket: Stationary: flame-retardant PVC vinyl; Continuous flexing: oil-resistant, flame-retardant PUR

Technical Data:



Minimum Bend Radius:
 - for continuous flexing: 10 x cable diameter
 - for stationary use: 7.5 x cable diameter



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



Test Voltage:
 - Resolver & encoder cable: 1.5kV
 - Motor cable, power cores: 4kV
 - Motor cable, control cores: 2kV



Temperature Range:
 - for continuous flexing: -5°C to +70°C
 - for stationary use: -40°C to +80°C



Conductor Stranding: Class 6 Super Fine Wire



Color Code:
 - Encoder cable:
 for flexible use: gn/ye + bl/rd + gy/pk + bk/vi + bn/wt
 for stationary use: bk/ye + bk/gn + bk/rd + wt/bl + bk/wt
 - Resolver cable:
 for flexible use: gn/ye + bl/rd + gy/pk + bn/wt
 for stationary use: bk/ye + bk/gn + bk/rd + bk/wt



Approvals:
 - Resolver & encoder cable:
 UL AWM: - AWM 21165 (flexing)
 - AWM 2464 (stationary)
 Additional: - CE & RoHS
 - Motor cable:
 UL AWM: - AWM 20940 (flexing)
 - AWM 2570 (stationary)
 Additional: - CE & RoHS

Part Number	Size / Number of Pairs	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Motor Cables for Fixed Installation				
7072500	18 AWG/4c + 20 AWG/1pr	.394	86	53112230
7072501	16 AWG/4c + 20 AWG/1pr	.441	116	53112230
7072502	14 AWG/4c + 20 AWG/1pr	.484	164	53112240
Resolver & Encoder Cables for Fixed Installation				
7072507	26 AWG/3pr + 20 AWG/1pr	.366	61	53112220
7072508	26 AWG/4pr + 18 AWG/1pr	.433	91	53112230
Motor Cables for Power Chain				
7072509	12 AWG/4c + 20 AWG/1pr	.413	101	53112230
7072510	16 AWG/4c + 20 AWG/1pr	.476	129	53112240
7072511	14 AWG/4c + 20 AWG/1pr	.520	182	53112240
7072512	12 AWG/4c + 18 AWG/1pr	.575	251	53112250
7072513	10 AWG/4c + 18 AWG/1pr	.661	321	53112250
7072514	8 AWG/4c + 18 AWG/1pr	.791	477	53112260
7072515	6 AWG/4c + 18 AWG/1pr	.937	682	53112260
Resolver & Encoder Cable for Power Chain				
7072516	26 AWG/3pr + 20 AWG/1pr	.394	72	53112230
7072517	26 AWG/4pr + 18 AWG/1pr	.453	97	53112230

Servo Cables in acc. to SEW® Standard

Combined Control and Supply Line for Servomotors with AWM Approval



Construction:

Conductors: Extra fine bare copper
Insulation: TPE
Shielding: Laminated aluminum foil & layer of tinned copper wires
Jacket: Orange PVC

Technical Data:



Minimum Bend Radius:
 - for flexible use: 15 x cable diameter
 - for stationary use: 4 x cable diameter



Nominal Voltage:
 - Power cores:
 UL: 600V
 IEC: 750V
 - Control cores (1 mm² and 1.5 mm²):
 UL: 600V
 IEC: 350V



Test Voltage: 2000V



Conductor Stranding: Class 5 Fine Wire

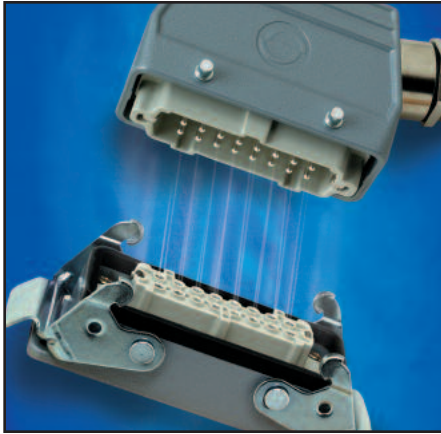


Color Code:
 - Power cable: Black with white letters, plus green/yellow ground
 - Control cores: Black with white numbers



Approvals:
 UL AWM: - AWM 2570
 Additional: - VDE
 - CE & RoHS

Part Number	Size / Number of Pairs	Nominal Outer Diameter (in.)	Approx. Weight (lb/mft)	SKINTOP® MS-SC (pg. 42)
0038060	16 AWG/4c + 18 AWG triad	.465	202	53112240
0038061	14 AWG/4c + 18 AWG triad	.528	249	53112240
0038062	12 AWG/4c + 18 AWG triad	.591	320	53112250
0038063	10 AWG/4c + 16 AWG triad	.669	420	53112250
0038064	8 AWG/4c + 16 AWG triad	.787	688	53112260

**EPIC® RECTANGULAR
CONNECTORS****EPIC® CIRCULAR
CONNECTORS****EPIC® PIN & SLEEVE
CONNECTORS**

Connector Type		Application			Technical Data						
		Power	Control/ Signal	Data	# of Contacts	Rated Voltage	Rated Current	Term Type	Wire AWG	IP/NEMA	Approval/ Design Spec
Rectangular	HA	X	X		3, 4, 10, 16, 32, 48, 64 (+PE)	600V	10A, 14A	Screw	20-14	IP65/ NEMA 4, 4X, 12	UL, CSA, VDE
	HBE	X	X		6, 10, 16, 24, 32, 48 (+PE)		16A	Screw, Crimp, Cage Clamp	20-14, 20-12		
	HBS	X			6, 12 (+PE)		35A	Screw	20-10		
	HBVE	X			3, 6, 10 (+PE)		16A	Screw	20-14		
	HD		X	X	7, 8, 15, 25, 40, 50, 64, 80, 128 (+PE)		10A	Crimp, Fiber Optic	26-14		
	HDD		X		24, 42, 72, 108, 144, 216 (+PE)		8.5A	Crimp	26-14		
	HEE	X	X		10, 18, 32, 46, 64, 92 (+PE)		16A	Crimp	20-12		
	HQ	X	X		5 (+PE)		16A	Crimp	20-14		
	MC	X	X	X	2 to 280, Data Bus (+PE), pneumatic	63-1000V	10-82A	Screw, Crimp, Cage Clamp, Fiber Optic, Hose	28-4		
	MP	X			4/0, 4/2, 4/8 (+PE)	600V	80/16A	Screw	16-6, 20-14		
	STA		X		6, 14, 20, 40 (+PE)	48V	10A	Screw, Solder	20-16		
Circular	EAB	X			3, 4, 5, 7, 14, 17, 37	200, 500, 900V	13, 23, 46A	Crimp	18-16, 14-12, 8	up to IP67	MIL-C-5015
	EAC	X			4, 6, 7, 10, 17						
	EPT	X	X		3, 5, 6, 8, 8+4, 10, 19, 26	600, 1000V	7.5, 13A	Crimp	24-20, 20-16	up to IP67	MIL-C-26482
	LS1	X			5+PE, 3+PE+4	600V	25/7A	Crimp	20-12, 24-18	IP67/68	cRUus, VDE
	LS1.5	X			3+PE+2, 3+PE+4	600V	70/30A	Crimp	18-8, 26-12	IP67	UL, cUL, VDE
	M23	X	X		6, 7, 8+1, 9, 12, 16, 17	150, 100, 50V	14, 7A	Crimp, Solder	18-14, 24-18	IP67/68	cRUus, VDE
Pin & Sleeve	MULTIMAX	X			1+N+PE, 2+PE, 2+N+PE, 3+PE, 3+N+PE	125-600V	16-32A	Screw	12, 8	IP44	cULus
	CEE	X				125-500V	16-125A		12, 8, 6, 1	IP67	
	ULYSSEE	X					16-63A		12, 8, 6	IP66/67	
	ALUPRES	X					16-63A		12, 8, 6	IP65/55	

EPIC® Connectors to Cable Cross Reference

Find the Right Connector for your Cable



ÖLFLEX® VFD SLIM (pg. 6)				Rectangular Connectors (pg. 16)				Circular Connectors (pg. 19)			
Part Number	Wire Size	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	HBS 6 Max. OD 21mm	MP 4/0 Max. OD 25mm	Modular Max. OD 25mm	LS1 5+PE Max. OD 15.5mm	LS1.5 Max. OD (mm)	M23 Max. OD 13.5mm	EAC Max. OD (mm)
760404	4	4	30.1				X*				
760604	6	4	25.2			X*	X*		X (26.5)		
760804	8	4	22.3			X	X		X (26.5)		22-22 (28)*
761004	10	4	17.2		X ULTRA	X ULTRA			X (20.5)		22-22 (21)
761204	12	4	14.1	X ULTRA	X ULTRA				X (14)		20-4 (21)
761404	14	4	12.6	X ULTRA	X ULTRA			X	X (14)	X	20-4 (21)
761604	16	4	11.6	X ULTRA	X ULTRA			X	X (14)	X	16S-1 (16.5)
761804	18	4	10	X ULTRA				X	X (14)	X	16S-1 (16.5)

* Standard housing with adapter and appropriate SKINTOP® gland

ÖLFLEX® VFD w/Brake (pg. 6)				Rectangular Connectors (pg. 16)				Circular Connectors (pg. 19)	
Part Number	Wire Size	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	HBS 6 Max. OD 21mm	MP 4/2 Max. OD 25mm	Modular Max. OD 25mm	LS1 5+PE Max. OD 15.5mm	LS1.5 4+PE+2 Max. OD (mm)
7404044	4	4 + 14/2c	33.6				X*		
7406044	6	4 + 14/2c	27.5			X*	X*		
7408044	8	4 + 14/2c	24.2			X	X		X (26.5)
7410044	10	4 + 14/2c	18.4		X ULTRA	X ULTRA			X (20.5)
7412048	12	4 + 14/2c	16.1	X ULTRA	X ULTRA				X (20.5)
7412044	12	4 + 18/2c	15.5	X ULTRA	X ULTRA				X (20.5)
7414048	14	4 + 14/2c	14.8	X ULTRA	X ULTRA			X	X (20.5)
7414044	14	4 + 18/2c	14.1	X ULTRA	X ULTRA			X	X (14)
7416048	16	4 + 18/2c	13.1	X ULTRA	X ULTRA			X	X (14)

* Standard housing with adapter and appropriate SKINTOP® gland

ÖLFLEX® VFD XL (pg. 7)				Rectangular Connectors (pg. 16)				Circular Connectors (pg. 19)		
Part Number	Wire Size	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	HBS 6 Max. OD 21mm	MP 4/0 Max. OD 25mm	Modular Max. OD 25mm	LS1 5+PE Max. OD 15.5mm	LS1.5 Max. OD (mm)	EAC Max. OD (mm)
730204	2	4	33.8							
730404	4	4	29.4				X*			
730604	6	4	26.2			X*	X*		X (26.5)	
730804	8	4	22.5			X	X		X (26.5)	22-22 (28)*
731004	10	4	17.8		X ULTRA	X ULTRA			X (20.5)	22-22 (21)
731204	12	4	16.5	X ULTRA	X ULTRA				X (20.5)	20-4 (21)
731404	14	4	14.8	X ULTRA	X ULTRA			X	X (20.5)	20-4 (21)
731604	16	4	12.9	X ULTRA	X ULTRA			X	X (14)	16S-1 (16.5)

* Standard housing with adapter and appropriate SKINTOP® gland

ÖLFLEX® SDP TC (pg. 8)				Rectangular Connectors (pg. 16)				Circular Connectors (pg. 19)		
Part Number	Wire Size	# of Wires	OD (mm)	HBE 6 Max. OD 25mm	HBS 6 Max. OD 25mm	MP 4/0 Max. OD 25mm	Modular Max. OD 25mm	LS1 5+PE Max. OD 15.5mm	LS1.5 Max. OD (mm)	EAC Max. OD (mm)
780204	2	4	32.8							
780404	4	4	27.9				X*			
780604	6	4	22.8			X	X		X (26.5)	
780804	8	4	19.5			X	X		X (20.5)	22-22 (21)
781004	10	4	14.6		X	X			X (20.5)	22-22 (21)
781204	12	4	11.3	X	X				X (14)	20-4 (15)
781404	14	4	10	X	X			X	X (14)	20-4 (15)

* Standard housing with adapter and appropriate SKINTOP® gland



EPIC® Connectors to Cable Cross Reference

Find the Right Connector for your Cable

ÖLFLEX® SERVO FD LK-INX (pg. 8)				Circular Connectors (pg. 19)		
Part Number	Wire Size	# of Wires	OD (mm)	LS1 3+PE+4 Max. OD 15.5mm	LS1.5 3+PE+4 Max. OD (mm)	M23 Max. OD 13.5mm
7072408	8	4 + 18/1pr + 16/1pr	22.0		X (26.5)	
7072407	10	4 + 18/1pr + 16/1pr	18.8		X (20.5)	
7072406	12	4 + 18/1pr + 16/1pr	16.0		X (20.5)	
7072405	14	4 + 18/2pr	15.1	X	X (20.5)	
7072404	16	4 + 19/2pr	12.2	X	X (14)	
7072403	18	4 + 19/2pr	11.5	X	X (14)	
7072402	20	9	8.8			X
7072401	20	2 + 24/4pr	8.5			X
7072400	18	2 + 24/4pr	8.8			X

ÖLFLEX® SERVO FD 796 CP (pg. 9)				Rectangular Connectors (pg. 16)				Circular Connectors (pg. 19)			
Part Number	Wire Size	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	ULTRA HBS 6 Max. OD 21mm	Mixed Power Max. OD 25mm	Modular Max. OD 25mm	LS1 Max. OD 15.5mm	LS1.5 Max. OD (mm)	M23 Max. OD 13.5mm	EAC Max. OD (mm)
27958	1	4	33.4								
27957	2	4	28.7								
27956	4	4	25.2				X*				
27955	6	4	22.0			X	X		X (26.5)		
27954	8	4	17.6			X ULTRA	X ULTRA		X (20.5)		22-22 (21)
27953	10	4	14.4		X ULTRA	X ULTRA			X (20.5)		22-22 (21)
27952	12	4	11.9	X ULTRA	X ULTRA				X (14)		20-4 (21)
27951	14	4	10.6	X ULTRA	X ULTRA			X	X (14)	X	20-4 (16.5)*
27950	16	4	9.2	X ULTRA	X ULTRA			X	X (14)	X	16S-1 (16.5)
27967	1	4 + 16/1pr	34.7								
27966	2	4 + 16/1pr	31.2								
27965	4	4 + 16/1pr	27.0				X*				
27964	6	4 + 16/1pr	23.8			X	X		X (26.5)		
27963	8	4 + 16/1pr	19.4			X ULTRA	X ULTRA		X (20.5)		
27962	10	4 + 16/1pr	17.0		X ULTRA	X ULTRA			X (20.5)		
27961	12	4 + 16/1pr	14.9	X ULTRA	X ULTRA				X (20.5)		
27960	14	4 + 16/1pr	13.8	X ULTRA	X ULTRA			X	X (14)		
27959	16	4 + 16/1pr	12.0	X ULTRA	X ULTRA			X	X (14)	X	16S-1 (16.5)
27977	1	4 + 16/2pr	36.8								
27976	2	4 + 16/2pr	31.4								
27975	4	4 + 16/2pr	28.9				X*				
27974	6	4 + 16/2pr	25.5			X*	X*		X (26.5)		
27973	8	4 + 18/1pr + 16/1pr	21.8			X	X*		X (26.5)		
27972	10	4 + 18/1pr + 16/1pr	18.1		X ULTRA	X ULTRA			X (20.5)		
27971	12	4 + 18/1pr + 16/1pr	16.3	X ULTRA	X ULTRA				X (20.5)		
27970	14	4 + 18/2pr	14.6	X ULTRA	X ULTRA			X	X (20.5)		
27969	16	4 + 19/2pr	12.2	X ULTRA	X ULTRA			X	X (14)	X	

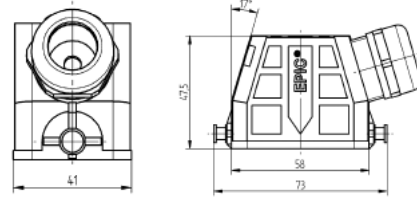
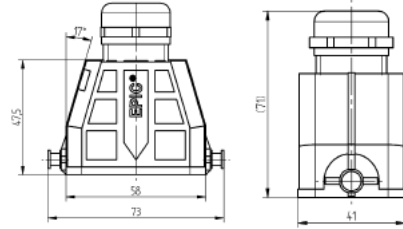
* Standard housing with adapter and appropriate SKINTOP® gland

Servo Cables in acc. to SEW® (pg. 11)				Rectangular Connectors (pg. 16)			Circular Connectors (pg. 19)		
Part Number	Wire Size	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	HBS 6 Max. OD 21mm	MP 4/8 Max. OD 25mm	LS1 Max. OD 15.5mm	LS1.5 Max. OD (mm)	M23 Max. OD 13.5mm
0038060	16	4c + 18/3c	12.0	X ULTRA			X	X (14)	X
0038061	14	4c + 18/3c	13.4	X ULTRA			X	X (14)	X
0038062	12	4c + 18/3c	15.0	X ULTRA	X ULTRA			X (20.5)	
0038063	10	4c + 16/3c	17.0		X ULTRA	X ULTRA		X (20.5)	
0038064	8	4c + 16/3c	20.0			X ULTRA		X (20.5)	

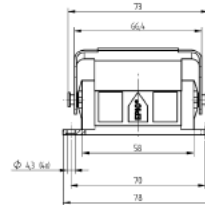
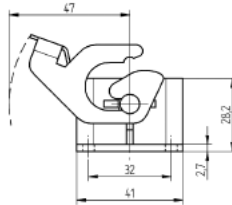
SIEMENS® 6FX 8 PLUS (pg. 10)				Rectangular Connectors (pg. 16)			Circular Connectors (pg. 19)			
Part Number	Wire Size (AWG)	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	HBS 6 Max. OD 21mm	MP 4/0 Max. OD 25mm	LS1 Max. OD 15.5mm	LS1.5 Max. OD (mm)	M23 Max. OD 13.5mm	EAC Max. OD (mm)
Motor Cables										
27789	6	4	21.6			X		X (26.5)		
27788	8	4	17.5			X ULTRA		X (20.5)		22-22 (21)
27787	10	4	14.5		X ULTRA	X ULTRA		X (20.5)		22-22 (21)
27786	12	4	11.9	X ULTRA	X ULTRA			X (14)		20-4 (21)
27785	14	4	10.6	X ULTRA			X	X (14)	X	20-4 (16.5)*
27784	16	4	9.1	X ULTRA			X	X (14)	X	16S-1 (16.5)
Servo Cables										
27798	1	4 + 16/1pr	34.0							
27797	2	4 + 16/1pr	30.9							
27796	4	4 + 16/1pr	26.6							
27795	6	4 + 16/1pr	23.4			X		X (26.5)		
27794	8	4 + 16/1pr	19.4			X ULTRA		X (20.5)		
27793	10	4 + 16/1pr	16.8		X ULTRA	X ULTRA		X (20.5)		
27792	12	4 + 16/1pr	14.8	X ULTRA	X ULTRA			X (20.5)		
27791	14	4 + 16/1pr	13.4	X ULTRA	X ULTRA		X	X (14)	X	
27790	16	4 + 16/1pr	11.6	X ULTRA	X ULTRA		X	X (14)	X	
Feedback / Signal Cables										
277101	26	8pr	7.8						X	
277111	20/4c + 22/4pr		8.9						X	
277121	20/2c + 26/3pr (ISP)		9.0						X	
277131	26/4c + 26/3pr (ISP) + 20/1pr		8.9						X	
277141	26/4c + 26/3pr (ISP) + 24/4c + 20/1pr		9.5						X	
277151	26	4pr	6.4							
277161	26	2pr	5.0							
277171	22	12pr	6.9							
277991	24/2pr + 21/1pr		7.2						X	

* Standard housing with adapter and appropriate SKINTOP® gland

Servo Cables in acc. to LENZE® (pg. 10)				Rectangular Connectors (pg. 16)			Circular Connectors (pg. 19)		
Part Number	Wire Size (AWG)	# of Wires	OD (mm)	HBE 6 Max. OD 17mm	HBS 6 Max. OD 21mm	MP 4/2 Max. OD 25mm	LS1 Max. OD 15.5mm	LS1.5 Max. OD (mm)	M23 Max. OD 13.5mm
Motor Cables (stationary installation)									
7072502	14	4 + 21/1pr	12.3	X ULTRA			X	X (14)	X
7072501	16	4 + 21/1pr	11.2	X ULTRA			X	X (14)	X
7072500	18	4 + 21/1pr	10	X ULTRA			X	X (14)	X
Resolver & Encoder Cables (stationary installation)									
7072507	26/3pr + 21/1pr		9.3						X
7072508	26/4pr + 18/1pr		11.0						X
Motor Cables (power chain)									
7072509	12	4 + 21/1pr	10.5					X (14)	
7072510	16	4 + 21/1pr	12.1				X	X (14)	X
7072511	14	4 + 21/1pr	13.2				X	X (14)	X
7072512	12	4 + 18/1pr	14.6	X ULTRA	X ULTRA			X (20.5)	
7072513	10	4 + 18/1pr	16.8		X	X ULTRA		X (20.5)	
7072514	8	4 + 18/1pr	20.1			X ULTRA		X (20.5)	
7072515	6	4 + 18/1pr	23.8			X		X (26.5)	
Resolver & Encoder Cables (power chain)									
7072516	26/3pr + 21/1pr		10.0						X
7072517	26/4pr + 18/1pr		11.5						X


EPIC® ULTRA HB 6 HOOD: SINGLE LEVER BOLTS


Part Number	Cable Outer Diameter	Gland Type
Top Entry Hood		
70250200	6–13 mm	Standard
70250202	9–17 mm	with Brush
Side Entry Hood		
70250203	6–13 mm	Standard
70250205	9–17 mm	with Brush

EPIC® ULTRA HB 6 PANEL MOUNT BASE: SINGLE LEVER


Part
Number
70250206

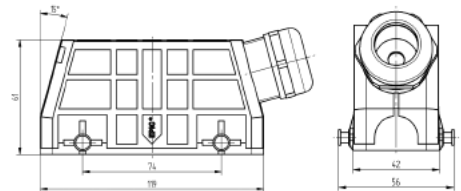
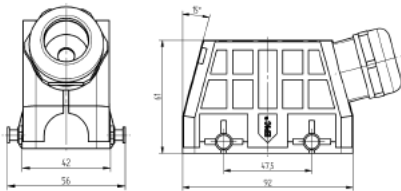
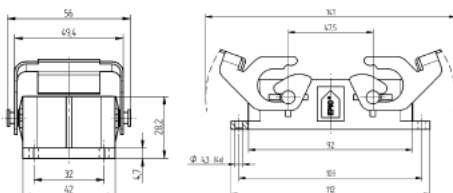
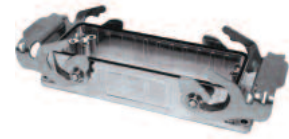
**EPIC® ULTRA HB 16 & 24 HOODS:
DOUBLE LEVER BOLTS**

HB 16

Part Number	Cable Outer Diameter	Gland Type
70250216	11–21 mm	with Brush

HB 24

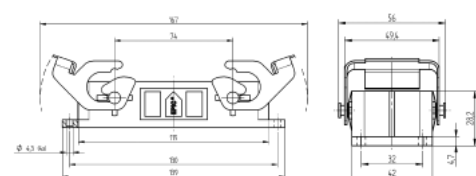
Part Number	Cable Outer Diameter	Gland Type
70250221	11–21 mm	with Brush


**EPIC® ULTRA HB 16 & 24 PANEL MOUNT BASES:
DOUBLE LEVER**

HB 16

Part Number
70250217

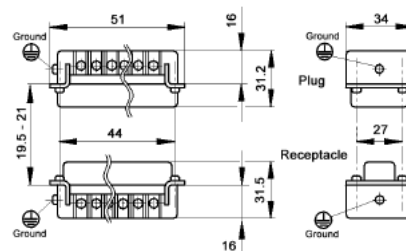
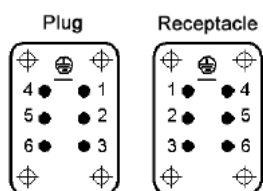
HB 24

Part Number
70250222



Additional configurations available, please see full line catalog or visit our website.

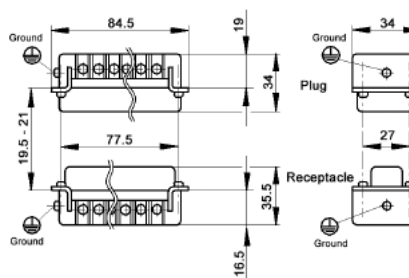
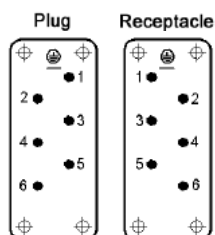
HBE 6 SCREW TERMINATED INSERTS



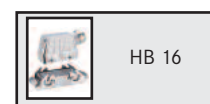
Plug	Receptacle
10190000	10191000



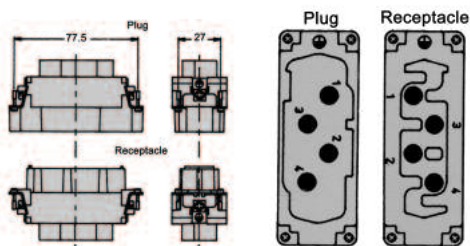
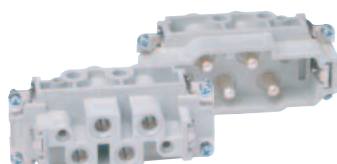
HBS 6 SCREW TERMINATED INSERTS



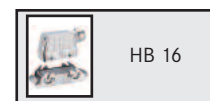
Plug	Receptacle
10170000	10171000



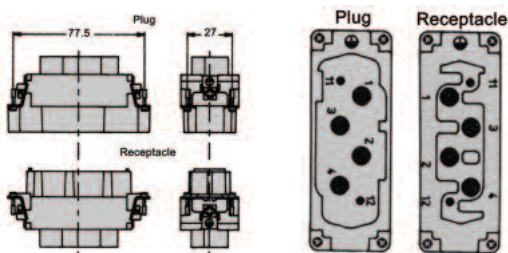
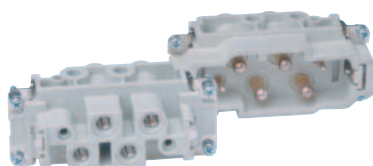
4 POWER / 0 SIGNAL MIXED POWER INSERTS



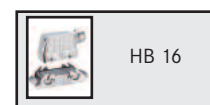
Plug	Receptacle
MP/M400	MP/F400



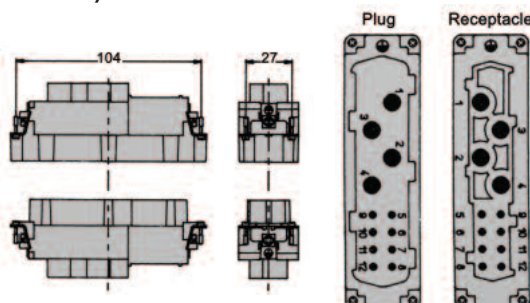
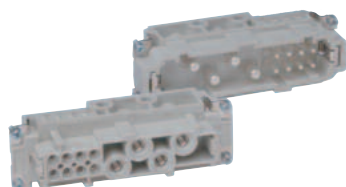
4 POWER / 2 SIGNAL MIXED POWER INSERTS



Plug	Receptacle
MP/M402	MP/F402



4 POWER / 8 SIGNAL MIXED POWER INSERTS



Plug	Receptacle
11/2408	11/1408





MODULAR SERIES

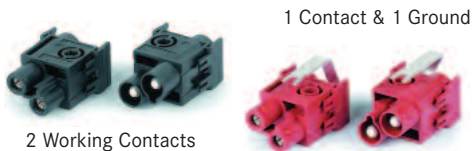
The MC Modular Series connector can be custom configured to meet application requirements by combining a variety of standard plug-and-play modules within various size support frames. Configurations include contacts for power and control, thermocouple contacts, data modules for Profibus and Ethernet,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

For more information and additional configurations, see page 330 of the full line catalog or visit our website at <http://www.lappusa.com/catalog/EPICInserts-MC.htm>.

Configuration	Plug	Receptacle	Rated Voltage	Rated Current	Full Catalog Page #
2 Contact Module: 2 Working Contacts*	10344100	10345100	1000V	82A	331
2 Contact Module with ground*	10344600	10345600	1000V	82A	331
3 Contact Module	10382000	10382100	630V	40A	333
3 Contact High Voltage Module	10399800	10399900	1000V	50A	334
5 Contact Module	10382200	10382300	400V	20A	337
10 Contact Module: Machine Crimp	10382400	10382500	250V	10A	339
20 Contact Module	10383600	10383700	100V	4A	340
Dummy Module	10399400	10399500	-	-	341
Profibus DP Module	10390400	10390500	30V	1A	341
Ethernet Module- RJ 45 Connectors + 4 Power Contacts*	10344300	10345300	600V	10A	342
Universal Bus Modules	10390600	10390700	30V	1A	342

* Module takes up 2 positions in frame

2 CONTACT MODULES



8 – 4 AWG

Plug	Receptacle
2 Contacts: 10344100	2 Contacts: 10345100
1 Contact & Ground: 10344600	1 Contact & Ground: 10345600

3 CONTACT MODULES



16 – 8 AWG

Plug	Receptacle
3 Contacts: 10382000	3 Contacts: 10382100
High Voltage: 10399800	High Voltage: 10399900

5 CONTACT MODULES



20 – 12 AWG

Plug	Receptacle
10382200	10382300

10 CONTACT MODULES



26 – 14 AWG

Plug	Receptacle
10382400	10382500

20 CONTACT MODULES & DUMMY MODULES



28 – 20 AWG

Plug	Receptacle
20 Contacts: 10383600	20 Contacts: 10383700
Dummy Module: 10399400	Dummy Module: 10399500

PROFIBUS DP MODULES: 2 Contacts & Shield



22 AWG per Profibus DP

Plug	Receptacle
10390400	10390500

Mount in High Profile Housings only.

ETHERNET MODULES: RJ 45 Connectors + 4 Power Contacts



26 – 24 AWG

Plug	Receptacle
10344300	10345300

Uses standard HD Series Machined Crimp Contacts for Power. RJ 45 plug not included (P/N CE6326)

UNIVERSAL BUS MODULES



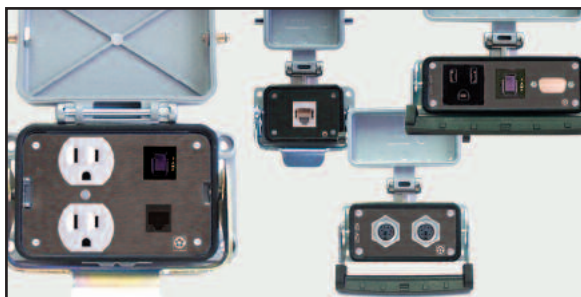
28 – 16 AWG

Plug: 4+Shield	Receptacle: 4+Shield
10390600	10390700

MODULE FRAMES



Plug	Receptacle
2 Module Frame: 10381000	2 Module Frame: 10381100
5 Module Frame: 10381400	5 Module Frame: 10381500



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

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

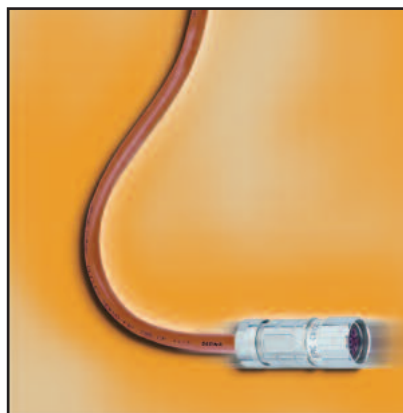
- OSHA 29 CRF 1910.147
- NFPA 70E and NFPA 79 Electrical Machinery Safety Standard 2002 Edition, Sections 16.1.1 (6), 16.1.2

Standard and custom configurations are available. These include: AC outlets, circuit breakers, DIN couplers, phone jacks, D-sub connectors, key lock switches, computer data storage devices and just about any component that can fit in the available port housings.

PLC TYPE	RELATIVE PROTOCOLS
A-B PLC-5/ 10	DB9F (Programming Terminal) 3P Header (DH+)
A-B PLC-5/ 10	DB9F (Programming Terminal) 3P Header (DH+) 3P Header (Remote I/O)
A-B PLC-5/ 10	8P Mini Din (DH+) 3P Header (DH+)
SLC 5/04	3P Header (DH+) 8P Mini Din (DH+) DB9F (RS232/DH485)
SLC 5/03	RJ45 (DH485) DB9F (RS232/DH485)
SLC 5/02	RJ45 (DH485)
SLC 5/01	RJ45 (DH485)
SLC 500	RJ45/TB INTFC (DH485)
A-B Panelview 900	DB9F RS232
A-B Panelview 1200E/1400E	DB9F (Programming)
A-B Control Net	RJ45 (DH485)
A-B 1394	DB9F (RS232)
A-B PLC 2	DB15F
A-B Device Net	5P Header
GE SNP	DB9M
GE SNP	DB15F
GE CNC	PCR20M
Siemens Current Loop	DB15F
Modicon Modbus	DB9F
Modicon Modbus +	DB9M

EPIC® Circular Connectors

CIRCON LS1 Series



Technical Data:

Contact Configuration: 5+PE, 3+PE+4

Rated Voltage:

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

Rated Current:

- 2mm contacts: 25/26 A
- 1mm contacts: 7 A

Impulse Voltage:

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

Contact Resistance: < 5m Ω

Mating Cycles: 500

Temperature Range: -25°C to +125°C

Protection Class: IP 67/68 (10h/1m)
IP 65 (Style A3)

Wire Gauge (Crimp):

- 2mm contacts: 20-12 AWG
- 1mm contacts: 24-18 AWG

Cable Diameter: 7.5 to 15.5mm

Materials:

Housing: Nickel-plated zinc (diecast)
Insulation Body: PA, PBT, UL94 V-0
Contacts: Gold-plated copper alloy
Gaskets & Seals: FPM

Standards: DIN EN 61984

View from contact side

Male Insert

Female Insert



5 + PE



View from contact side

Male Insert

Female Insert



3 + PE + 4





EPIC® Circular Connectors

CIRCON LS1 Series

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 F6
Cable Coupler



Contact Configuration	Part Number
5+PE	76133000
3+PE+4	76134000

Style D6
Cable Connector



Contact Configuration	Part Number
5+PE	76123000
3+PE+4	76124000

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	11148300

Additional configurations available, please see full line catalog or visit our website.



EPIC® Circular Connectors

CIRCON LS1.5 Series



Technical Data:

Contact Configuration: 3+PE+2, 3+PE+4

Protection Class: IP 67

Rated Voltage:

- VDE: 630 V (3.6mm contacts)
250 V (2.0mm contacts)

Wire Gauge (Crimp):

- 3.6mm contacts: 18-8 AWG (Style A1, A3 & A6)
18-6 AWG (Style D6 & F6)

- UL:

600 V

- 2.0mm contacts:

24-12 AWG

Rated Current:

- 3.6mm contacts: 70 A
- 2.0mm contacts: 30 A

Cable Diameter: 9 - 26.5mm

Materials:

Housing: Nickel-plated zinc (diecast)
Insulation Body: PA
Contacts: Gold-plated copper alloy
Gaskets & Seals: FPM

Impulse Voltage:

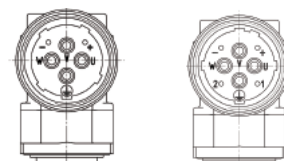
- 3.6mm contacts: 6 kV
- 2.0mm contacts: 4 kV

Temperature Range: -20°C to +125°C

Standards: DIN EN 61984



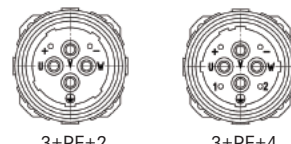
Style A3: View from contact side



3+PE+2

3+PE+4

Style A6: View from contact side



3+PE+2

3+PE+4

Style A1

Style A3

Style A6



Style D6: Cable Connector



Style F6: Cable Coupler



Part Number	Contact Configuration
Style A1: Straight Panel Mount	
44429308	3+PE+2
44429309	3+PE+4
Style A3: Angled Panel Mount	
44429306	3+PE+2
44429307	3+PE+4
Style A6: Panel Mount Socket	
44429316	3+PE+2
44429317	3+PE+4

Part Number	Contact Configuration	Cable Outer Diameter (mm)
44429310	3+PE+2	9-14
44429311	3+PE+2	14-20.5
44429312	3+PE+2	20.5-26.5
44429313	3+PE+4	9-14
44429314	3+PE+4	14-20.5
44429315	3+PE+4	20.5-26.5

Part Number	Contact Configuration	Cable Outer Diameter (mm)
44429300	3+PE+2	9-14
44429301	3+PE+2	14-20.5
44429302	3+PE+2	20.5-26.5
44429303	3+PE+4	9-14
44429304	3+PE+4	14-20.5
44429305	3+PE+4	20.5-26.5



LS1.5 Crimp Contacts



Crimp Tool with Locator



Part Number	Wire Size	Style	Part Number	Wire Size	Style
3.6mm Male Contacts			2mm Male Contacts		
44429334	18-16 AWG	A1, A3	44429339	26-24 AWG	A1, A3
44429335	18-14 AWG	A1, A3	44429340	24-18 AWG	A1, A3
44429336	18-12 AWG	A1, A3	44429341	18-16 AWG	A1, A3
44429337	12-10 AWG	A1, A3	44429342	18-14 AWG	A1, A3
44429338	10-8 AWG	A1, A3	44429343	12 AWG	A1, A3
44429326	18-14 AWG	F6	44429330	24-18 AWG	F6
44429327	14-12 AWG	F6	44429331	18-16 AWG	F6
44429328	12-10 AWG	F6	44429332	18-14 AWG	F6
44929329	10-6 AWG	F6	44929333	12 AWG	F6
3.6mm Female Contacts			2mm Female Contacts		
44429318	18-14 AWG	A6, D6	44429322	24-18 AWG	A6, D6
44429319	14-12 AWG	A6, D6	44429323	18-16 AWG	A6, D6
44429320	12-10 AWG	A6, D6	44429324	18-14 AWG	A6, D6
44429321	10-6 AWG	A6, D6	44429325	12 AWG	A6, D6

Part Number	Size
44429367	26-10 AWG
44429368	10-8 AWG

EPIC® Circular Connectors

CIRCON M23 Series



Technical Data:

Contact Configuration: 6, 7, 8+1, 9, 12, 16, 17

Rated Voltage:

- 6 - 9 poles: 150 V
- 12 - 16 poles: 100 V
- 17 poles: 50 V

Rated Current:

- 6 & 7 pole: 14 A
- 8+1 - 17 poles: 7 A

Impulse Voltage: 0.8 kV

Contact Resistance: < 5m Ω

Mating Cycles: 100 minimum

Temperature Range: -25°C to +125°C

Protection Class: IP 67/68 (10h/1m)
IP 65 (Style A3)

Wire Gauge:

- Crimp:
 - 1mm contacts: 26-18 AWG
 - 2mm contacts: 18-14 AWG
- Solder:
 - 1mm contacts: up to 18 AWG
 - 2mm contacts: up to 14 AWG

Cable Diameter: 7.0 to 13.5 mm

Materials:

- Housing: Nickel-plated zinc
- Insert: PA, PBT, UL94 V-0
- Contacts: Gold-plated copper alloy
- Gaskets & Seals: FPM

Standards: DIN EN 61984

Approvals: - cRUus
- VDE



Style A1
Straight Panel Mount



Part Number
72004000

Style A3
Angled Panel Mount



Part Number
24420055
IP 65 only

Style D6
Cable Connector



Part Number
44420037

Style F6
Cable Coupler

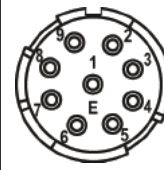
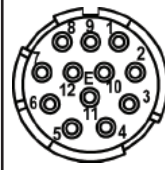
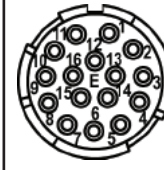
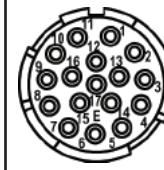
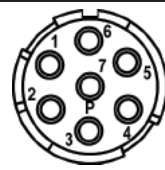
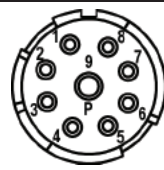
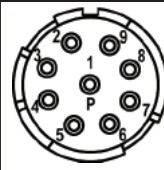
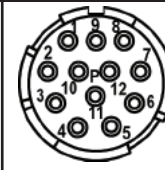
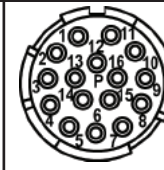
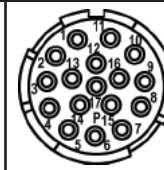


Part Number
44420040

Insert Configurations

Connector inserts will accept both male and female contacts.

A complete connection requires one E-Type insert and one P-Type insert.

E-Type Insert (Clockwise numbered contacts viewed from the mating side)	73002768 with male solder	73002756 with male solder	73002744 with male solder	73002732 with male solder	73002720 with male solder	73002708 with male solder	73028500 with male solder
	73002770 with female solder	73002758 with female solder	73002746 with female solder	73002734 with female solder	73002722 with female solder	73002710 with female solder	73018500 with female solder
	Use 2mm Contacts 	Use 2mm Contacts 	Use 1 & 2mm Contacts 	Use 1mm Contacts 	Use 1mm Contacts 	Use 1mm Contacts 	Use 1mm Contacts 
# of Contacts	6	7	8+1	9	12	16	17
P-Type Insert (Counter-Clockwise numbered contacts viewed from the mating side)							
	Use 2mm Contacts	Use 2mm Contacts	Use 1 & 2mm Contacts	Use 1mm Contacts	Use 1mm Contacts	Use 1mm Contacts	Use 1mm Contacts
	73002762 with male solder	73002750 with male solder	73002738 with male solder	73002726 with male solder	73002714 with male solder	73002702 with male solder	73028000 with male solder
	73002764 with female solder	73002752 with female solder	73002740 with female solder	73002728 with female solder	73002716 with female solder	73002704 with female solder	73018000 with female solder

EPIC® Circular Connectors

EAC MIL Style 5015

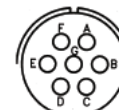


Material & Environmental:

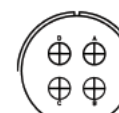
Housing:	Nickel Plated Aluminum Alloy
Contact Insert:	TPE Synthetic Rubber UL94 V-0
Contact:	Copper Alloy, Silver Plate per QQ-S-365, Crimp
Gaskets & Seals:	TPE Synthetic Rubber UL94 V-0
Temperature Range:	-55°C to +125°C
Environmental Seal:	Ref MIL-C-5015 (MIL-STD 202/1344) (Class J&S IP 67 equiv. mated)
RoHS Compliance:	Yes
Standards:	MIL-C-5015; QQ-S-365; VG95234
Mating Cycles:	500 minimum

Connector Insert Configuration:

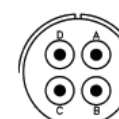
16S-1



20-4



22-22



					Connector Configuration Code	
Wire Size	# of Wires	Voltage (V)	Current (A)	Max OD (mm)	Panel Mount Receptacle	Straight Plug
AWG 8, 10	4	500	46	21	EAC02E22-22PC	EAC06J22-22SC32M
AWG 12, 14	4	900	23	21	EAC02E20-4PC	EAC06J20-4SC32M
AWG 16, 18	7	500	13	17	EAC02E16S-1PC	EAC06J16S-1SC25M

Additional configurations available, please see full line catalog or visit our website.

Assemblies for Rockwell Automation Motors

AB Legacy Products



Connector Technical Data:

- Connector Series:
- MP: ITT Cannon TNM, Bayonet
 - MPF: M23 Series, Threaded
 - N: M26482 Series, Bayonet
 - H & F: M5015 Series, Threaded
 - Y: Tyco CPC Black Plastic, Threaded
 - TL: Tyco MATE-N-LOK, Tab Locking



Cable Technical Data:

Cable Type:		Jacket Material:		Bend Radius:	
- Feedback:	812090, 812308, 811738, 812701	- Feedback:	Gray or Black PVC	- Feedback:	for stationary use: 10 x cable diameter
- Power & Brake:	190 CY, 890 CY, SERVO Series	- Power & Brake:	Gray or Black PVC 190CY/890CY - PUR Lapp SERVO	- Feedback:	for flexible use: 12 x cable diameter
				- Power & Brake:	Per specific cable catalog data
Voltage Rating:		Construction:			
- Feedback:	300V	- Feedback:	See drawing/specification		
- Power & Brake:	600V	- Power & Brake:	See drawing/specification		

Unless otherwise noted, replace # with "7" for Flexing or "6" for Stationary cable
Replace xxx with the desired cable length in feet.

*** For 90° version on motor end: add "-R" to Lapp part #

*** For extension assembly (M-F): add "-E" to Lapp part #

Drawings for all assemblies are available on our website.

All raw cable is Lapp product.

For data sheets, see our website or contact Sales.

All overmolded products are molded with UL/94-VO PVC.

MP SERIES MOTORS

(230V) - POWER

Lapp Part Number	Rockwell Part Number
#3529xxx-10	2090-UXNPAMP-10Sxx
#3529xxx-14	2090-UXNPAMP-14Sxx
#3529xxx-16	2090-UXNPAMP-16Sxx
#3529xxx-10	2090-XXNPMP-10Sxx
#3529xxx-14	2090-XXNPMP-14Sxx
#3529xxx-16	2090-XXNPMP-16Sxx

(460V) 1394C-SJTXX-D (D29) - POWER

Lapp Part Number	Rockwell Part Number
#3529xxx-8	2090-CDNPBMP-8Sxx
#3529xxx-10	2090-CDNPBMP-10Sxx
#3529xxx-14	2090-CDNPBMP-14Sxx
#3529xxx-16	2090-CDNPBMP-16Sxx

H/F SERIES MOTORS

POWER / FEEDBACK

Lapp Part Number	Rockwell Part Number
Power	
#3502xxx	2090-UXNPAHF-14SXX
#3502xxx	2090-XXNPHF-14SXX
#3503xxx	2090-UXNPAHF-10SXX
#3506xxx	2090-UXNPAHF-8SXX
Feedback	
#3513xxx	2090-UXNFBHF-SXX
#3525xxx	2090-UXNFDHF-SXX
#5925xxx	2090-XXNFHF-SXX
Brake	
#3544xxx	NO A/B PART NUMBER

TLY SERIES MOTORS

POWER/BRAKE & FEEDBACK

Lapp Part Number	Rockwell Part Number
Power/Brake	
#2505xxx	2090-CPWM6DF-16AAxx
#4505xxx	2090-CPBM6DF-16SAAxx
Feedback	
#2515xxx	2090-CFBM6DD-CCAAxx
#2514xxx	2090-CFBM6DF-CBAAxx

(460V) - POWER

Lapp Part Number	Rockwell Part Number
#3529xxx-8	2090-UXNPBMP-8Sxx
#3529xxx-10	2090-UXNPBMP-10Sxx
#3529xxx-14	2090-UXNPBMP-14Sxx
#3529xxx-16	2090-UXNPBMP-16Sxx
#3529xxx-8	2090-XXNPMP-8Sxx
#3529xxx-10	2090-XXNPMP-10Sxx
#3529xxx-14	2090-XXNPMP-14Sxx
#3529xxx-16	2090-XXNPMP-16Sxx

H SERIES MOTORS

POWER

Lapp Part Number	Rockwell Part Number
#3501xxx	2090-XXNPH-16Sxx

MPF SERIES MOTORS

POWER / FEEDBACK

Lapp Part Number	Rockwell Part Number
Power with Brake	
#00270-xxx-10	2090-XXNPMF-10Sxx
#00270-xxx-10NB	NO A/B PART NUMBER
#00270-xxx-14	2090-XXNPMF-14Sxx
#00270-xxx-14NB	NO A/B PART NUMBER
#00270-xxx-16	2090-XXNPMF-16Sxx
#00270-xxx-16NB	NO A/B PART NUMBER
Feedback	
#00271-xxx-15P	NO A/B PART NUMBER
#00271-xxx	2090-XXNFMF-SXX

Replace # with "4" for Flexing or "3" for Stationary cable (MPF Only)

Unless otherwise noted, replace # with "7" for Flexing or "6" for Stationary cable

(230/460V) - FEEDBACK

Lapp Part Number	Rockwell Part Number
#3528xxx	2090-UXNFBMP-Sxx
#3526xxx	2090-UXNFDMP-Sxx
#5926xxx	2090-XXNFMP-Sxx

1394 (D29)

Lapp Part Number	Rockwell Part Number
#1100125-xxx	2090-CDNFDMP-Sxx

ULTRA 3000/5000 1394 BRAKE

Lapp Part Number	Rockwell Part Number
#3524xxx	2090-UXNBMP-18Sxx

N SERIES MOTORS

POWER / FEEDBACK

Lapp Part Number	Rockwell Part Number
Power	
#3507xxx	2090-UXNPAN-16Sxx
#3507xxx	2090-XXNPN-16Sxx
Feedback	
#3516xxx	2090-UXNFBN-Sxx
#3527xxx	2090-UXNFDN-Sxx
#5927xxx	2090-XXNFN-Sxx
Brake	
#3534xxx	NO AB PART NUMBER

Y SERIES MOTORS

POWER / BRAKE

Lapp Part Number	Rockwell Part Number
Power	
#3505xxx	2090-UXNPAY-16Sxx
#3505xxx	2090-XXNPNY-16Sxx

230V- FEEDBACK

Lapp Part Number	Rockwell Part Number
#3515xxx	2090-UXNFBY-Sxx
#3514xxx	2090-UXNFDY-Sxx
#5914xxx	2090-XXNFY-Sxx



Assemblies for Rockwell Automation Motors

AB Legacy Products

TL SERIES MOTORS

POWER / FEEDBACK / BRAKE

Lapp Part Number	Rockwell Part Number
Power	
#1529xxx-16	2090-XXNPT-16Sxx
#1529xxx-16	2090-DANPT-16Sxx
Feedback	
#1526xxx	FLYING LEAD CONFIGURATION
#1528xxx	2090-XXNFT-Sxx
#2528xxx	2090-DANFCT-Sxx
Brake	
#00058xxx	2090-DANBT-18Sxx

For Power & Feedback: Replace # with "7" for Flexing or "6" for Stationary cable
For Brake ONLY: Replace # with "5" for Flexing or "3" for Stationary cable

ULTRA 100/200 MOTORS

POWER/BRAKE & FEEDBACK

Lapp Part Number	Rockwell Part Number
F-Series	
#1103xxx	9101-1383
#1121xxx	9101-1365
F/H Series	
#1101xxx	9101-1381
#1102xxx	9101-1382
#1106xxx	9101-1399
#1113xxx	9101-1366
#1118xxx	9101-2027

ULTRA 100/200 MOTORS

POWER/BRAKE & FEEDBACK

Lapp Part Number	Rockwell Part Number
N-Series	
#1107xxx	9101-1467
#1116xxx	9101-1468
#1117xxx	9101-1474
Y Series	
#1105xxx	9101-1385
#1114xxx	9101-1373
#1115xxx	9101-1375



Assemblies for Rockwell Automation Motors

AB Assemblies



Connector Technical Data:

Connector Series:	M23 Series
- MP:	Speedtec Type (M7) (M4 still available)
- TLV:	Tyco CPC / Tab Locking

Cable Technical Data:

Cable Type:		Jacket Material:	
- Feedback:	812896, 812872	- Feedback:	Green TPE/PVC - CMG
- Power & Brake:	812866, 812867, 812868, 812869, 812870, 812871	- Power & Brake:	Orange TPE/PVC - TC-ER/MTW
Voltage Rating:		Construction:	
- Feedback:	600V	- Feedback:	See drawing/specification
- Power & Brake:	600V	- Power & Brake:	See drawing/specification

Bend Radius:	
- Feedback:	for stationary use: 10 x cable diameter for flexible use: 12 x cable diameter
- Power & Brake:	10 x cable diameter
* Raw cable spec sheets available upon request.	

POWER WITH BRAKE

Lapp Part Number	Rockwell Part Number
Flexing	
93579xxx-16	2090-CPBM7DF-16AFxx
93549xxx-16	2090-CPBM4DF-16AFxx
93579xxx-16-E	2090-CPBM7E7-16AFxx
93579xxx-14	2090-CPBM7DF-14AFxx
93549xxx-14	2090-CPBM4DF-14AFxx
93579xxx-14-E	2090-CPBM7E7-14AFxx
93579xxx-10	2090-CPBM7DF-10AFxx
93549xxx-10	2090-CPBM4DF-10AFxx
93579xxx-10-E	2090-CPBM7E7-10AFxx
93579xxx-8	2090-CPBM7DF-8AFxx
93549xxx-8	2090-CPBM4DF-8AFxx
93579xxx-8-E	2090-CPBM7E7-8AFxx
Stationary	
83579xxx-16	2090-CPBM7DF-16AAxx
83549xxx-16	2090-CPBM4DF-16AAxx
85949xxx-16	2090-xxNPMF-16Sxx
83579xxx-14	2090-CPBM7DF-14AAxx
83549xxx-14	2090-CPBM4DF-14AAxx
85949xxx-14	2090-xxNPMF-14Sxx
83579xxx-10	2090-CPBM7DF-10AAxx
83549xxx-10	2090-CPBM4DF-10AAxx
83579xxx-8	2090-CPBM7DF-8AAxx
83549xxx-8	2090-CPBM4DF-8AAxx

MP SERIES MOTORS

POWER WITHOUT BRAKE

Lapp Part Number	Rockwell Part Number
Flexing	
93577xxx-16	2090-CPWM7DF-16AFxx
93547xxx-16	2090-CPWM4DF-16AFxx
93577xxx-14	2090-CPWM7DF-14AFxx
93547xxx-14	2090-CPWM4DF-14AFxx
93577xxx-10	2090-CPWM7DF-10AFxx
93547xxx-10	2090-CPWM4DF-10AFxx
93577xxx-8	2090-CPWM7DF-8AFxx
93547xxx-8	2090-CPWM4DF-8AFxx
Stationary	
83577xxx-16	2090-CPWM7DF-16AAxx
83547xxx-16	2090-CPWM4DF-16AAxx
83577xxx-14	2090-CPWM7DF-14AAxx
83547xxx-14	2090-CPWM4DF-14AAxx
83577xxx-10	2090-CPWM7DF-10AAxx
83547xxx-10	2090-CPWM4DF-10AAxx
83577xxx-8	2090-CPWM7DF-8AAxx
83547xxx-8	2090-CPWM4DF-8AAxx

Drawings for all assemblies are available on our website.
All raw cable is Lapp product.
For data sheets, see our website or contact Sales.

For TLY Motors: Replace # with "7" for Flexing or "6" for Stationary cable

FEEDBACK

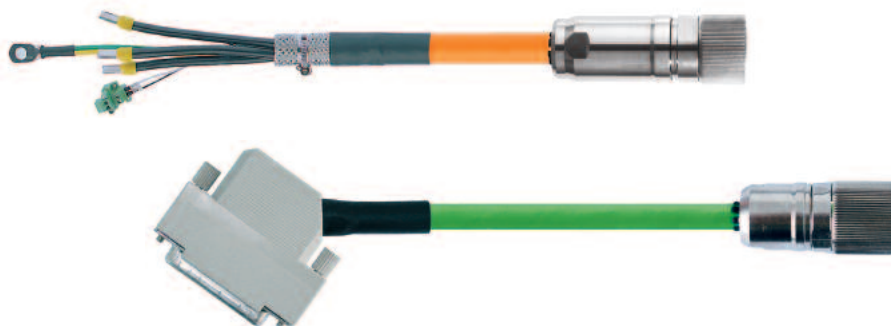
Lapp Part Number	Rockwell Part Number
Flexing	
93572xxx	2090-CFBM7DF-CEAFxx
93574xxx	2090-CFBM7DD-CEAFxx
93542xxx	2090-CFBM4DF-CEAFxx
93572xxx-E	2090-CFBM7E7-CEAFxx
93576xxx	2090-CFBM7DF-CDAFxx
93578xxx	2090-CFBM7DD-CDAFxx
93546xxx	2090-CFBM4DF-CDAFxx
93576xxx-E	2090-CFBM7E7-CDAFxx
Stationary	
83572xxx	2090-CFBM7DF-CEAAxx
83574xxx	2090-CFBM7DD-CEAAxx
83576xxx	2090-CFBM7DF-CDAAxx
83546xxx	2090-CFBM4DF-CDAAxx

TLY SERIES MOTORS

POWER / FEEDBACK

Lapp Part Number	Rockwell Part Number
Power & Power/Brake	
#2505xxx	2090-CPWM6DF-16AFxx
#4505xxx	2090-CPBM6DF-16AFxx
Feedback	
#2515xxx	2090-CFBM6DD-CCAFxx
#4515xxx	2090-CFBM6DF-CBAFxx





Technical Data – 6FX 8002:

- Minimum Bend Radius:
- Power cable:
 - for flexible use: 1.5 mm² – 16 mm²: 7.5 x outer diameter
 - 25 mm² – 50 mm²: 10 x outer diameter
 - for stationary use: 4 x outer diameter
 - Signal cable:
 - for flexible use: 8 x outer diameter
 - for stationary use: 4 x outer diameter
- Temperature Range:
- for flexible use: -20°C to +60°C
 - for stationary use: -50°C to +80°C

- Nominal Voltage:
- Power cable, Power cores:
 - IEC: 600/1000 V
 - UL/CSA: 1000 V
 - Power cable, Control cores:
 - UL/CSA: 1000 V
 - IEC: 250 V AC
 - Signal cable:
 - UL/CSA: 30 V AC/DC
 - IEC: 30 V AC
- Approvals:
- UL AWM: - AWM 21223
 - AWM 20236
 - CSA: - AWM I/II A/B FT1
 - Additional: - VDE
 - CE & RoHS

Technical Data – 6FX 5002:

- Minimum Bend Radius:
- for flexible use: 12 x outer diameter
 - for stationary use: 5 x outer diameter
- Temperature Range:
- for flexible use: 0°C to +60°C
 - for stationary use: -20°C to +60°C
- Nominal Voltage:
- Power cable, Power cores:
 - IEC: 600/1000 V
 - UL/CSA: 1000 V
 - Power cable, Control cores:
 - UL/CSA: 750 V
 - IEC: 30 V AC
 - Signal cable:
 - UL/CSA: 30 V AC/DC
 - IEC: 30 V AC
- Approvals:
- UL AWM: - AWM 2570 (power)
 - AWM 2502 (signal)
 - Additional: - VDE
 - CE & RoHS

6FX 8002: Continuous Flex Assemblies

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

6FX 5002: Stationary Assemblies

Lapp Part Number	Siemens Part Number for Harnessing	Lapp Cable Part Number
Feedback		
235210xxx	6FX5002-2EQ10-XXXX	0025726
235231xxx	6FX5002-2CA31-XXXX	0025726
235202xxx	6FX5002-2CF02-XXXX	0025725
-	6FX5002-2CB31-XXXX	-
235214xxx	6FX5002-2EQ14-XXXX	0025726
235234xxx	6FX5002-2CA34-XXXX	0025726
235204xxx	6FX5002-2CF04-XXXX	0025725
235100xxx	6FX5002-1AD00-XXXX	0025725
235104xxx	6FX5002-1AD04-XXXX	0025725
235200xxx	6FX5002-2AH00-XXXX	0025725
235211xxx	6FX5002-2CA11-XXXX	0025724
235300xxx	6FX5002-2CG00-XXXX	0025724
235400xxx	6FX5002-2CH00-XXXX	0025725
235201xxx	6FX5002-2CF01-XXXX	0025725
-	6FX5002-4AA21-XXXX	-
Power		
235501xxx	6FX5002-5CA01-XXXX	00257001
235505xxx	6FX5002-5CA05-XXXX	00257001
235601xxx	6FX5002-5CS01-XXXX	00257001
235531xxx	6FX5002-5CA31-XXXX	00257011
235511xxx	6FX5002-5CS11-XXXX	00257011
235541xxx	6FX5002-5CA41-XXXX	00257021
235551xxx	6FX5002-5CA51-XXXX	00257031
Power with Brake		
235601xxx	6FX5002-5DA01-XXXX	00257151
235605xxx	6FX5002-5DA05-XXXX	00257151
235701xxx	6FX5002-5DS01-XXXX	00257151
235631xxx	6FX5002-5DA31-XXXX	00257161
235611xxx	6FX5002-5DS11-XXXX	00257161
235641xxx	6FX5002-5DA41-XXXX	00257171
235651xxx	6FX5002-5DA51-XXXX	00257181

Replace xxx with desired cable length in meters



ÖLFLEX® SERVO LK-INX Assemblies

Continuous Flex Servo Assemblies according to Indramat Standard IKG & IKS

Assemblies according to Indramat Standard IKG / RKL:

Motor Connection cables for power transmission systems



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



Technical Data:

- Minimum Bend Radius
 - Stationary: 6 x cable diameter
 - Flexing: 10 x cable diameter
- Temperature Range
 - Stationary: -50°C to +80°C
 - Flexing: -30°C to +60°C
- Nominal Voltage
 - Power Cores:
 - IEC: 600 / 1000 V
 - UL/CSA: 1000 V
 - Control Cores:
 - IEC: 250 V AC
 - UL/CSA: 1000 V
- Approvals
 - UL AWM: - AWM 20234

Assemblies according to Indramat Standard IKS / RKG:

Feedback cables for signal transmission systems



Lapp Part Number	Length (m.)	Indramat® Part Number	Lapp Cable Part Number
INDRAMAT Standard IKS			
70335583	10	IKS4374-010	7072401
70335584	10	IKS4376-010	7072401
70335595	10	IKS4103-010	7072401
70335596	10	IKS4153-010	7072401
INDRAMAT Standard RKG			
70392984	10	RKG4200-010	7072401
70410002	10	RKG4201-010	7072401



Technical Data:

- Minimum Bend Radius
 - Stationary: 5 x cable diameter
 - Flexing: 10 x cable diameter
- Temperature Range
 - Stationary: -30°C to +90°C
 - Flexing: -30°C to +80°C
- Nominal Voltage 300 V
- Approvals
 - UL AWM: - AWM 20236

Additional configurations available, please see full line catalog or visit our website.

Servo Harnesses in acc. to LENZE® Standard



Technical Data:



Minimum Bend Radius

- Continuous Flexing: 10 x cable diameter
- Stationary: 7.5 x cable diameter



Temperature Range

- Flexing: -5°C to +70°C
- Stationary: -25°C to +80°C



Nominal Voltage

- Resolver & encoder cable:
 - VDE: 30 V
 - UL/CSA: 300 V
- Motor cable
 - Power cores: 600/1000 V
 - VDE: 600/1000 V
 - UL/CSA: 600 V



Test Voltage

- Resolver & encoder cable: 1.5 kV
- Motor cable
 - Power cores: 4 kV
 - Control cores: 2 kV



Approvals

- Resolver & encoder cable:
 - UL AWM: - AWM 21165 (flexing)
 - AWM 2464 (stationary)
- Motor cable:
 - UL AWM: - AWM 20940 (flexing)
 - AWM 2570 (stationary)

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

Servo Harnesses in acc. to SEW® Standard



Technical Data:



Minimum Bend Radius:

- Power cable:
 - Occasional Flexing: 15 x cable diameter
- Signal cable:
 - Flexing: 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 cores: 600 V
 - UL: 750 V
 - IEC: 750 V
- Signal cable:
 - Signal cores: 600 V
 - UL: 350 V
 - IEC: 350 V
 - Signal cable: 250 V



Test Voltage:

- Power cable: 2 kV
- Signal cable: 1.5 kV



Approvals:

- UL AWM: - AWM 2587

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





UNITRONIC® BUS DeviceNet™ Gray

For Bus-System DeviceNet, Stationary & Continuous Flex Applications, 120 Ω

UNITRONIC® CABLE 15/1PR + 18/1PR DEVICENET™ TRUNK CABLE (UL)

UNITRONIC® CABLE 22/1PR + 24/1PR DEVICENET™ DROP CABLE (UL)



Rate Table

Communication Rate	Maximum Length Trunk Cable				Maximum Length Drop Cable			
	Feet	THICK Meters	Feet	THIN Meters	Feet	THICK Meters	Feet	THIN Meters
125 Kbps	1640	500	328	100	512	156	20	6
250 Kbps	820	250	328	100	256	78	20	6
500 Kbps	328	100	328	100	128	39	20	6

Construction:

Conductors: Stranded tinned copper

Insulation: Power conductors: PVC;

Data conductors: Polyethylene

Shielding: Both pairs are tri-laminated foil shield (100% coverage) and utilize a common tinned copper drain wire plus an overall foil wrap and braid (65% coverage).

Jacket: Oil resistant PVC, PUR or halogen-free

Jacket Color: Gray or violet

Technical Data: Gray Version

Minimum Bend Radius:
10 x cable diameter

Temperature:
-20°C to +80°C

Nominal Voltage: 300V

Color Code:
Power pair: Red & Black
Data pair: Blue & White

Approvals:
UL: - CMG per UL 444
Canada: - CMG FT4

Part Number	Type	Conductor Description	Nominal Outer Diameter (in.)	Impedance	Nominal Capacitance (1000 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Stationary: PVC							
4001	Thick	18/1pr + 15/1pr	.437	120 Ω	12 pF/ft	140	53112240
4002	Thin	24/1pr + 22/1pr	.260	120 Ω	12 pF/ft	43	53112210
Continuous Flex: PVC							
6001	Thick	18/1pr + 14/1pr	.468	120 Ω	12 pF/ft	140	53112240
6002	Thin	24/1pr + 22/1pr	.283	120 Ω	12 pF/ft	43	53112210



UNITRONIC® BUS DeviceNet™ Violet

For Bus-System DeviceNet, Stationary & Continuous Flex Applications, 120 Ω

UNITRONIC® BUS DeviceNet™ THICK Cable

UNITRONIC® BUS DeviceNet™ THIN Cable

LAPP KABEL STUTTGART UNITRONIC® BUS DN THICK FD P

LAPP KABEL STUTTGART UNITRONIC® BUS DN THIN FD P

Technical Data: Violet Version

Minimum Bend Radius:
15 x cable diameter

Nominal Voltage: 300V

Color Code:
- Power pair: Red & Black
- Data pair: Blue & White

Approvals:
UL: - CMG per UL444
- PLTC per UL 13
- CMX (2170344 & 2170345)
Attributes: - Sunlight Resistant
Canada: - CMG per UL 444
- CMX (2170344 & 2170345)

Part Number	Type	Approval	Conductor Description	Nominal Outer Diameter (in.)	Temperature Range	Impedance	Nominal Capacitance (800 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Stationary: PVC									
2170342	Thick	UL/CSA CMG & PLTC*	18/1pr + 15/1pr	.480	-20°C to +80°C	120 Ω	12 pF/ft	129	53112240
2170343	Thin	UL/CSA CMG & PLTC*	24/1pr + 22/1pr	.272	-20°C to +80°C	120 Ω	12 pF/ft	45	53112210
Stationary: Halogen-Free & Flame Retardant (FRNC)									
2170340	Thick	UL/CSA CMG & PLTC*	18/1pr + 15/1pr	.480	-25°C to +80°C	120 Ω	12 pF/ft	131	53112240
2170341	Thin	UL/CSA CMG & PLTC*	24/1pr + 22/1pr	.272	-25°C to +80°C	120 Ω	12 pF/ft	47	53112210
Continuous Flex: PUR									
2170344	Thick	UL/CSA CMX	18/1pr + 15/1pr	.480	-40°C to +80°C	120 Ω	12 pF/ft	124	53112240
2170345	Thin	UL/CSA CMX	24/1pr + 22/1pr	.272	-40°C to +80°C	120 Ω	12 pF/ft	45	53112210
Continuous Flex: PVC									
2170346	Thick	UL/CSA CMG & PLTC*	18/1pr + 15/1pr	.480	-10°C to +80°C	120 Ω	12 pF/ft	131	53112240
2170347	Thin	UL/CSA CMG & PLTC*	24/1pr + 22/1pr	.272	-10°C to +80°C	120 Ω	12 pF/ft	47	53112210

* UL Listed



UNITRONIC® BUS PB

For BUS-Systems PROFIBUS-DP/FMS/FIP, Stationary Applications, 150 Ω



**Maximum cable length by bit rate
for one bus segment:**

Communication Rate	PROFIBUS-DP, Type A Cable Feet	PROFIBUS-DP, Type A Cable 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

Technical Data:

Minimum Bend Radius:
8 x cable diameter

Temperature Range:
-40°C to +80°C
-30°C to +80°C (2170853)

Nominal Voltage: 250V

Construction: Stationary

Conductors: Solid and stranded bare copper

Insulation: Polyethylene

Shielding: Specially designed foil/tinned copper braid

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

Color Code: Red/Green pair

Approvals:

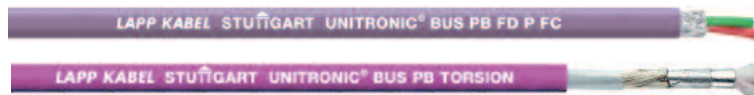
UL: - CMG
- CMX (2170219)
Canada: - CMG
- CMX (2170219)

Part Number	Conductor Description	Jacket	Approval	Nominal Outer Diameter (in.)	Impedance	Nominal Capacitance (800 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Stationary								
2170220	22/1pr	PVC	-	.315	150 Ω ± 15 Ω	9 pF/ft	50	53112220
2170219	22/1pr	PVC	UL/CSA CMX	.315	150 Ω ± 15 Ω	9 pF/ft	38	53112220
2170824*	24/1pr, 7 wire	PVC	UL/CSA CMG	.315	150 Ω ± 15 Ω	9 pF/ft	37	53112220
Stationary: Fast Connect								
2170820	22/1pr	PVC	UL/CSA CMG	.315	150 Ω ± 15 Ω	9 pF/ft	56	53112220
Stationary: Fast Connect, FRNC								
2170853	22/1pr	Halogen-free PUR	UL/CSA CMG	.315	150 Ω ± 15 Ω	9 pF/ft	50	53112220

* For applications where vibrations occur

UNITRONIC® BUS PB FD & PB Torsion

For BUS-Systems PROFIBUS-DP/FMS/FIP, Continuous Flex & Torsion Applications, 150 Ω



Technical Data:

Minimum Bend Radius:
Continuous Flex: 15 x cable diameter
Torsion:
- for flexible use: 15 x cable diameter
- for stationary use: 4 x cable diameter

Temperature Range:
Continuous Flex: -30°C to +70°C
Torsion:
- Operating: -25°C to +75°C
- Storage: -40°C to +80°C

Nominal Voltage:
- for continuous flexing: 250V
- for torsional use: 300V

Color Code: Red/Green pair

Approvals:

- Continuous Flex:
UL: - CMX
CSA: - CMX
- Torsion:
UL: - CMX

Construction: Continuous Flex

Conductors: Stranded bare copper

Insulation: Polyethylene

Shielding: Specially designed foil/tinned copper braid

Jacket: PUR

Construction: Torsion

Conductors: Stranded bare copper

Insulation: Polyethylene

Shielding: Specially designed foil/tinned copper braid

Jacket: Halogen-free PUR

UNITRONIC® BUS PB FD: Continuous Flex Applications

Part Number	Jacket	Conductor Description	Maximum Outer Diameter (in.)	Impedance	Nominal Capacitance	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Continuous Flex: Fast Connect							
2170322	PUR	22/1pr	.315	150 Ω ± 15 Ω	9 pF/ft	53	53112220

UNITRONIC® BUS PB Torsion: Torsion Applications ± 180°/m

Part Number	Jacket	Conductor Description	Maximum Outer Diameter (in.)	Impedance	Nominal Capacitance	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Torsion Flex							
2170332	PUR	22/1pr	.315	150 Ω ± 15 Ω	9 pF/ft	44	53112220

Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.

LAPP KABEL STUTTGART UNITRONIC® BUS CAN



Construction: Stationary

Conductors: 7-wire strands of bare copper

Insulation: Polyethylene

Shielding: Foil wrap; tinned copper braid shield

Jacket: Violet PVC



Rate Table (ISO 11898 Recommendations)

Distance in meters	AWG	Max. Rate
0 to 40	22	1 Mbps @ 40m
40 to 300	22, 20	500 kbps @ 100m
300 to 600	20	100 kbps @ 500m
600 to 1000	18	50 kbps @ 1km

Technical Data:

	Minimum Bend Radius:	8 x cable diameter		Color Code:	DIN 47100 Pair 1: White + Brown Pair 2: Green + Yellow
	Temperature Range:	-30°C to +80°C			
	Nominal Voltage:	250V		Approvals:	UL: - CMX Canada: - CMX
	Characteristic Impedance:	120 Ω ± 15 Ω			

Part Number	Conductor Description	Nominal Outer Diameter (in.)	Nominal Capacitance (800 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170260	24 / 1pr	0.224	12 pF/ft	28	53112220
2170261	24 / 2pr	0.299	12 pF/ft	46	53112220
2170263	22 / 1pr	0.268	12 pF/ft	37	53112220
2170264	22 / 2pr	0.335	12 pF/ft	59	53112220
2170266	20 / 1pr	0.295	12 pF/ft	60	53112220
2170267	20 / 2pr	0.382	12 pF/ft	71	53112230
2170269	19 / 1pr	0.343	12 pF/ft	73	53112220
2170270	19 / 2pr	0.453	12 pF/ft	95	53112230

LAPP KABEL STUTTGART UNITRONIC® BUS CAN FD P



Construction: Continuous Flex

Conductors: Fine wire strands of bare copper

Insulation: Polyethylene

Shielding: Foil wrap; tinned copper braid shield

Jacket: Violet halogen-free PUR



Rate Table (ISO 11898 Recommendations)

Distance in meters	AWG	Max. Rate
0 to 40	22	1 Mbps @ 40m
40 to 300	22, 20	500 kbps @ 100m
300 to 600	20	100 kbps @ 500m
600 to 1000	18	50 kbps @ 1km

Technical Data:

	Minimum Bend Radius:	15 x cable diameter		Characteristic Impedance:	120 Ω ± 15 Ω
	Temperature Range:	-40°C to +80°C		Color Code:	DIN 47100; Pair 1: White + Brown, Pair 2: Green + Yellow
	- for installation:	-30°C to +70°C			
	- for continuous flexing:	-30°C to +70°C			
	Nominal Voltage:	250V		Approvals:	UL: - CMX Canada: - CMX

Part Number	Conductor Description	Nominal Outer Diameter (in.)	Nominal Capacitance (800 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170272	24 / 1pr	0.252	18 pF/ft	27	53112220
2170273	24 / 2pr	0.331	18 pF/ft	44	53112220
2170275	22 / 1pr	0.268	18 pF/ft	40	53112230
2170276	22 / 2pr	0.378	18 pF/ft	59	53112220
2170278	20 / 1pr	0.315	18 pF/ft	50	53112230
2170279	20 / 2pr	0.425	18 pF/ft	67	53112230

SKINTOP® sizing assumes minimal OD variance.

UNITRONIC® BUS LD & LD FD P

For BUS Systems RS485/RS223, Stationary & Continuous Flex Applications, 100-120 Ω



Technical Data:

	Minimum Bend Radius:	
	Stationary:	8 x cable diameter
	Continuous Flex:	
	- for installation	6 x cable diameter
	- for flexible use:	15 x cable diameter

	Temperature Range:	
	Stationary:	
	- for stationary use:	-40°C to +80°C
	Continuous Flex:	
	- for installation:	-40°C to +80°C
	- for flexible use:	-30°C to +70°C

	Nominal Voltage:	250V
	Characteristic Impedance:	100 Ω - 120 Ω
	Color Code:	DIN 47100 Pair 1: White + Brown Pair 2: Green + Yellow Pair 3: Gray + Pink

UNITRONIC® BUS LD: Stationary Applications

Part Number	Approval	Conductor Description	Nominal Outer Diameter (in.)	Nominal Capacitance (800 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170203	-	24/1pr	.224	18 pF/ft	25	53112210
2170204	-	24/2pr	.280	18 pF/ft	30	53112210
2170205	-	24/3pr	.283	18 pF/ft	48	53112210
2170803	UL/CSA CMX	24/1pr	.224	18 pF/ft	26	53112210

UNITRONIC® BUS LD FD P: Continuous Flex Applications

Part Number	Approval	Conductor Description	Nominal Outer Diameter (in.)	Nominal Capacitance (800 Hz)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170213	-	24/1pr	.236	18 pF/ft	26	53112210
2170214	-	24/2pr	.311	18 pF/ft	44	53112220
2170215	-	24/3pr	.315	18 pF/ft	52	53112220
2170813	UL/CSA CMX	24/1pr	.244	18 pF/ft	26	53112210
2170815	UL/CSA CMX	24/3pr	.331	18 pF/ft	52	53112220

UNITRONIC® SENSOR

Multi-Conductor Unshielded 300V PUR, Continuous Flex Communication Cable



Construction:

Conductors: Super fine stranded bare copper
Insulation: Polypropylene
Jacket: Halogen-free black PUR

Technical Data:

	Minimum Bend Radius:	5 x cable diameter
	Temperature Range:	
	- for stationary use:	-40°C to +80°C
	- for flexible use:	-15°C to +80°C

	Color Code:	
	- 7038864:	1-Brown, 2-Blue, 3-Black
	- 7038865:	1-Brown, 2-White, 3-Blue, 4-Black
	- 7038866 & 7038867:	1-Brown, 2-White, 3-Blue, 4-Black, 5-Gray
	- 7038868:	1-White, 2-Brown, 3-Green, 4-Yellow, 5-Gray, 6-Pink, 7-Blue, 8-Red

	Approvals:	
	UL:	- AWM 20549

Part Number	Number of Conductors (incl. ground)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)
24 AWG (0.25 mm²)			
7038867	5	.185	23
7038868	8	.232	34
22 AWG (0.34 mm²)			
7038864	3	.181	20
7038865	4	.185	27
7038866	5	.201	30



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® Flex CAT.5

LAPP KABEL STUTTGART ETHERLINE® FD P CAT.5 2x2xAWG22/19

Construction:

Conductors: Solid or stranded copper

Insulation: PE

Shielding: Foil and braid

Jacket: PVC, PUR, or halogen-free



Technical Data:

- Minimum Bend Radius:
- for stationary use: 5 x cable diameter
 - for flexible use: 5 x cable diameter
 - for continuous flexing: 15 x cable diameter

- Temperature Range:
- for stationary use: -40°C to +70°C
 - for flexible use: -30°C to +70°C
 - for continuous flexing: -20°C to +70°C

- Characteristic Impedance: 100 Ω ± 15 Ω
- Color Code:
- Pair 1: White/Orange & Orange
 - Pair 2: White/Green & Green
 - PROFINET Conform: White, Yellow, Blue, Orange

- Approvals:
- UL: - CMG (2170886 & 2170893)
- CMX (2170894)
- Canada: - CMG (2170886 & 2170893)
- CMX (2170894)

Part Number	Description	Category	Jacket Color	Conductor Description (AWG/pairs)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Stationary							
2170893*	PVC, Fast Connect, UL/CSA (CMG), 600V	CAT.5	Green	22/2pr (solid)	.256	47	53112210
Flexing							
2170284**	PUR	CAT.5e	Teal	26/2pr (7wire)	.228	30	53112210
2170283**	Halogen-free	CAT.5e	Teal	26/2pr (7wire)	.213	29	53112210
2170886*	PVC, Fast Connect, UL/CSA (CMG), 600V	CAT.5	Green	22/2pr (7wire)	.256	45	53112210
Continuous Flex							
2170289**	PUR, Fast Connect	CAT.5e	Teal	26/2pr (19wire)	.240	32	53112210
2170894*	PUR, Fast Connect, UL/CSA (CMX)	CAT.5	Green	22/2pr (19wire)	.256	42	53112210

* PROFINET Conform

** Max. cable run: 196 ft/60m



ETHERLINE® TORSION CAT.5

Industrial Ethernet Cable Suitable for Torsion Stress, PROFINET Conform

LAPP KABEL STUTTGART ETHERLINE® TORSION CAT.5

Construction:

Conductors: Stranded tinned copper

Insulation: Foamed PE

Shielding: Tape and braid

Jacket: Halogen-free PUR



Technical Data:

- Minimum Bend Radius: 5 x cable diameter
- Color Code: White, Yellow, Blue, Orange

- Temperature Range: -40°C to +80°C

- Nominal Voltage: 100V peak not for power
- Approvals: UL: - AWM 21161

- Characteristic Impedance: 100 Ω ± 15 Ω

Industrial Ethernet cables suitable for Torsion Stress, PROFINET-conform

Part Number	Description	Category	Jacket Color	Conductor Description (AWG/pairs)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170888*	TORSION UL (AWM)	CAT.5	Green	22/2pr (19wire)	.256	35	53112210

* Can be used in drip loop



ETHERLINE® 4 Pair: CAT.5e

Industrial Ethernet Cables for Stationary, Flexing & Continuous Flex Applications



LAPP KABEL STUTTGART ETHERLINE® P Flex CAT.5e



Technical Data:

	Minimum Bend Radius: - for stationary use: 5 x cable diameter - for flexible use: 10 x cable diameter		Characteristic Impedance: 100 Ω ± 15 Ω
	Temperature Range: - for stationary use: -30°C to +80°C - for flexible use: -5°C to +70°C		Color Code: White/Blue & Blue White/Orange & Orange White/Green & Green White/Brown & Brown

Construction:

Conductors: Solid or stranded bare copper
Insulation: PE
Shielding: Foil and braid
Jacket: Teal PUR or halogen-free

Part Number	Jacket Material	Conductor Description (AWG/pairs)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
Stationary					
2170297	PUR	24/4pr (solid)	.248	42	53112210
2170296	Halogen-free	24/4pr (solid)	.248	36	53112210
Flexing					
2170300*	PUR	26/4pr (7wire)	.240	36	53112210
2170299*	Halogen-free	26/4pr (7wire)	.240	32	53112210
Continuous Flex					
2170489*	PUR	26/4pr (19wire)	.248	36	53112210

* Max. cable run: 196 ft/60m



ETHERLINE® 4 Pair: CAT.6

Industrial Ethernet Cable for Continuous Flex Applications



Technical Data:

	Minimum Bend Radius: - for stationary use: 7.5 x cable diameter - for flexible use: 4 x cable diameter		Characteristic Impedance: 100 Ω ± 15 Ω		Approvals: UL: - CMX Canada: - CMX
	Temperature Range: - for stationary use: -40°C to +80°C - for flexible use: -30°C to +70°C		Color Code: White & Blue White & Orange White & Green White & Brown		

Construction:

Conductors: Stranded tinned copper
Shielding: Foil and braid
Insulation: Polypropylene
Jacket: Green halogen-free PUR

Part Number	Jacket Material	Conductor Description (AWG/pairs)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170488*	PUR	26/4pr (19wire)	.307	42	53112220

* Max. cable run: 196 ft/60m



ETHERLINE® 4 Pair: CAT.6a/CAT.7

Industrial Ethernet Cables for Stationary Applications



Technical Data:

	Minimum Bend Radius: 10 x cable diameter		Color Code: White/Blue & Blue White/Orange & Orange White/Green & Green White/Brown & Brown
	Temperature Range: -40°C to +80°C		
	Characteristic Impedance: 100 Ω ± 15 Ω		

Construction:

Conductors: Solid bare copper
Insulation: PE

Shielding: Pairs are individually screened with metal tape; overall copper braid
Jacket: Green PVC or PUR

Part Number	Category	Jacket Material	Conductor Description (AWG/pairs)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
2170465	CAT.6a	PUR	22/4pr (solid)	.343	61	53112220
2170475	CAT.7	PUR	22/4pr (solid)	.343	61	53112220
2170464	CAT.6a	PVC	22/4pr (solid)	.343	66	53112220
2170474	CAT.7	PVC	22/4pr (solid)	.343	66	53112220

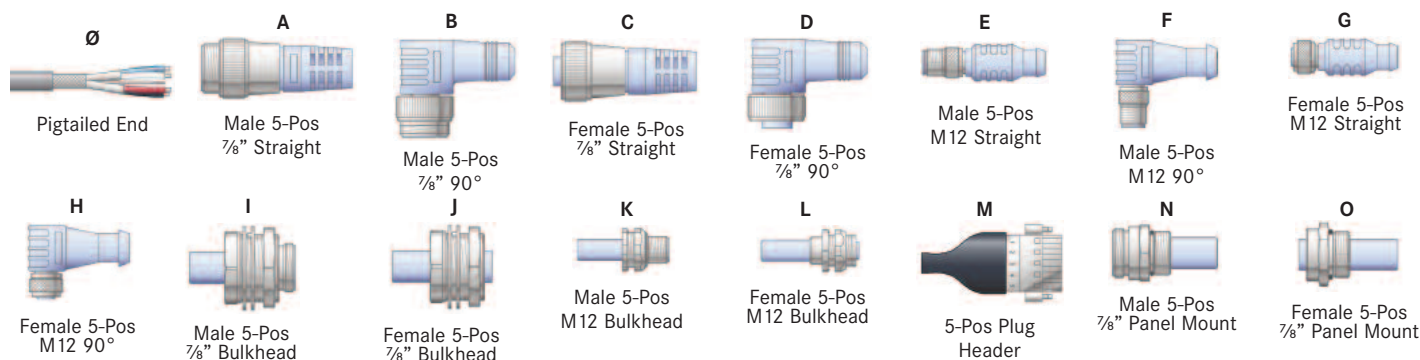


Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.

Cordsets

Part numbers for cordsets terminated with connectors A–O listed below.
Replace “@” with “S” for Stationary cable or “F” for Flexible cable.
Replace “x” with the desired cable length in meters. For maximum length, see Rate table on page 28. Standard lengths are 1m, 2m, 3m, 5m, & 10m.

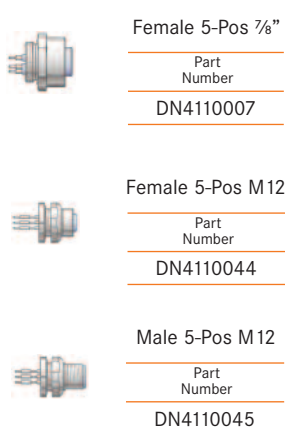
* Assemblies are made using raw UNITRONIC® BUS DeviceNet cable P/N 4001 (Stationary) or 6001 (Flexing), pg. 28 (THICK)
** Assemblies are made using raw UNITRONIC® BUS DeviceNet cable P/N 4002 (Stationary) or 6002 (Flexing), pg. 28 (THIN)



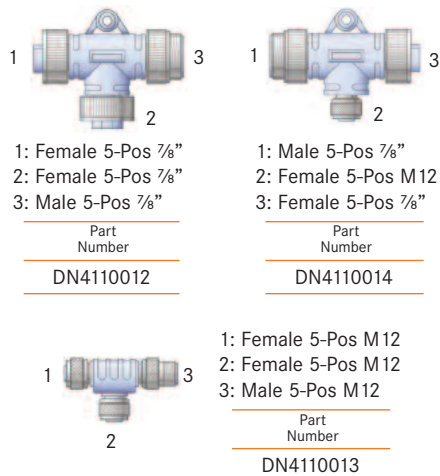
End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2
Ø	A	Ø	N	A	L	C	C	D	G	E	L	G	K
DN4110001@-xM*		DN4110005@-xM*		DN4110091@-xM**		DN4110055@-xM*		DN4110066@-xM**		DN4110037@-xM**		DN4110035@-xM**	
Ø	B	Ø	O	A	M	C	D	D	H	E	M	G	L
DN4110002@-xM*		DN4110006@-xM*		DN4110046@-xM*		DN4110056@-xM*		DN4110069@-xM**		DN4110048@-xM**		DN4110095@-xM**	
Ø	C	A	A	B	B	C	E	D	I	F	F	H	H
DN4110003@-xM*		DN4110052@-xM*		DN4110054@-xM*		DN4110031@-xM**		DN4110016@-xM*		DN4110064@-xM**		DN4110071@-xM**	
Ø	D	A	B	B	C	C	F	D	J	F	G	H	I
DN4110004@-xM*		DN4110053@-xM*		DN4110010@-xM*		DN4110032@-xM**		DN4110079@-xM*		DN4110025@-xM**		DN4110077@-xM**	
Ø	E	A	C	B	D	C	G	D	K	F	H	H	J
DN4110019@-xM**		DN4110008@-xM*		DN4110011@-xM*		DN4110065@-xM**		DN4110088@-xM**		DN4110026@-xM**		DN4110083@-xM**	
Ø	F	A	D	B	E	C	H	D	L	F	I	H	K
DN4110020@-xM**		DN4110009@-xM*		DN4110059@-xM**		DN4110068@-xM**		DN4110094@-xM**		DN4110075@-xM*		DN4110036@-xM**	
Ø	G	A	E	B	F	C	I	E	E	F	J	H	L
DN4110021@-xM**		DN4110058@-xM**		DN4110062@-xM**		DN4110015@-xM*		DN4110060@-xM**		DN4110081@-xM*		DN4110096@-xM**	
Ø	H	A	F	B	G	C	J	E	F	F	K	I	M
DN4110022@-xM**		DN4110061@-xM**		DN4110029@-xM**		DN4110078@-xM*		DN4110063@-xM**		DN4110090@-xM**		DN4110050@-xM**	
Ø	I	A	G	B	H	C	K	E	G	F	L	K	M
DN4110097@-xM*		DN4110027@-xM**		DN4110030@-xM**		DN4110087@-xM**		DN4110023@-xM**		DN4110038@-xM**		DN4110049@-xM**	
Ø	J	A	H	B	I	C	L	E	H	G	G		
DN4110098@-xM*		DN4110028@-xM**		DN4110073@-xM*		DN4110093@-xM**		DN4110024@-xM**		DN4110067@-xM**			
Ø	K	A	I	B	J	D	D	E	I	G	H		
DN4110040@-xM**		DN4110072@-xM*		DN4110018@-xM*		DN4110057@-xM*		DN4110074@-xM*		DN4110070@-xM**			
Ø	L	A	J	B	K	D	E	E	J	G	I		
DN4110039@-xM**		DN4110017@-xM*		DN4110086@-xM**		DN4110033@-xM**		DN4110080@-xM*		DN4110076@-xM**			
Ø	M	A	K	B	L	D	F	E	K	G	J		
DN4110047@-xM*		DN4110085@-xM**		DN4110092@-xM**		DN4110034@-xM**		DN4110089@-xM**		DN4110082@-xM**			

Field Wireable Connectors

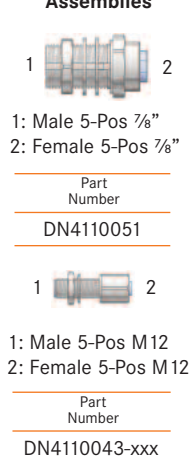
PCB Connections



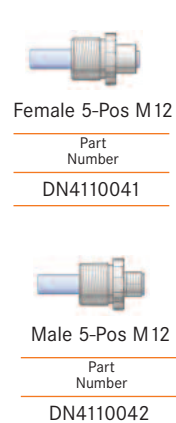
Bus Drop Tees



Feed-Through Assemblies



Special Receptacles



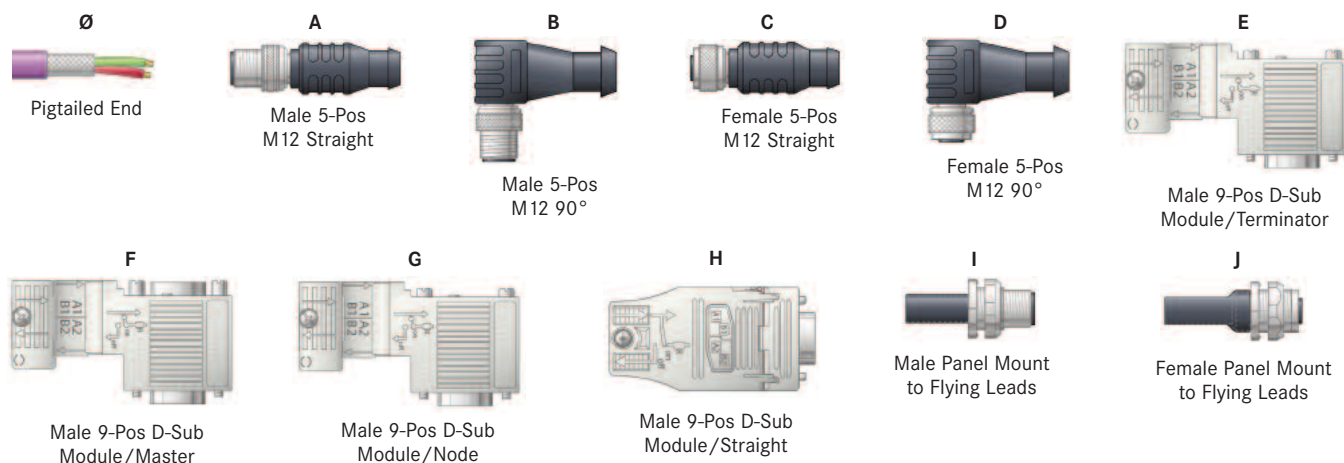
 Male 5-Pos 7/8" Straight		 Female 5-Pos 7/8" Straight		 Male 5-Pos M12 90°		 Female 5-Pos M12 90°		 Male 5-Pos M12 Straight		 Female 5-Pos M12 Straight	
Cable Diameter	Part Number	Cable Diameter	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
10-12 mm	DN4110150	10-12 mm	DN4110152	DN4110155	DN4110154	DN4110157	DN4110156	DN4110157	DN4110156	DN4110157	DN4110156
12-14 mm	DN4110151	12-14 mm	DN4110153								

Cordsets & Field Wireable Connectors for PROFIBUS

Cordsets

Part numbers for cordsets terminated with connectors A-J listed below. Replace "x" with the desired cable length in meters. For maximum length, see Rate table on page 29. Standard lengths are 1m, 3m, 5m, & 10m.

Replace "@" with "S" for Stationary cable or "F" for Flexible cable. Assemblies are made using UNITRONIC® BUS PROFIBUS cable. P/N 2170219 (Stationary) and 2170322 (Flexing), pg. 29



End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2	End 1	End 2
Ø	A	Ø	I	A	G	B	G	C	G	D	G	B & B	G
PB4110100@-xM	PB4110119-xM	PB4110145@-xM	PB4110146@-xM	PB4110147@-xM	PB4110148@-xM	PB4110109@-xM							
Ø	B	Ø	J	A	H	B	H	C	H	D	H	B & B	H
PB4110101@-xM	PB4110120-xM	PB4110152@-xM	PB4110153@-xM	PB4110154@-xM	PB4110155@-xM	PB4110160@-xM							
Ø	C	A	A	B	A	C	A	D	A	A & B	G	C & C	G
PB4110102@-xM	PB4110128@-xM	PB4110129@-xM	PB4110104@-xM	PB4110105@-xM	PB4110149@-xM	PB4110110@-xM							
Ø	D	A	B	B	B	C	B	D	B	A & B	H	C & C	H
PB4110103@-xM	PB4110130@-xM	PB4110131@-xM	PB4110106@-xM	PB4110107@-xM	PB4110156@-xM	PB4110161@-xM							
Ø	E	A	C	B	C	C	C	D	C	C & D	G	D & D	G
PB4110140@-xM	PB4110132@-xM	PB4110133@-xM	PB4110134@-xM	PB4110135@-xM	PB4110150@-xM	PB4110111@-xM							
Ø	F	A	D	B	D	C	D	D	D	C & D	H	D & D	H
PB4110118@-xM	PB4110136@-xM	PB4110137@-xM	PB4110138@-xM	PB4110139@-xM	PB4110157@-xM	PB4110162@-xM							
Ø	G	A	E	B	E	C	E	D	E	A & A	G	A & C	G
PB4110117@-xM	PB4110141@-xM	PB4110142@-xM	PB4110143@-xM	PB4110144@-xM	PB4110108@-xM	PB4110112@-xM							
Ø	H	A	F	B	F	C	F	D	F	A & A	H	A & C	H
PB4110151@-xM	PB4110113@-xM	PB4110114@-xM	PB4110115@-xM	PB4110116@-xM	PB4110158@-xM	PB4110163@-xM							

Field Wireable Connectors

Terminating Resistors



Male 5-Pos M12

Part Number

PB4110121

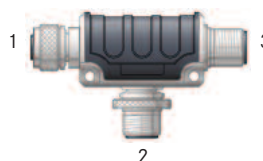


Female 5-Pos M12

Part Number

PB4110122

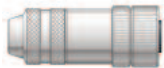
Bus Tee



- 1: Female 5-Pos M12
- 2: Male 5-Pos M12
- 3: Male 5-Pos M12

Part Number

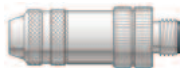
PB4110123



Female 5-Pos M12

Part
Number

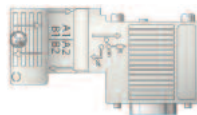
PB4110124



Male 5-Pos M12

Part
Number

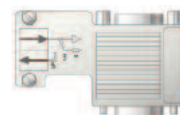
PB4110125



Male DB9

Part
Number

PB4110126



Male 2XDB9

Part
Number

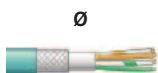
PB4110127

Cordsets

Part numbers for cordsets terminated with connectors A-J listed below.
Replace “@” with “S” for Stationary cable or “F” for Flexible cable.
Replace “x” with the desired cable length in meters.
Standard lengths are 1m, 3m, 5m, & 10m. Maximum length is 100m.

* Assemblies are made using ETHERLINE® 4 Pair CAT.5e Ethernet cable P/N 2170300 (Stationary) or 2170489 (Flexing), pg. 33

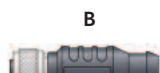
** Assemblies are made using ETHERLINE® 2 Pair CAT.5e Ethernet cable P/N 2170284 (Stationary) or 2170289 (Flexing), pg. 32



Pigtailed End



Male 8-Pos
M12 Straight



Female 8-Pos
M12 Straight



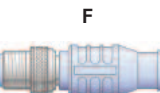
Male 8-Pos
M12 Panel Mount



Female 8-Pos
M12 Panel Mount



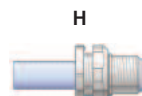
RJ45 8-Wire/
Shielded



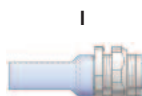
Male 4-Pos
M12/D-Code Straight



Female 4-Pos
M12/D-Code Straight



Male 4-Pos M12/
D-Code Panel Mount



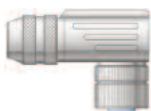
Female 4-Pos M12/
D-Code Panel Mount



RJ45 4-Wire/
Shielded

End 1	End 2	End 1	End 2
Ø	A	A	A
C5E003@-xM*		C5E005@-xM*	
Ø	B	A	B
C5E004@-xM*		C5E007@-xM*	
Ø	C	B	B
C5E010@-xM*		C5E006@-xM*	
Ø	D	E	A
C5E011@-xM*		C5E008@-xM*	
Ø	E	E	B
C5E002@-xM*		C5E009@-xM*	
Ø	F	E	E
C5E103@-xM**		C5E001@-xM*	
Ø	G	F	F
C5E104@-xM**		C5E105@-xM**	
Ø	H	F	G
C5E110@-xM**		C5E107@-xM**	
Ø	I	G	G
C5E111@-xM**		C5E106@-xM**	
Ø	J	J	F
C5E102@-xM**		C5E108@-xM**	
		J	G
		C5E109@-xM**	
		J	J
		C5E101@-xM**	

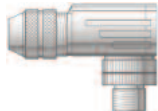
Field Wireable Connectors



Female 4-Pos (D-Code)
M12 90°

Part
Number

C5E204C



Male 4-Pos (D-Code)
M12 90°

Part
Number

C5E205C



Female 8-Pos
M12 Straight

Part
Number

C5E200C



Male 8-Pos
M12 Straight

Part
Number

C5E201C



Female 4-Pos (D-Code)
M12 Straight

Part
Number

C5E202C



Male 4-Pos (D-Code)
M12 Straight

Part
Number

C5E203C



Female M12 Straight
Screw Connector

Part
Number

22260127



Male M8
Straight Connector

Part
Number

22260120



Female M8
Straight Connector

Part
Number

22260124



RJ45 CAT.5
Hirose TM11

Part
Number

CE6321



RJ45 CAT.5
Stewart SS37

Part
Number

CE6323



Field-Terminable
RJ45 CAT.5e FM45

Part
Number

21700540

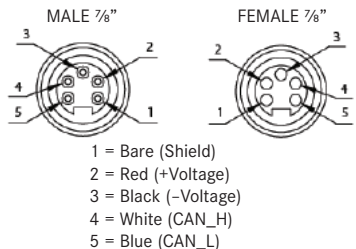


RJ45 CAT.6
Hirose TM21

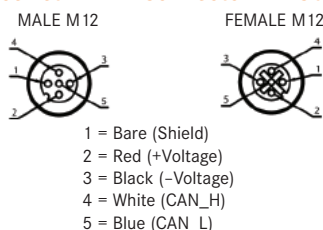
Part
Number

CE6324

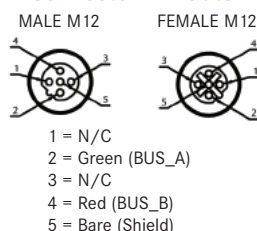
DeviceNet™ 7/8" Connector Pin Outs



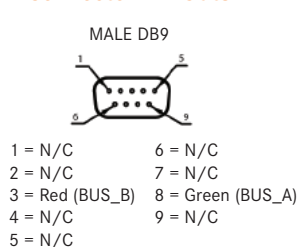
DeviceNet™ M12 Connector Pin Outs



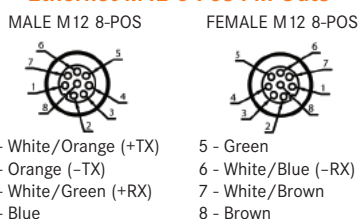
PROFIBUS M12 Connector Pin Outs



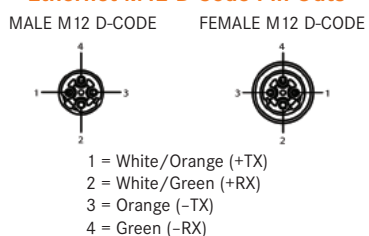
PROFIBUS DB9 Connector Pin Outs



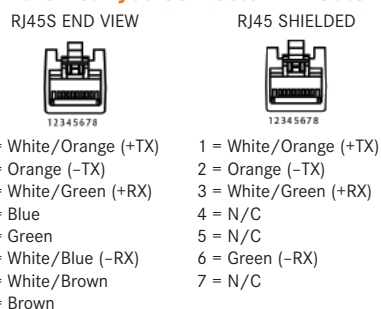
Ethernet M12 8 Pos Pin Outs



Ethernet M12 D-Code Pin Outs



Ethernet RJ45 Connector Pin Outs



Contact Carrier Material/Color:

- DeviceNet™ Cordsets:	Thermoplastic PUR/Blue-Grey
- PROFIBUS Cordsets:	PBT- UL94-VO/Black
- Ethernet Cordsets (RJ45):	Polycarbonate
- Ethernet Cordsets (M12):	Thermoplastic PUR/Black

Molded Head Material/Color:

- DeviceNet™ Cordsets:	Thermoplastic PUR/Blue-Grey*
- PROFIBUS Cordsets:	Thermoplastic PUR/Black*
- Ethernet Cordsets (RJ45):	Thermoplastic PUR/Black*
- Ethernet Cordsets (M12, 8 Pos):	Thermoplastic PUR/Black*
- Ethernet Cordsets (M12, 4 Pos, D-Code):	Thermoplastic PUR/Blue-Grey*

Contact Material/Plating:

- DeviceNet™ Cordsets:	Brass/Gold
- PROFIBUS Cordsets:	Brass/Gold
- Ethernet Cordsets:	Brass/Gold

Coupling Nut Material/Plating:

- DeviceNet™ Cordsets:	Brass/Nickel
- PROFIBUS Cordsets:	Brass/Nickel
- Ethernet Cordsets:	Brass/Nickel

Rated Current (A):

- DeviceNet™ 7/8" Cordsets:	9A
- DeviceNet™ M12 Cordsets:	4A
- PROFIBUS Cordsets:	4A
- Ethernet Cordsets:	1.5A

Rated Voltage (V):

- DeviceNet™ 7/8" Cordsets:	300V
- DeviceNet™ M12 Cordsets:	250V
- PROFIBUS Cordsets:	250V
- Ethernet Cordsets:	42V

Outer Jacket Material/Color:

- DeviceNet™ Cordsets:	PVC/Grey
- PROFIBUS Cordsets:	PVC/Violet
- Ethernet Cordsets:	PUR/Teal

Conductor Insulation Material:

- DeviceNet™ Cordsets:	PE (Data), PVC (Power)
- PROFIBUS Cordsets:	Polyethylene
- Ethernet Cordsets:	FPE

Number of Conductors (AWG):

- DeviceNet™ 7/8" Cordsets:	2x15 AWG, 2x18 AWG, 18 AWG Drain
- DeviceNet™ M12 Cordsets:	2x22 AWG, 2x24 AWG, 22 AWG Drain
- PROFIBUS Cordsets:	2x22 AWG (Shielded Data Pair)
- Ethernet Cordsets (RJ45 Shielded & M12 -D-Code):	2pr x 26 AWG, Stranded CAT.5e
- Ethernet Cordsets M12 8 Pos. & RJ45S):	4pr x 26 AWG, Stranded CAT.5e

Shielding:

- DeviceNet™ Cordsets:	Foil (Pairs), Tinned Copper Braid (Overall)
- PROFIBUS Cordsets:	Foil & Tinned Copper Braid
- Ethernet Cordsets:	Alum Foil & Tinned Copper Braid

Temperature Range:

- DeviceNet™ Cordsets:	-40°C to +75°C
- PROFIBUS M12 Cordsets:	-40°C to +80°C
- PROFIBUS DB9 Cordsets:	-0°C to +60°C
- Ethernet Cordsets:	-20°C to +80°C

Protection Class:

- DeviceNet™ Cordsets:	Meets NEMA 1,3,4,6,13 and IEC IP67
- PROFIBUS M12 Cordsets:	Meets NEMA 1,3,4,6 and IEC IP67
- PROFIBUS DB9 Cordsets:	Meets NEMA 1,3,4,6,13 and IEC IP67 (IP20 (D9S))
- Ethernet Cordsets:	Meets NEMA 1,3,4,6P, and IEC IP68 (RJ45/IP20)

* Colors are typical not standard



UNITRONIC® 300/ 300 S

300V Signal and Control Cable: CMG, PLTC, ITC, Oil Res I

LAPP KABEL STUTTGART UNITRONIC® 300- UL CMG/CSA CMG/CE/RoHS

Unshielded Construction:

Conductors: Finely stranded tinned copper

Insulation: PVC blend

Jacket: UV and Oil resistant PVC

LAPP KABEL STUTTGART UNITRONIC® 300 S- UL CMG/CSA CMG/CE/RoHS

Shielded Construction:

Conductors: Tinned copper conductors with drain wire

Insulation: PVC blend

Shielding: Tri-laminated foil shield and tinned copper braid (75%)

Jacket: UV and Oil resistant PVC



Cable Legend Example:

LAPP KABEL STUTTGART UNITRONIC® 300 P/N 301806 18AWG (1,00MM²)/6C (UL) CMG or ITC or PLTC-ER 105°C OIL RES I SUN RES DIR BUR E216027 or AWM 2464 – CSA CMG or AWM I/II A/B 300V 105°C FT4 CE ROHS

Technical Data:



Minimum Bend Radius:

- for installation: 4 x cable diameter
- with shield: 6 x cable diameter



Approvals:

- UL:
- CMG per UL 444
 - PLTC-ER per UL 13
 - ITC-ER per UL 2250
 - AWM 2464



Temperature Range:

- for continuous flexing: -40°C to +105°C

Attributes:

- UL Oil Res I
- Sunlight Resistant
- Direct Burial



Nominal Voltage:

300V

Canada:

- CSA AWM I/II AB FT4
- c(UL) CMG FT4



Color Code:

- 28 - 22 AWG: Chart 4, page 46
- 20 - 16 AWG: Chart 5, page 46

UNITRONIC® 300

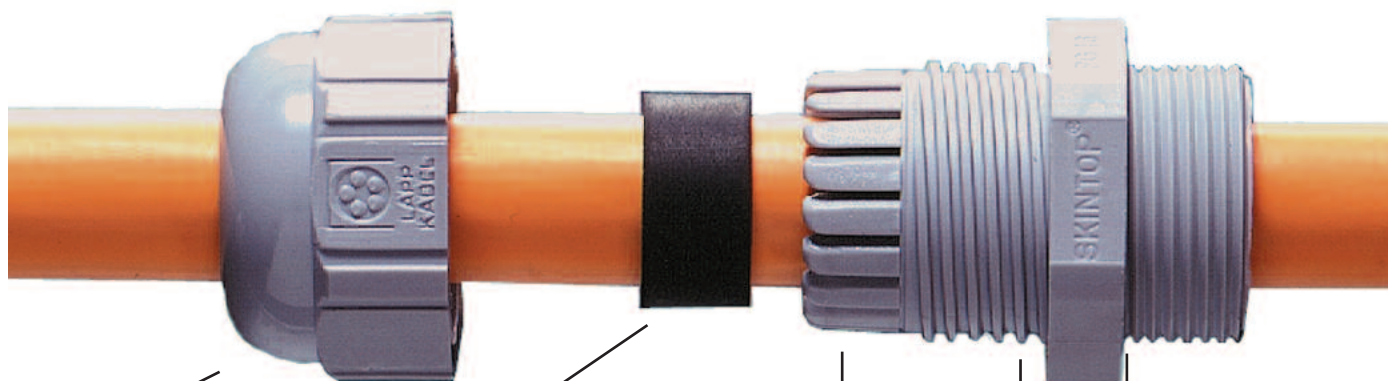
Part Number	Size	Number of Conductors (incl. ground)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® PG Non-Metallic Gray (pg. 40)	Part Number	Size	Number of Conductors (incl. ground)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® PG Non-Metallic Gray (pg. 40)
302404	24 AWG	4	.183	18	S1207	302003	20 AWG	3	.237	40	S1107
302408	24 AWG	8	.223	28	S1107	302004	20 AWG	4	.256	50	S1109
302410	24 AWG	10	.253	34	S1109	302008	20 AWG	8	.331	90	S1111
302202	22 AWG	2	.179	15	S1207	302010	20 AWG	10	.381	96	S1113
302203	22 AWG	3	.187	19	S1107	302015	20 AWG	15	.452	120	S1113
302204	22 AWG	4	.200	22	S1107	301802	18 AWG	2	.243	41	S1109
302208	22 AWG	8	.245	37	S1109	301803	18 AWG	3	.256	43	S1109
302210	22 AWG	10	.289	45	S1111	301804	18 AWG	4	.287	53	S1109
302215	22 AWG	15	.324	61	S1111	301602	16 AWG	2	.265	56	S1109
302225	22 AWG	25	.414	95	S1113	301604	16 AWG	4	.314	74	S1111
302002	20 AWG	2	.225	38	S1107						

UNITRONIC® 300 S: Foil & Braid Shielded

Part Number	Size	Number of Conductors (incl. ground)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)	Part Number	Size	Number of Conductors (incl. ground)	Nominal Outer Diameter (in.)	Approx. Weight (lbs/mft)	SKINTOP® MS-SC (pg. 42)
302402S	24 AWG	2	.192	20	53112210	302006S	20 AWG	6	.335	80	53112220
302403S	24 AWG	3	.199	22	53112210	302008S	20 AWG	8	.358	107	53112220
302404S	24 AWG	4	.210	25	53112210	302010S	20 AWG	10	.408	115	53112230
302406S	24 AWG	6	.236	32	53112210	302015S	20 AWG	15	.485	144	53112220
302202S	22 AWG	2	.206	23	53112210	301802S	18 AWG	2	.270	54	53112210
302203S	22 AWG	3	.214	27	53112210	301803S	18 AWG	3	.283	58	53112210
302204S	22 AWG	4	.227	31	53112210	301804S	18 AWG	4	.314	69	53112220
302206S	22 AWG	6	.256	41	53112210	301806S	18 AWG	6	.362	88	53112220
302208S	22 AWG	8	.272	48	53112210	301808S	18 AWG	8	.387	114	53112230
302210S	22 AWG	10	.316	58	53112220	301810S	18 AWG	10	.470	154	53112240
302220S	22 AWG	20	.382	94	53112230	301815S	18 AWG	15	.527	197	53112240
302225S	22 AWG	25	.447	117	53112240	301602S	16 AWG	2	.292	74	53112220
302002S	20 AWG	2	.252	49	53112210	301603S	16 AWG	3	.317	78	53112220
302004S	20 AWG	4	.283	62	53112210	301604S	16 AWG	4	.341	93	53112220

Additional configurations available, please see full line catalog or visit our website. SKINTOP® sizing assumes minimal OD variance.





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

Neoprene sealing for a hermetic seal (IP68)*. Every SKINTOP® version is available with reducing seal insert for smaller cable diameters.

Lamellar design for optimum strain relief and protection of the cable. Widely variable clamping range, therefore only a few gland sizes are necessary.

Integral sealing ridges for a water tight junction with the housing.

Multiple trapezoidal thread for secure and instant assembly.

Shown here are the carefully matched components of the SKINTOP® screw-type cable glands. It is precisely these parts which guarantee optimum reliability.

Even more:

With SKINTOP® you can install the cable in an instant. Just feed it in, turn nut until tight - ready. 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: Stationary: -40°C to +100°C
Dynamic: -20°C to +100°C

Chemical: +Alcohols

+ = resistant
o = with limited resistance
- = non-resistant

+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
+Trichlorethylene

Testing:

SKINTOP®
Incandescent wire test to IEC 695, Part 2-1
Test Temperature 750°C
Strain relief to DIN VDE 0619
Protection Class IP 68,
Test to DIN 40050 and 40052

International Approvals:

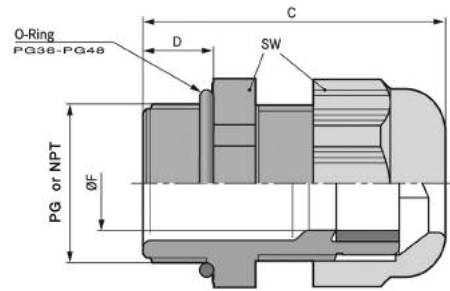
UL #E146370
CSA #LR50370-10
VDE #57986 (Metric)
SEV #100989

* All IP ratings are dependent on proper installation by the user.



SKINTOP® SLN/ SLRN & SL/ SLR

Liquid-Tight, Vibration-Proof, Strain Relief Cable Gland with NPT or PG Threads



PG Only



Technical Data:



Materials:

- Body: Polyamide
- Bushing: CR
- Locknuts: Polyamide



Protection: 70 PSI

- Seal: IP 68, 5 Bar
(Exceeds NEMA 6/ 6P
Pressure rating)



Color:

- Black (RAL 9005) UV-Resistant
- Gray (RAL 7001)



Temperature:

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

NOTES:

1. NPT glands do not come with locknuts.
2. Orders of 2000 pieces or more per item will be bulk packaged unless otherwise requested.
3. UL Status: R = Recognized; L = Listed

SKINTOP® SLN: NPT Threads

Part Number		Thread Type & Size	UL Status	Clamping Range ØF inches	SW Wrenching Flats inches	C Overall Length inches	D Thread Length inches	Standard Pack Size	Weight 100 pcs. lbs.
Black	Gray								
S2138	S1138	NPT-3/8"	R	.138 - 0.315	0.748	1.693	.591	100	2.00
S2112	S1112	NPT-1/2"	L	.197 - 0.472	0.945	1.772	.591	100	2.50
S2134	S1134	NPT-3/4"	L	.512 - 0.709	1.299	2.087	.591	50	5.50
S2101	S1101	NPT-1"	L	.748 - 1.000	1.654	2.362	.591	25	9.00

SKINTOP® SLRN: NPT Threads with Reducer Bushing

Part Number		Thread Type & Size	UL Status	Clamping Range ØF inches	SW Wrenching Flats inches	C Overall Length inches	D Thread Length inches	Standard Pack Size	Weight 100 pcs. lbs.
Black	Gray								
S2238	S1238	NPT-3/8"	R	.079 - 0.236	0.748	1.693	.591	100	2.00
S2212	S1212	NPT-1/2"	L	.157 - 0.354	0.945	1.772	.591	100	2.50
S2234	S1234	NPT-3/4"	L	.354 - 0.630	1.299	2.087	.591	50	5.50
S2201	S1201	NPT-1"	L	.551 - 0.827	1.654	2.362	.591	25	9.00

SKINTOP® SL: PG Threads

Part Number		Thread Type & Size	UL Status	Clamping Range ØF inches	SW Wrenching Flats inches	C Overall Length inches	D Thread Length inches	Standard Pack Size	Weight 100 pcs. lbs.
Black	Gray								
S2107	S1107	PG-7	R	0.098 - 0.256	0.591	1.260	.315	100	1.00
S2109	S1109	PG-9	R	0.138 - 0.315	0.748	1.417	.315	100	1.50
S2111	S1111	PG-11	R	0.157 - 0.394	0.866	1.496	.315	100	2.00
S2113	S1113	PG-13	L	0.236 - 0.472	0.945	1.614	.354	100	2.50
S2116	S1116	PG-16	L	0.354 - 0.551	1.063	1.732	.394	50	3.00
S2121	S1121	PG-21	L	0.512 - 0.709	1.299	1.929	.433	50	5.00
S2129	S1129	PG-29	R	0.551 - 0.984	1.654	2.205	.433	25	8.50
S2136	S1136	PG-36	L	0.945 - 1.260	2.087	2.598	.512	10	17.50
S2142	S1142	PG-42	R	1.378 - 1.496	2.362	2.677	.512	5	24.00
S2148	S1148	PG-48	L	1.535 - 1.732	2.559	2.717	.551	5	29.00

SKINTOP® SLR: PG Threads with Reducer Bushing

Part Number		Thread Type & Size	UL Status	Clamping Range ØF inches	SW Wrenching Flats inches	C Overall Length inches	D Thread Length inches	Standard Pack Size	Weight 100 pcs. lbs.
Black	Gray								
S2207	S1207	PG-7	R	0.059 - 0.197	0.591	1.260	.315	100	1.00
S2209	S1209	PG-9	R	0.079 - 0.236	0.748	1.417	.315	100	1.50
S2211	S1211	PG-11	R	0.079 - 0.276	0.866	1.496	.315	100	2.00
S2213	S1213	PG-13	L	0.157 - 0.354	0.945	1.614	.354	100	2.50
S2216	S1216	PG-16	L	0.236 - 0.472	1.063	1.732	.394	50	3.00
S2221	S1221	PG-21	L	0.354 - 0.630	1.299	1.929	.433	50	5.00
S2229	S1229	PG-29	R	0.433 - 0.787	1.654	2.205	.433	25	8.50
S2236	S1236	PG-36	L	0.669 - 1.024	2.087	2.598	.512	10	17.50
S2242	S1242	PG-42	R	0.866 - 1.220	2.362	2.677	.512	5	24.00
S2248	S1248	PG-48	L	1.024 - 1.378	2.559	2.717	.551	5	29.00

Additional configurations available, please see full line catalog or visit our website.

SKINTOP® CLICK

Liquid-Tight, Non-Metallic Strain Relief with “Quick Click” Insertion System



SKINTOP® CLICK Disassembly Tool



Technical Data:



Materials:
- Body: Special polyamide
- Seal: Special elastomer



Color: Black (RAL 9005), UV-Resistant
Gray (RAL 7001)



Protection:
- M12: IP 68, 4 bar
- M16-M32: IP 68, 5 bar



Temperature Range: -20°C to +100°C

SKINTOP® CLICK: Liquid Tight, Non-Metallic Strain Relief with Metric Threads

Part Number Black	Part Number Gray	Thread Type & Size	UL Status	Clamping Range øF inches	SW1/ SW2 Wrenching Flats inches	C Overall Length inches	D Thread Length inches	M Hole inches	S Wall Thickness inches	Standard Pack Size*
53112923	53112921	M-12	R	.138 - .276	0.591/0.709	1.575	0.315	0.484 (-.008)	.039 - .157	50
53112882	53112876	M-16	R	.197 - .354	0.748/0.866	1.654	0.315	0.642 (-.008)	.039 - .157	50
53112883	53112877	M-20	L	.276 - .512	0.984/1.063	1.791	0.315	0.799 (-.008)	.039 - .157	25
53112884	53112878	M-25	L	.354 - .669	1.181/1.339	1.909	0.315	0.996 (-.008)	.039 - .157	25
53112924	53112922	M-32	L	.433 - .827	1.417/1.575	2.165	0.315	1.272 (-.008)	.039 - .157	25

SKINTOP® CLICK-R: Liquid Tight, Non-Metallic Strain Relief with Reducer Bushing & Metric Threads

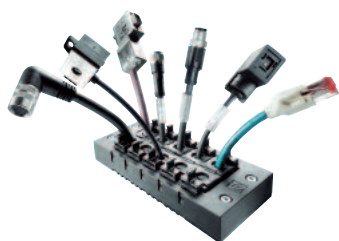
Part Number Black	Part Number Gray	Thread Type & Size	UL Status	Clamping Range øF inches	SW1/ SW2 Wrenching Flats inches	C Overall Length inches	D Thread Length inches	M Hole inches	S Wall Thickness inches	Standard Pack Size*
53112929	53112927	M-12	R	.039 - .197	0.591/0.709	1.575	0.315	0.484 (-.008)	.039 - .157	50
53112885	53112879	M-16	R	.157 - .276	0.748/0.866	1.654	0.315	0.642 (-.008)	.039 - .157	50
53112886	53112880	M-20	L	.197 - .394	0.984/1.063	1.791	0.315	0.799 (-.008)	.039 - .157	25
53112887	53112881	M-25	L	.236 - .512	1.181/1.339	1.909	0.315	0.996 (-.008)	.039 - .157	25
53112931	53112928	M-32	L	.276 - .591	1.417/1.575	2.165	0.315	1.272 (-.008)	.039 - .157	25

UL Status: R = Recognized; L = Listed

* one disassembly tool included per pack

SKINTOP® CUBE

Innovative Multi-Cable Bushing System



SKINTOP® CUBE Frame



SKINTOP® CUBE Module

Technical Data:



Materials:
- Frame: Glass fiber reinforced polyamide
- Frame seal: CR
- Clip Module: Special polyamide
- Clip Module Seal: LSE 2



Color: Black



Protection: IP 64
UL 94 V0



Temperature Range: -20°C to +80°C

Part Number Black	Size	Clamping Range Ø (in.)	Clamping Range Ø (mm)	Max # of Inserts	Standard Pack Size
SKINTOP® CUBE Frame					
52220000	16 Panel Cut-Out: (36 x 86 mm)	-	-	8	1
52220001	24 Panel Cut-Out: (36 x 112 mm)	-	-	10	1
SKINTOP® CUBE Clip Module					
52220004	20x20 Blank Module	.039 - .118	1 - 3	-	5
52220002	20x20 Small Module	.157 - .236	4 - 6	-	5
52220003	20x20 Large Module	.236 - .354	6 - 9	-	5
52220040	20x20 AS-I BUS	AS-I BUS cable	AS-I BUS cable	-	5
52220005	40x40 Small Module	.354 - .472	9 - 12	-	5
52220006	40x40 Large Module	.472 - .629	12 - 16	-	5
52220007	40x40 Blank Module	-	-	-	5





SKINTOP® MS-SC/ MS-SC-XL

Liquid-Tight, Nickel-Plated Brass, Strain Relief for EMC Shielding: NPT, PG & Metric



PG:



NPT:



Metric:



Technical Data:



Materials:

- Body: Nickel-Plated Brass
- Insert: Polyamide
- Bushing: CR
- O-Ring: Perbunan (NBR)



Seal:

IP 68, 5 Bar when using an o-ring
(Exceeds NEMA 6/ 6P Pressure rating)



Temperature Range:

-30°C to +100°C

* Locknuts: Add SM-PE Locknuts, page 43

SKINTOP® MS-SC: NPT Threads

Part Number	Thread Type & Size	Clamping Range øF (in.)	SW Wrenching Flats (in.)	C Overall Length (in.)	D Thread Length (in.)	Standard Pack Size
53112920	NPT 1/2"	0.276 - 0.492	0.945	1.673	.591	50
53112930	NPT 3/4"	0.354 - 0.650	1.142	1.752	.591	25
53112940	NPT 1"	0.433 - 0.827	1.417	1.929	.669	25
53112950	NPT 1-1/4"	0.748 - 1.102	1.772	2.264	.669	10

SKINTOP® MS-SC: PG Threads

Part Number	Thread Type & Size	Clamping Range øF (in.)	SW Wrenching Flats (in.)	C Overall Length (in.)	D Thread Length inches	Min ø above braiding	Standard Pack Size
53112210	PG-9	.118 - 0.315	0.669	1.142	.236	.157	50
53112220	PG-11	.157 - 0.394	0.787	1.260	.236	.157	50
53112230	PG-13	.197 - 0.472	0.866	1.339	.256	.157	25
53112240	PG-16	.315 - 0.551	0.945	1.378	.256	.236	25
53112250	PG-21	.433 - 0.689	1.181	1.575	.276	.315	25
53112260	PG-29	.630 - 0.984	1.575	1.890	.315	.512	10
53112270	PG-36	.748 - 1.260	1.969	2.441	.591	.630	5

SKINTOP® MS-SCL: Extended PG Threads

Part Number	Thread Type & Size	Clamping Range øF (in.)	SW Wrenching Flats (in.)	C Overall Length (in.)	D Thread Length (in.)	Min ø above braiding	Standard Pack Size
53112310	PG-9	0.118 - 0.315	0.669	1.378	.472	.157	50
53112320	PG-11	0.157 - 0.394	0.787	1.496	.472	.157	50
53112330	PG-13	0.197 - 0.472	0.866	1.555	.472	.157	25
53112340	PG-16	0.315 - 0.551	0.945	1.594	.472	.236	25
53112350	PG-21	0.433 - 0.689	1.181	1.772	.472	.315	25
53112360	PG-29	0.630 - 0.984	1.575	2.047	.591	.512	10

SKINTOP® MS-SC-M: Metric Threads

Part Number	Thread Type & Size	Clamping Range øF (in.)	SW Wrenching Flats (in.)	C Overall Length (in.)	D Thread Length (in.)	Standard Pack Size
53112610	M-12X1.5	0.138 - 0.276	0.630	1.043	.256	50
53112620	M-16X1.5	0.177 - 0.354	0.787	1.299	.276	50
53112630	M-20X1.5	0.276 - 0.492	0.945	1.457	.315	25
53112640	M-25X1.5	0.354 - 0.650	1.142	1.516	.315	25
53112650	M-32X1.5	0.433 - 0.827	1.417	1.791	.354	25
53112660	M-40X1.5	0.748 - 1.102	1.772	1.890	.354	10
53112670	M-50X1.5	1.063 - 1.378	2.126	2.185	.394	5

SKINTOP® MS-SC-M-XL: Extended Metric Threads

Part Number	Thread Type & Size	Clamping Range øF (in.)	SW Wrenching Flats (in.)	C Overall Length (in.)	D Thread Length (in.)	Standard Pack Size
53112625	M-16X1.5	0.177 - 0.354	0.787	1.496	.472	50
53112635	M-20X1.5	0.276 - 0.492	0.945	1.614	.472	25
53112645	M-25X1.5	0.354 - 0.650	1.142	1.673	.472	25
53112655	M-32X1.5	0.433 - 0.827	1.417	2.028	.591	25
53112665	M-40X1.5	0.748 - 1.102	1.772	2.126	.591	10
53112675	M-50X1.5	1.063 - 1.378	2.126	2.382	.591	5

Additional configurations available, please see full line catalog or visit our website.

SKINTOP® MS-M BRUSH

Liquid-Tight, Metallic Strain Relief for EMC Shielding Applications



Technical Data:



Materials:

- Body: Nickel-Plated Brass
- Insert: Polyamide
- Bushing: Special Elastomer
- O-Ring: Special Elastomer



Seal:

IP 68, 5 Bar
(Exceeds NEMA 6/6P
Pressure rating)



Temperature Range: -30°C to +100°C

* Locknuts:

Add SM-PE Locknuts, page 43

SPECIAL FEATURES

SKINTOP® sizes M75X1.5 to M110X2.0 feature the innovative, double lamella gasket for easier assembling of cables with larger diameters



Part Number	Thread Type & Size	Clamping Range øF (in.)	SW Wrenching Flats (in.)	Minimum ø above braiding (in.)	Thread Length (in.)	Standard Pack Size
53112676	M-25X1.5	0.354 - 0.669	1.142	0.236	0.315	10
53112677	M-32X1.5	0.433 - 0.827	1.417	0.315	0.354	1
53112678	M-40X1.5	0.748 - 1.102	1.772	0.394	0.354	1
53112679	M-50X1.5	1.063 - 1.378	2.126	0.551	0.394	1
53112680	M-63X1.5	1.339 - 1.772	2.638	0.787	0.591	1
53112681	M-63X1.5, plus	1.732 - 2.165	2.953	0.984	0.591	1
53112501	M-75X1.5	2.087 - 2.480	3.740	1.378	0.591	1
53112500	M-75X1.5, plus	2.283 - 2.677	3.740	1.378	0.591	1
53112503	M-90X2.0	2.598 - 3.071	4.528	1.772	0.787	1
53112505	M-110X2.0	2.992 - 3.465	5.315	2.165	0.984	1
53112504	M-110X2.0, plus	3.386 - 3.858	5.315	2.165	0.984	1

SKINDICHT® SM-PE LOCKNUTS

Nickel-Plated Brass Grounding Locknuts for PG and Metric Threaded Products



Technical Data:



Materials: Nickel-Plated Brass



Part Number	Thread Type & Size	Wrenching Flats (in.)	Nut Thickness (in.)	Standard Pack Size	Part Number	Thread Type & Size	Wrenching Flats (in.)	Nut Thickness (in.)	Standard Pack Size
PG Threads					Metric Threads				
52103200	PG 7	0.590	.185	100	52103300	M 12x1.5	0.591	.138	100
52103210	PG 9	0.709	.185	100	52103310	M 16x1.5	0.748	.138	100
52103220	PG 11	0.827	.185	100	52103320	M 20x1.5	0.945	.146	100
52103230	PG 13	0.906	.185	100	52103330	M 25x1.5	1.181	.165	50
52103240	PG 16	1.024	.185	100	52103340	M 32x1.5	1.417	.185	50
52103250	PG 21	1.260	.205	50	52103350	M 40x1.5	1.811	.217	25
52103260	PG 29	1.614	.224	50	52103360	M 50x1.5	2.362	.217	10
52103270	PG 36	2.008	.264	50	52103370	M 63x1.5	2.756	.276	10
					52103371	M 75x1.5	2.953	.315	5
					52103372	M 90x2.0	4.016	.394	1
					52103373	M 110x2.0	4.882	.472	1





Square D Variable Frequency Drive Cross Reference

Altivar 31

Voltage	HP	Amps	Lapp P/N	Lapp Product	SKINTOP® MS-M Brush
230V	1	4.8	761404	VFD Slim	53112676
	1½	6.9	761404	VFD Slim	53112676
	2	8	761404	VFD Slim	53112676
	3	11	761404	VFD Slim	53112676
	4	13.7	761404	VFD Slim	53112676
	5	17.5	761404	VFD Slim	53112676
	7½	27.5	761204	VFD Slim	53112676
	10	33	760804	VFD Slim	53112678
	15	54	760604	VFD Slim	53112678
	20	66	760404	VFD Slim	53112679
460V	1	2.3	761404	VFD Slim	53112676
	1½	3	761404	VFD Slim	53112676
	2	4.1	761404	VFD Slim	53112676
	3	5.5	761404	VFD Slim	53112676
	4	7.1	761404	VFD Slim	53112676
	5	9.5	761404	VFD Slim	53112676
	7½	14.3	761404	VFD Slim	53112676
	10	17	761404	VFD Slim	53112676
	16	27.7	761004	VFD Slim	53112677
	20	33	761804	VFD Slim	53112678

Altivar 32 AC

Voltage	HP	Amps	Lapp P/N	Lapp Product	SKINTOP® MS-M Brush	SKINTOP® MS-SC
208 / 204V	¼	1.5	761404	VFD Slim	53112676	53112240
	½	3.3	761404	VFD Slim	53112676	53112240
	¾	3.7	761404	VFD Slim	53112676	53112240
	1	4.8	761404	VFD Slim	53112676	53112240
	1½	6.9	761404	VFD Slim	53112676	53112240
	2	8	761404	VFD Slim	53112677	53112240
	3	11	761404	VFD Slim	53112676	53112240
	¾	1.5	761404	VFD Slim	53112676	53112240
	1	1.9	761404	VFD Slim	53112676	53112240
	1	2.3	761404	VFD Slim	53112676	53112240
380 / 480V	1½	3	761404	VFD Slim	53112676	53112240
	2	4.1	761404	VFD Slim	53112676	53112240
	3	5.5	761404	VFD Slim	53112676	53112240
	4	7.1	761404	VFD Slim	53112676	53112240
	5	9.5	761404	VFD Slim	53112676	53112240
	7½	14.3	761404	VFD Slim	53112676	53112240
	10	17	761204	VFD Slim	53112676	53112250
	15	27.7	761004	VFD Slim	53112678	53112250
	20	33	760804	VFD Slim	53112678	53112260

Altivar 71

Voltage	HP	Amps	Lapp P/N	Lapp Product	SKINTOP® MS-M Brush
230V	1	4.8	761404	VFD Slim	53112676
	2	8	761404	VFD Slim	53112676
	3	11	761404	VFD Slim	53112676
	4	13.7	761404	VFD Slim	53112676
	5	17.5	761404	VFD Slim	53112676
	7½	27.5	761004	VFD Slim	53112677
	10	33	760804	VFD Slim	53112678
	15	54	760604	VFD Slim	53112678
	20	66	760404	VFD Slim	53112679
	25	75	760204	VFD Slim	53112679
460V	30	88	760204	VFD Slim	53112679
	40	120	761103	VFD Symmetrical	53112679
	50	144	762203	VFD Symmetrical	53112680
	60	176	764403	VFD Symmetrical	53112680
	75	221	-	-	-
	100	285	-	-	-
	1	2.3	761404	VFD Slim	53112676
	2	4.1	761404	VFD Slim	53112676
	3	5.8	761404	VFD Slim	53112676
	4	7.8	761404	VFD Slim	53112676
500V	5	10.5	761404	VFD Slim	53112676
	7½	14.3	761404	VFD Slim	53112676
	10	17.6	761404	VFD Slim	53112676
	15	27.7	761004	VFD Slim	53112677
	20	33	760804	VFD Slim	53112678
	25	41	760604	VFD Slim	53112678
	30	48	760604	VFD Slim	53112678
	40	66	760404	VFD Slim	53112679
	50	79	760204	VFD Slim	53112679
	60	94	760204	VFD Slim	53112679
600V	75	116	760103	VFD Symmetrical	53112679
	100	160	763303	VFD Symmetrical	53112680
	125	179	764403	VFD Symmetrical	53112680
	150	215	-	-	-
	200	259	-	-	-
	250	314	-	-	-

Altivar 312

Voltage	HP	Amps	Lapp P/N	Lapp Product	SKINTOP® MS-M Brush	SKINTOP® MS-SC
208 / 204V	¼	1.5	761404	VFD Slim	53112676	53112240
	½	3.3	761404	VFD Slim	53112676	53112240
	¾	3.7	761404	VFD Slim	53112676	53112240
	1	4.8	761404	VFD Slim	53112676	53112240
	1½	6.9	761404	VFD Slim	53112676	53112240
	2	8	761404	VFD Slim	53112676	53112240
	3	11	760404	VFD Slim	53112676	53112240
	4	13.7	760404	VFD Slim	53112676	53112240
	5	17.5	760204	VFD Slim	53112676	53112250
	7½	27.5	761004	VFD Slim	53112677	53112250
350 / 500V	10	33	760804	VFD Slim	53112678	53112260
	15	54	760604	VFD Slim	53112678	53112270
	20	66	760404	VFD Slim	53112679	53112270
	¼	1.5	761404	VFD Slim	53112676	53112240
	¾	1.9	761404	VFD Slim	53112676	53112240
	1	2.3	761404	VFD Slim	53112676	53112240
	1½	3	761404	VFD Slim	53112676	53112240
	2	4.1	761404	VFD Slim	53112676	53112240
	3	5.5	761404	VFD Slim	53112676	53112240
	4	7.1	761404	VFD Slim	53112676	53112240
525 / 600V	5	9.5	761404	VFD Slim	53112676	53112240
	7½	14.3	761404	VFD Slim	53112676	53112240
	10	17	761204	VFD Slim	53112676	53112250
	15	27.7	761004	VFD Slim	53112677	53112250
	20	33	760804	VFD Slim	53112678	53112260
	1	1.7	761404	VFD Slim	53112676	53112240
	2	2.7	761404	VFD Slim	53112676	53112240
	4	3.9	761404	VFD Slim	53112676	53112240
	5	6.1	761404	VFD Slim	53112676	53112240
	7½	9	761404	VFD Slim	53112676	53112240
600V	10	11	761404	VFD Slim	53112676	53112240
	15	17	761204	VFD Slim	53112676	53112250
	20	22	761004	VFD Slim	53112677	53112250

Square D Variable Frequency Drive Cross Reference



Altivar 61

Voltage	HP	Amps	Lapp P/N	Lapp Product	SKINTOP® MS-M Brush
230V	5	17.5	761404	VFD Slim	53112676
	7½	27.5	761004	VFD Slim	53112677
	10	33	760804	VFD Slim	53112678
	15	54	760604	VFD Slim	53112678
	20	66	760404	VFD Slim	53112679
	25	75	760204	VFD Slim	53112679
	30	88	760204	VFD Slim	53112679
	40	120	761103	VFD Symmetrical	53112679
	50	144	762203	VFD Symmetrical	53112680
	60	179	764403	VFD Symmetrical	53112680
460V	75	221	-	-	-
	100	285	-	-	-
	125	359	-	-	-
	5	10.5	761404	VFD Slim	53112676
	7½	14.3	761404	VFD Slim	53112676
	10	17.6	761404	VFD Slim	53112676
	15	27.7	761004	VFD Slim	53112677
	20	33	760804	VFD Slim	53112678
	25	41	760604	VFD Slim	53112678
	30	48	760604	VFD Slim	53112678
	40	66	760404	VFD Slim	53112679
	50	79	760204	VFD Slim	53112679
	60	94	760204	VFD Slim	53112679
	75	118	760103	VFD Symmetrical	53112679
	100	160	763303	VFD Symmetrical	53112680
	125	179	764403	VFD Symmetrical	53112680
	150	215	-	-	-
	200	259	-	-	-
	250	314	-	-	-

Altivar 212

Voltage	HP	Amps	Lapp P/N	Lapp Product	SKINTOP® MS-M Brush	SKINTOP® MS-SC
208 / 240V	1	4.6	761404	VFD Slim	53112676	53112240
	2	7.5	761404	VFD Slim	53112676	53112240
	3	10.6	761404	VFD Slim	53112676	53112240
	4	13.7	761404	VFD Slim	53112676	53112240
	5	18.7	761204	VFD Slim	53112676	53112250
	7½	24.2	761004	VFD Slim	53112677	53112250
	10	32	760804	VFD Slim	53112678	53112260
	15	46.2	760604	VFD Slim	53112678	53112270
	20	61	760404	VFD Slim	53112679	53112270
	25	74.8	760204	VFD Slim	53112680	-
380 / 480V	30	88	760204	VFD Slim	53112680	-
	40	117	761103	VFD Slim	53112679	-
	1	2.2	760404	VFD Slim	53112679	53112240
	2	3.7	761404	VFD Slim	53112676	53112240
	3	5.1	761404	VFD Slim	53112676	53112240
	4	7	761404	VFD Slim	53112676	53112240
	5	9.1	761404	VFD Slim	53112676	53112240
	7½	12	761404	VFD Slim	53112676	53112240
	10	16	761204	VFD Slim	53112676	53112250
	15	22.5	761004	VFD Slim	53112677	53112250
	20	30.5	760804	VFD Slim	53112678	53112260
	25	37	760804	VFD Slim	53112678	53112260
	30	43.5	760604	VFD Slim	53112678	53112270
	40	58.5	760404	VFD Slim	53112679	53112270
	50	79	760204	VFD Slim	53112680	-
	60	94	760204	VFD Slim	53112680	-
	75	116	761103	VFD Slim	53112679	-
	100	160	763303	VFD Slim	53112680	-

Number/Color Codes

Charts 1, 2 & 3



Chart 1

Conductor	Color	Conductor	Color
1	Black	6	Blue
2	White	7	Orange
3	Red	8	Yellow
4	Green*	9	Violet
5	Brown	10	Gray

* Cables with CE approval have green/yellow conductor for #4

Chart 2

Conductor	Color	Conductor	Color
1	Black	14	White/Green
2	White	15	White/Blue
3	Red	16	Red/Black
4	Green	17	Red/White
5	Orange	18	Red/Orange
6	Blue	19	Red/Blue
7	Black/White	20	Green/Red
8	Black/Red	21	Green/Orange
9	Black/Green	22	Black/White/Red
10	Black/Orange	23	White/Black/Red
11	Black/Blue	24	Red/Black/White
12	White/Black	25	Green/Black/White
13	White/Red		

Chart 3

Pair	Colors
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

Chart 4

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

Chart 5

Conductor	Color	Conductor	Color
1	Black	9	Violet
2	Red	10	Gray
3	White	11	Pink
4	Green	12	Tan
5	Orange	13	Red/Green
6	Blue	14	Red/Yellow
7	Brown	15	Red/Black
8	Yellow		

Motor Properties: AWG Size Selection Chart

Drive HP	230V 3 AWG	460V 3 AWG	575V 3 AWG	Drive HP	230V 3 AWG	460V 3 AWG	575V 3 AWG
½ - 3	14	14	14	60	4/0	1	2
5	14	14	14	75	300 KCMIL	1/0	1
7 ½	10	14	14	100	500 KCMIL	3/0	1/0
10	8	14	14	125	-	4/0	3/0
15	6	10	12	150	-	300 KCMIL	4/0
20	4	8	10	200	-	500 KCMIL	300 KCMIL
25	2	6	8	250	-	-	500 KCMIL
30	1	6	8	300	-	-	-
40	2/0	4	6	250	-	-	-
50	3/0	2	4	400 - 500	-	-	-

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:

For Example: For a 5 HP and 460 Volt motor, the FLC is 7.6A x 125% = 9.5A. The right AWG wire for 9.5A is 14 per NEC Art. 310.15(B)(16)

Voltage Drop Factors: Volts at FLC @ 20°C

Drive HP	230 V 3 AWG	460 V 3 AWG	575 V 3 AWG	Drive HP	230 V 3 AWG	460 V 3 AWG	575 V 3 AWG	Drive HP	230 V 3 AWG	460 V 3 AWG	575 V 3 AWG
½	.017	.008	.007	10	.036	.072	.084	75	.012	.020	.019
¾	.025	.012	.010	15	.034	.045	.053	100	.011	.022	.021
1	.032	.016	.013	20	.028	.038	.047	125	.008	.047	.022
1 ½	.046	.023	.019	25	.020	.028	.036	150	.008	.041	.015
2	.052	.026	.021	30	.020	.032	.042	200	.008	.011	.013
3	.074	.037	.030	40	.021	.027	.033	250	.006	.010	.011
5	.050	.058	.046	50	.023	.020	.026	300	-	.008	.009
7 ½	.047	.058	.069	60	.016	.019	.018	350	-	.008	.009

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

For Example: For a 5 HP and 460V motor, P/N 701804 would be used. For a distance of 200 feet, the voltage drop would be 200 x .058 = 11.6 volts.

In keeping with the principles of the Lapp Group, customer education is a top priority. We strive to keep our customers aware of breaking industry changes. For a more detailed technical explanation, please visit Lapp USA's website at <http://www.lappusa.com/LappVFDWhitepaper.htm>

Cross Reference for AWG (American Wire Gauge) to mm²



When crossing mm² to AWG, Lapp references the most common AWG sizes for ease of use. Technically the standard mm² in Europe is slightly larger than AWG. Within the Lapp catalog, the measurement mm² refers to true size of the wire. When crossing over from mm² to AWG, please refer to the chart below.

AWG to mm²

AWG	mm ²	AWG	mm ²
30	0.05	8	10
28	0.08	6	16
26	0.14	4	25
24	0.25	2	35
22	0.34	1	50
21	0.38	2/0	70
21	0.50	3/0	95
20	0.50	4/0	120
19	0.75	300 KCMIL	150
18	1.0	350 KCMIL	185
16	1.5	500 KCMIL	240
14	2.5	600 KCMIL	300
12	4.0	750 KCMIL	400
10	6.0	1,000 KCMIL	500

mm² to AWG

mm ²	AWG	mm ²	AWG
0.0507	30	8.37	8
0.0804	28	13.3	6
0.128	26	21.2	4
0.205	24	33.6	2
0.324	22	42.4	1
0.519	20	2/0	2/0
0.823	18	3/0	3/0
1.31	16	4/0	4/0
2.08	14	127	300 KCMIL
3.31	12	177	350 KCMIL
5.26	10	253	500 KCMIL

Conversion Factors



Length	Volume	Mass	Area
Inch x 25.40 = Millimeter	Cu. Inch x 16.39 = Cu. Centimeter	Ounce x 28.35 = Gram	Sq. Inch x 6.452 = Sq. Centimeter
Millimeter x 0.0394 = Inch	Cu. Centimeter x 0.0610 = Cu. Inch	Gram x 0.0353 = Ounce	Sq. Centimeter x 0.1550 = Sq. Inch
Feet x 0.3048 = Meter	Cu. Foot x 0.0283 = Cu. Meter	Pound x 0.4536 = Kilogram	Sq. Foot x 0.0929 = Sq. Meter
Meter x 3.281 = Feet	Cu. Meter x 35.31 = Cu. Foot	Kilogram x 2.205 = Pound	Sq. Meter x 10.76 = Sq. Foot
Mile x 1.609 = Kilometer		Kg/km x 0.6720 = Lb/mft	Sq. Mile x 2.590 = Sq. Kilometer
Kilometer x 0.6214 = Mile		Lb/mft x 1.488 = Kg/km	Sq. Kilometer x 0.3861 = Sq. Mile
Ω/km x 0.3048 = Ω/mft			Circular Mil x 0.7854 = Sq. Mil
			mm ² = (Strand mm) ² x (# Strands) x 0.7854

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