Appendix

A7 Selection Table

LAPP GROUP

A7: UNITRONIC® BUS and ETHERLINE® – Which UNITRONIC® BUS cable for which field bus system?

Cable and Lead Designation	Application Criteria																				
	Laying					Standards		Characteristic impedance	Bus systems												
	stationary static	flexible	highly flexible (power chains etc.)	outdoor use/direct burial/UV-resist.		UL/CSA approved		100 – 120 Ohm		INTERBUS® DIN 19258 EN 50251 Sensor-/Actor Bus	INTERBUS® (Phoenix Contact)	SUCOnet p® (Klöckner-Möller) Modulink® P (Weidmüller) MODBUS VariNet®-P (Pepperl + Fuchs)	PROFIBUS DIN 19245 EN 50170	PROFIBUS-DP, -FMS/FIP	PROFIBUS-PA, Foundation™ Fieldbus	CAN ISO 11898	AS-INTERFACE	EIB	CC-Link	DeviceNet™ (Allen-Bradley/Rockwell Automation)	Industrial Ethernet/Fast Ethernet
Lapp Kabel Bus Cables (cross sections in mm² or diameter in mm or AWG size)																					
UNITRONIC® BUS IBS + UNITRONIC® BUS IBS 3 x 2 x 0,22 + 3 x 1,0	●					●		●		●	●										
UNITRONIC® BUS IBS P COMBI 3 x 2 x 0,22 + 3 x 1,0	●					●		●			●										
UNITRONIC® BUS IBS FD P 3 x 2 x 0,25			●			●		●			●										
UNITRONIC® BUS IBS FD P COMBI 3 x 2 x 0,25 + 3 x 1,0			●			●		●			●										
UNITRONIC® BUS IBS Yv COMBI 3 x 2 x 0,22 + 3 x 2 x 0,22 + 3 x 1,0				●		●		●			●										
UNITRONIC® BUS LD A + BUS FD P A 1 x 2 x 0,22, 2 x 2 x 0,22 + 3 x 2 x 0,22	●		●			●		●				●									
UNITRONIC® BUS PB A 1 x 2 x 0,64	●					●								●							
UNITRONIC® BUS PB PE 1 x 2 x 0,64	●													●							
UNITRONIC® BUS PB 7-W A 1 x 2 x 0,64	●	●				●								●							
UNITRONIC® BUS PA 1 x 2 x 1,0	●							●							●						
UNITRONIC® BUS PB FD P 1 x 2 x 0,64			●											●							
UNITRONIC® BUS PB Torsion 1 x 2 x 0,8			●			●								●							
UNITRONIC® BUS PB Festoon 1 x 2 x 0,64			●			●								●							
UNITRONIC® BUS PB FD P HYBRID 1 x 2 x 0,64 + 4 x 1,5			●			●								●							
UNITRONIC® BUS PB Yv, PB YY 1 x 2 x 0,64	●			●										●							
UNITRONIC® BUS PB PE FC 1 x 2 x 0,64	●			●										●							
UNITRONIC® BUS PB H FC 1 x 2 x 0,64	●					●								●							
UNITRONIC® BUS PB P FC 1 x 2 x 0,64	●					●								●							
UNITRONIC® BUS PA FC 1 x 2 x 1,0	●					●		●							●						
UNITRONIC® BUS PB FD P FC 1 x 2 x 0,64			●			●								●							
UNITRONIC® BUS PB BURIAL FC 1 x 2 x 0,64				●										●							
UNITRONIC® BUS CAN 1 x 2 x 0,22, 2 x 2 x 0,22	●	●				●										●					
UNITRONIC® BUS CAN 1 x 2 x 0,34, 2 x 2 x 0,34	●	●				●										●					
UNITRONIC® BUS CAN 1 x 2 x 0,5, 2 x 2 x 0,5	●	●				●										●					
UNITRONIC® BUS CAN 1 x 2 x 0,75, 2 x 2 x 0,75	●	●				●										●					
UNITRONIC® BUS CAN FD P 1 x 2 x 0,22, 2 x 2 x 0,22			●			●										●					
UNITRONIC® BUS CAN FD P 1 x 2 x 0,34, 2 x 2 x 0,34			●			●										●					

Legend

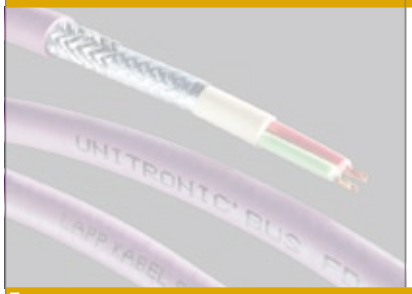
7-W	=	7-wire strand
AS-I	=	AS-INTERFACE
COMBI IBS	=	Installation remote bus cable for INTERBUS
DN	=	**D**evice **N**et
EIB	=	European Installation Bus
FD	=	suitable for power chains
FRNC	=	**F**lame **R**etardant **N**on **C**orrosive
G	=	rubber outer sheath (EPDM)
H	=	Halogen free material
IBS	=	Remote bus cable for INTERBUS
L2	=	Abbreviation for SINEC® L2-DP
LD	=	Long distance
P	=	Polyurethane outer sheath
PB	=	**P**rofi **B**us
PE	=	Polyethylene outer sheath
PROFIBUS-DP	=	**D**ecentralized **P**eriphery
PROFIBUS-FMS	=	**F**ieldbus **M**essage **S**pecification
PROFIBUS-PA	=	**P**rocess **A**utomation
TPE	=	thermoplastic Elastomer
Yv	=	Wire for outdoor use/direct burial with reinforced PVC outer sheath
YY	=	double PVC outer sheath

A7: UNITRONIC® BUS and ETHERLINE® – Which UNITRONIC® BUS cable for which field bus system?

Cable and Lead Designation	Application Criteria																			
	Laying				**Standards**		**Characteristic impedance**	**Bus systems**												
	stationary static	flexible	highly fexible (power chains etc.)	outdoor use/direct burial/UV-resist.	UL/CSA approved	100 - 120 Ohm	INTERBUS® DIN 19258 EN 50251 Sensor-/Actor Bus	INTERBUS® (Phoenix Contact)	SUCOnet p® (Klöckner-Möller) Modulink® P (Weidmüller) MODBUS VariNet®-P (Pepperl + Fuchs)	PROFIBUS DIN 19245 EN 50170	PROFIBUS-DP, -FMS/FIP	PROFIBUS-PA, Foundation™ Fieldbus	CAN ISO 11898	AS-INTERFACE	EIB	CC-Link	DeviceNet™ (Allen-Bradley/Rockwell Automation)	Industrial Ethernet/Fast Ethernet
Lapp Kabel Bus Cables (cross sections in mm² or diameter in mm or AWG size)																				
UNITRONIC® BUS CAN FD P 1 x 2 x 0,5, 2 x 2 x 0,5			●		●								●							
UNITRONIC® BUS ASI (G) 2 x 1,5	●	●												●						
UNITRONIC® BUS ASI FD	●	●	●		●									●						
UNITRONIC® BUS ASI FD (TPE) A 2 x 1,5	●	●	●		●									●						
UNITRONIC® BUS ASI (PUR) 2 x 1,5	●													●						
UNITRONIC® BUS ASI (PVC) A 2 x 1,5	●	●			●									●						
UNITRONIC® BUS DN THICK FRNC AWG 18 + 15	●	●			●	●							●				●			
UNITRONIC® BUS DN THIN FRNC AWG 24 + 22	●	●			●	●							●				●			
UNITRONIC® BUS DN THICK Y AWG 18 + 15	●	●			●	●							●				●			
UNITRONIC® BUS DN THIN Y AWG 24 + 22	●	●			●	●							●				●			
UNITRONIC® BUS DN THICK FD P AWG 18 + 15			●		●	●							●				●			
UNITRONIC® BUS DN THIN FD P AWG 24 + 22			●		●	●							●				●			
UNITRONIC® BUS DN THICK FD Y AWG 18 + 15			●		●	●							●				●			
UNITRONIC® BUS DN THIN FD Y AWG 24 + 22			●		●	●							●				●			
UNITRONIC® BUS EIB, BUS EIB H 2 x 2 x 0,8	●										●									
UNITRONIC® BUS EIB COMBI 2 x 2 x 0,8 + 3 x 1,5	●										●									
ETHERLINE®-H, P 2 x 2 x AWG 24/1 und 4 x 2 x AWG 24/1	●					●								●						
ETHERLINE®-H-H 4 x 2 x AWG 24/1	●					●								●						
ETHERLINE®-H FLEX, P-FLEX 2 x 2 x AWG 26/7 und 4 x 2 x AWG 26/7		●				●														●
ETHERLINE®-Y FC CAT.5e, YY CAT.5e, UL/CSA CAT.5e 2 x 2 x AWG 22/1	●		●	●		●														●
ETHERLINE®-FD P CAT.5 2 x 2 x AWG 26/19, 4 x 2 x AWG 26/19			●			●														●
ETHERLINE®-FD P FC UL/CSA CAT.5e 2 x 2 x AWG 22/7			●		●	●														●
UNITRONIC® BUS FF 3, FF ARM 1 x 2 x 1,1 + 1 x 1,1	●				●	●						●								
UNITRONIC® BUS FF 2 1 x 2 x 1,1	●				●	●						●								
UNITRONIC® BUS CC 3 x 1 x AWG 20	●	●			●	●										●				
UNITRONIC® BUS CC FD P FRNC 3 x 1 x AWG 20			●		●	●										●				
ETHERLINE® Y FLEX FC UL/CSA (CMG) 2 x 2 x AWG 22/7		●			●	●														●
ETHERLINE® Y2Y ARM Type A CAT.5e 2 x 2 x AWG 22/1	●					●														●
ETHERLINE® FRNC HYBRID FLEX FC UL (AWM)		●			●	●														●
ETHERLINE® Y PiMF CAT.6e, P PiMF, H PiMF 4 x 2 x AWG 22/1	●					●														●
ETHERLINE® Y PiMF CAT.7, P PiMF, H PiMF 4 x 2 x AWG 22/1	●					●														●

Legend

7-W	= 7-wire strand	H	= Halogen free material	PROFIBUS-FMS	= **F**ieldbus **M**essage **S**pecification
AS-I	= AS-INTERFACE	IBS	= Remote bus cable for INTERBUS	PROFIBUS-PA	= **P**rocess **A**utomation
COMBI IBS	= Installation remote bus cable for INTERBUS	L2	= Abbreviation for SINEC® L2-DP	TPE	= thermoplastic Elastomer
DN	= **D**evice **N**et	LD	= Long distance	Yv	= Wire for outdoor use/direct burial with reinforced PVC outer sheath
EIB	= European Installation Bus	P	= Polyurethane outer sheath	YY	= double PVC outer sheath
FD	= suitable for power chains	PB	= **P**rofi **B**us		
FRNC	= **F**lame **R**etardant **N**on **C**orrosive	PE	= Polyethylene outer sheath		
G	= rubber outer sheath (EPDM)	PROFIBUS-DP	= **D**ecentralized **P**eriphery		

Cable Designation	Parameters								
	Characteristic impedance Ω	Mutual capacitance (800 Hz) max. nF/km	Peak working voltage in V (not for power purpose)	Test voltage conductor / conductor Urms. V	Conductor resistance max. Ω/km (Data Pair)	Minimum bending radius static in mm	Minimum bending radius flexible in mm	Temperature range °C static	Temperature range °C flexible
Type									
UNITRONIC® BUS IBS static laying	100	60	250	1500	186	8 x D	–	-30 °C up to +80 °C	–
UNITRONIC® BUS IBS FD P highly flexible application	100	60	250	1500	159.8	–	15 x D	-40 °C up to +80 °C	-30 °C up to +70 °C
UNITRONIC® BUS IBS Yv outdoor use/direct burial	100	60	250	1500	186	8 x D	–	-40 °C up to +70 °C	–
UNITRONIC® BUS LD static laying	100 – 120	60	250	1500	186	8 x D	–	-40 °C up to +80 °C	-5 °C up to +70 °C
UNITRONIC® BUS LD FD P highly flexible application	100 – 120	60	250	1500	159.8	–	15 x D	-40 °C up to +80 °C	-30 °C up to +70 °C
UNITRONIC® BUS PB static laying	150+/-15	30	250	1500	110	75 mm	–	-40 °C up to +80 °C	–
UNITRONIC® BUS PB FD P + PB FD P PC highly flexible application	150+/-15	30	250	1500	145, 133	–	w/o FC = 65 mm FC = 120 mm	-40 °C up to +80 °C	-30 °C up to +70 °C
UNITRONIC® BUS PB Yv outdoor use/direct burial	150+/-15	30	250	1500	115	75 mm	–	-40 °C up to +80 °C	–
UNITRONIC® BUS PA (blue + black), static laying	100+/-20	52	250	1500	44	65 mm	–	-30 °C up to +80 °C	–
UNITRONIC® BUS CAN static laying (0.22 mm²)	100 – 120	40	250	1500	186	8 x D	–	-30 °C up to +80 °C	-5 °C up to +70 °C
UNITRONIC® BUS CAN FD P highly flexible application (0.25 mm²)	100 – 120	40	250	1500	159.8	–	15 x D	-40 °C up to +80 °C	-30 °C up to +70 °C
UNITRONIC® BUS FF 3 ARM static laying	100	56	300	1500	≤ 24	15 x D	–	-25 °C up to +80 °C	–
UNITRONIC® BUS FF 3 static laying	100	65	300	1500	≤ 24	5 x D	–	-25 °C up to +105 °C	–
UNITRONIC® BUS CC static laying	110	60	300	2000	37.8	15 x D	–	-40 °C up to +70 °C	–
UNITRONIC® BUS CC FD FRNC static laying	110	60	300	2000	37.8	4 x D	8 x D	-40 °C up to +80 °C	-40 °C up to +80 °C
UNITRONIC® Etherline®-H CAT.5 2 pairs	100	48	125	1000	192	42 mm	–	-30 °C up to +80 °C	-5 °C up to +60 °C
UNITRONIC® Etherline®-P CAT.5 2 pairs	100	46	125	1000	186.6	42 mm	-	-30 °C up to +80 °C	-5 °C up to +60 °C
UNITRONIC® Etherline®-H-H 2 pairs	100	46	125	1000	186.6	60 mm	–	-30 °C up to +80 °C	-5 °C up to +60 °C
UNITRONIC® Etherline-H FLEX 2 pairs	100	48	125	1000	284	30 mm	78 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE® P FLEX 2 pairs	100	48	125	1000	284	30 mm	78 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®-H CAT.5 4 pairs	100	48	125	1000	192	50 mm	–	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®-P CAT.5 4 pairs	100	46	125	1000	186.6	50 mm	–	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®-H-H 4 pairs	100	46	125	1000	186.6	55 mm	–	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®-H FLEX 4 pairs	100	48	125	1000	284	35 mm	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®-P FLEX 4 pairs	100	48	125	1000	284	35 mm	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®Y CAT.5e AWG 22/1 static laying	100	48	125	1000	192	–	78 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®Y UL/CSA CAT.5e AWG 22/1 static laying	100	48	125	1000	192	–	90 mm	-30 °C up to +70 °C	-5 °C up to +60 °C

Cable Designation	Parameters								
	Characteristic impedance Ω	Mutual capacitance (800 Hz) max. nF/km	Peak working voltage in V (not for power purpose)	Test voltage conductor / conductor Urms. V	Conductor resistance max. Ω/km (Data Pair)	Minimum bending radius static in mm	Minimum bending radius flexible in mm	Temperature range °C static	Temperature range °C flexible
Type									
ETHERLINE®Y CAT.5e AWG 22/1 static laying	100	48	125	1000	192	–	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®Y FC CAT.5e AWG 22/1 static laying	100	48	125	1000	192	–	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE®YY CAT.5e AWG 22/1 outdoor use/direct burial	100	48	125	1000	192	–	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE® H-FLEX CAT.5e AWG 22/7 flexible	100	48	125	1000	192	–	78 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE® FD P CAT.5e AWG 26/19 highly flexible	100	48	125	1000	192	–	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE® FD P CAT.5e AWG 22/19 highly flexible application	100	48	125	1000	192	–	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
ETHERLINE® FD P FC UL/CSA CAT.5e highly flexible application	100	48	125	1000	192	–	90 mm	-30 °C up to +80 °C	-5 °C up to +60 °C
UNITRONIC® BUS SAFTEY static laying/flexible	100 – 200	45	250	3000	52	8 x D	–	-40 °C up to +80 °C	-30 °C up to +80 °C
UNITRONIC® BUS ASI (G) **yellow + black** static laying/flexible	–	–	300	2000	27.4	3 x D	–	-40 °C up to +85 °C	–
UNITRONIC® BUS ASI (TPE) **yellow + black** static/flexible	–	–	300	2000	27.4	3 x D	–	-40 °C up to +85 °C	–
UNITRONIC® BUS ASI FD **yellow + black** highly flexible application	–	–	300	2000	27.4	3 x D	6 x D	-40 °C up to +80 °C	-30 °C up to +70 °C
UNITRONIC® BUS ASI FD (TPE) A **yellow + black** highly flexible application	–	–	300	2000	27.4	3 x D	6 x D	-40 °C up to +105 °C	-30 °C up to +105 °C
UNITRONIC® BUS ASI (PUR) **yellow + black** static laying	–	–	300	2000	27.4	3 x D	–	-40 °C up to +85 °C	–
UNITRONIC® BUS ASI (PVC) UL/CSA CMG **yellow + black** static laying	–	–	300	2000	27.4	3 x D	–	-40 °C up to +90 °C	–
UNITRONIC® DeviceNet **THICK + THIN (halogen free)** static laying	120	39.8	300	2000	THICK 45 THIN 180	10 x D	–	-25 °C up to +80 °C	–
UNITRONIC® DeviceNet **THICK + THIN (PVC)** static laying	120	39.8	300	2000	THICK 45 THIN 180	10 x D	–	-20 °C up to +80 °C	–
UNITRONIC® DeviceNet **THICK + THIN (PUR)** highly flexible	120	39.8	300	2000	THICK 45 THIN 180	–	10 x D	–	-40 °C up to +80 °C
UNITRONIC® DeviceNet **THICK + THIN (PVC)** highly flexible	120	39.8	300	2000	THICK 45 THIN 180	–	10 x D	–	-10 °C up to +80 °C
UNITRONIC® BUS EIB	-	max. 100	250	4000	max. 130	10 x D	–	-30 °C up to +70 °C	–
UNITRONIC® BUS COMBI EIB	-	max. 100	250	4000	max. 130	10 x D	–	-30 °C up to +70 °C	–