

maxon motor

**maxon motor control
Cable Starting Set**

**EPOS Positioning Controller
Edition June 2006**

EPOS 24/1

part number 302287

Positioning Controller

Documentation

Cable Starting Set



1 Table of contents

1	Table of contents	2
2	Table of figures	2
3	Introduction	3
4	How to use this guide	3
5	Cable selector EPOS 24/1 part number 302287	4
5.1	EPOS 24/1 with maxon DC motor with separated motor and encoder cable	4
5.2	EPOS 24/1 with maxon DC motor with integrated motor / encoder ribbon cable	4
5.3	EPOS 24/1 with maxon EC motor with separated motor and encoder cable	4
5.4	RS-232 Communication	4
5.5	CAN Communication	4
6	EPOS power / signal cable (Connector J14)	5
7	EPOS 24/1 DC motor cable (Connector J10)	7
8	EPOS 24/1 motor / Hall sensor cable (Connector J10)	9
9	EPOS encoder cable (Connector J11)	11
10	EPOS RS232-COM cable (Connector J12)	13
11	EPOS CAN-COM cable (EPOS 24/1 CAN Y-cable head A or B)	15
12	EPOS 24/1 CAN Y-cable (Connector J13)	17
13	EPOS CAN-CAN cable (EPOS 24/1 CAN Y-cable head A or B)	18
14	EPOS CAN termination plug (EPOS 24/1 CAN Y-cable head A or B)	20
15	EPOS 24/1 connector set	21

2 Table of figures

Figure 1:	EPOS documentation hierarchy	3
Figure 2:	EPOS power / signal cable 275932	5
Figure 3:	EPOS power / signal cable head A	5
Figure 4:	Pin assignment EPOS power / signal cable head A	5
Figure 5:	EPOS power / signal cable head B	6
Figure 6:	EPOS 24/1 DC motor cable 303490	7
Figure 7:	EPOS 24/1 DC motor cable head A	7
Figure 8:	Pin assignment EPOS 24/1 DC motor cable head A	7
Figure 9:	EPOS 24/1 DC motor cable head B	8
Figure 10:	EPOS 24/1 motor / Hall sensor cable 302948	9
Figure 11:	EPOS 24/1 motor / Hall sensor cable head A	9
Figure 12:	Pin assignment EPOS 24/1 motor / Hall sensor cable head A	9
Figure 13:	Motor cable head B	10
Figure 14:	Hall sensor cable head B	10
Figure 15:	EPOS encoder cable 275934	11
Figure 16:	EPOS encoder cable head A	11
Figure 17:	Pin assignment EPOS encoder cable head A	11
Figure 18:	EPOS encoder cable head B	12
Figure 19:	Pin assignment EPOS encoder cable head B	12
Figure 20:	EPOS RS232-COM cable 275900	13
Figure 21:	EPOS RS232-COM cable head A	13
Figure 22:	Pin assignment EPOS RS232-COM cable head A	13
Figure 23:	EPOS RS232-COM cable head B	14
Figure 24:	Pin assignment EPOS RS232-COM cable head B	14
Figure 25:	EPOS CAN-COM cable 275908	15
Figure 26:	EPOS CAN-COM cable head A	15
Figure 27:	Pin assignment EPOS CAN-COM cable head A	15
Figure 28:	EPOS CAN-COM cable head B	16
Figure 29:	Pin assignment EPOS CAN-COM cable head B	16
Figure 30:	EPOS 24/1 CAN Y-cable	17
Figure 31:	Pin assignment EPOS 24/1 CAN Y-cable head A and B	17
Figure 32:	Pin assignment EPOS 24/1 CAN Y-cable head C	17
Figure 33:	EPOS CAN-CAN cable 275926	18
Figure 34:	EPOS CAN-CAN cable head A	18
Figure 35:	Pin assignment EPOS CAN-CAN cable head A	18
Figure 36:	EPOS CAN-CAN cable head B	19
Figure 37:	Pin assignment EPOS CAN-CAN cable head B	19
Figure 38:	EPOS CAN termination plug 275937	20
Figure 39:	Pin assignment EPOS CAN termination plug	20

3 Introduction

This documentation “Cable Starting Set” provides the wiring details from each EPOS cable. It contains pictures, drawings, cable specification, pin assignment and detailed connector information. The included “Cable selector” helps to choose the correct cable.

The latest edition of these “Cable Starting Set”, additional documentation and software to the EPOS positioning controller may also be found on the internet in www.maxonmotor.com category <Service&Downloads>.

4 How to use this guide

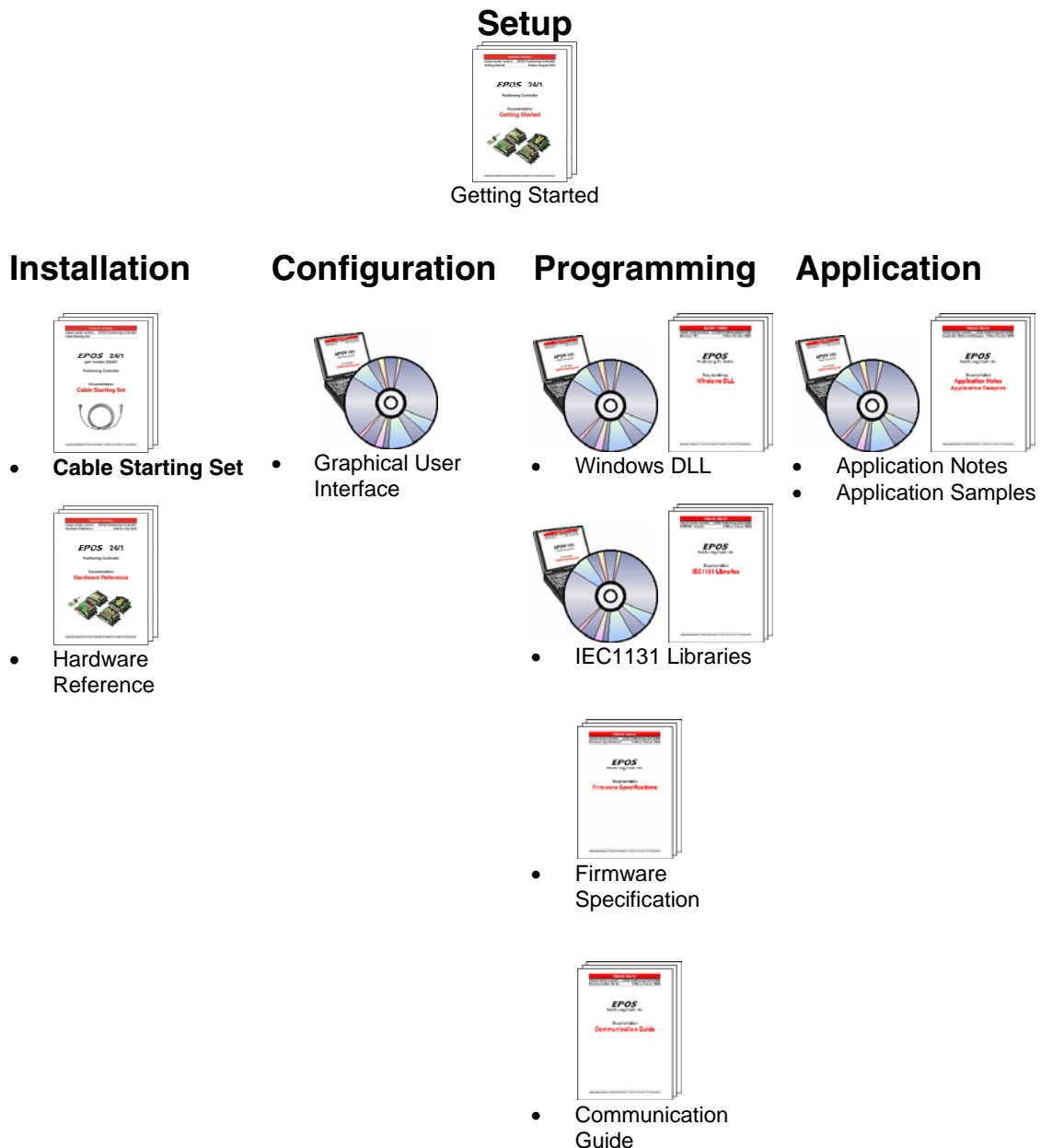


Figure 1: EPOS documentation hierarchy

5 Cable selector EPOS 24/1 part number 302287

5.1 EPOS 24/1 with maxon DC motor with separated motor and encoder cable

EPOS power / signal cable (Connector J14).....	order number	275932
EPOS 24/1 DC motor cable (Connector J10).....	order number	303490
EPOS encoder cable (Connector J11).....	order number	275934

5.2 EPOS 24/1 with maxon DC motor with integrated motor / encoder ribbon cable

EPOS power / signal cable (Connector J14).....	order number	275932
EPOS encoder cable (Connector J11).....	order number	275934

5.3 EPOS 24/1 with maxon EC motor with separated motor and encoder cable

EPOS power / signal cable (Connector J14).....	order number	275932
EPOS 24/1 motor / Hall sensor cable (Connector J10).....	order number	302948
EPOS encoder cable (Connector J11).....	order number	275934

5.4 RS-232 Communication

EPOS RS232-COM cable (Connector J12).....	order number	275900
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5.5 CAN Communication

EPOS CAN-COM cable (EPOS 24/1 CAN Y-cable head A or B).....	order number	275908
EPOS 24/1 CAN Y-cable (Connector J13).....	order number	319471
EPOS CAN termination plug (EPOS 24/1 CAN Y-cable head A or B).....	order number	275937
Optional:		
EPOS CAN-CAN cable (EPOS 24/1 CAN Y-cable head A or B).....	order number	275926

6 EPOS power / signal cable (Connector J14)

Order number: EPOS power / signal cable **275932**



Figure 2: EPOS power / signal cable 275932

The "EPOS power / signal cable" is a 16 x 0.14 mm², 3 m length cable.



Figure 3: EPOS power / signal cable head A

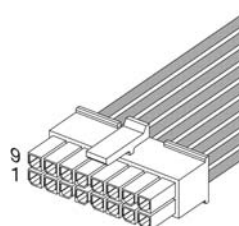


Figure 4: Pin assignment EPOS power / signal cable head A

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 connector "J14 Power / Signal"

Pin No.	Colour	Twisted wire	Signal	Description
1	White		D_Gnd	Digital signal ground
2	Brown		D_Gnd	Digital signal ground
3	Green		DigIN 6	Digital input 6 "negative limit switch"
4	Yellow		DigIN 5	Digital input 5 "positive limit switch"
5	Grey		DigIN 4	Digital input 4 "Home switch"
6	Pink		DigIN 3	Digital input 3 "general purpose"
7	Blue		DigIN 2	Digital input 2 "general purpose"
8	Red		DigIN 1	Digital input 1 "general purpose"
9	Black		+V _{OUT}	Auxiliary supply voltage Output (+5 VDC / 10mA)
10	Violet		DigOUT 4	Digital output 4 "general purpose"
11	Grey-Pink		DigOUT 3	Digital output 3 "general purpose"
12	Red-Blue		+V _{CC} (9..24 VDC)	Power supply voltage +9...+24 VDC
13	White-Green		Power_Gnd	Power Ground
14	Brown-Green		A_Gnd	Analogue signal ground
15	White-Yellow		AnIN 2	Analogue input 2
16	Yellow-Brown		AnIN 1	Analogue input 1

Connector: Molex Micro-Fit 3.0™ 16 poles (430-25-1600)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)



Figure 5: EPOS power / signal cable head B

Connect this cable end to the power supply and any used interface

Pin No.	Colour	Twisted wire	Signal	Description
1	White		D_Gnd	Digital signal ground
2	Brown		D_Gnd	Digital signal ground
3	Green		DigIN 6	Digital input 6 "negative limit switch"
4	Yellow		DigIN 5	Digital input 5 "positive limit switch"
5	Grey		DigIN 4	Digital input 4 "Home switch"
6	Pink		DigIN 3	Digital input 3 "general purpose"
7	Blue		DigIN 2	Digital input 2 "general purpose"
8	Red		DigIN 1	Digital input 1 "general purpose"
9	Black		+VOUT	Auxiliary supply voltage Output (+5 VDC / 10mA)
10	Violet		DigOUT 4	Digital output 4 "general purpose"
11	Grey-Pink		DigOUT 3	Digital output 3 "general purpose"
12	Red-Blue		+Vcc (9..24 VDC)	Power supply voltage +9...+24 VDC
13	White-Green		Power_Gnd	Power Ground
14	Brown-Green		A_Gnd	Analogue signal ground
15	White-Yellow		AnIN 2	Analogue input 2
16	Yellow-Brown		AnIN 1	Analogue input 1

Cable end sleeve: 0.14 mm²

7 EPOS 24/1 DC motor cable (Connector J10)

Order number: EPOS 24/1 DC motor cable **303490**



Figure 6: EPOS 24/1 DC motor cable 303490

The “EPOS 24/1 DC motor cable” is a 2 x 0.25 mm², shielded, 3 m length cable.



Figure 7: EPOS 24/1 DC motor cable head A

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 connector “J10”

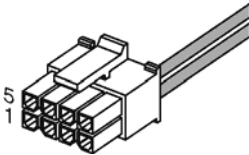


Figure 8: Pin assignment EPOS 24/1 DC motor cable head A

Pin No.	Colour	Twisted wire	Signal	Description
1				
2				
3				
4	White		M+	+ Motor terminal
5				
6				
7				
8	Brown		M-	- Motor terminal

Connector: Molex Micro-Fit 3.0™ 8 poles (430-25-0800)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)

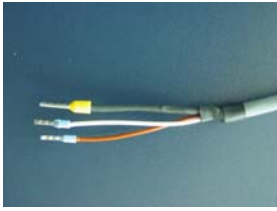


Figure 9: EPOS 24/1 DC motor cable head B

Connect this cable end to the DC motor

Pin No.	Colour	Twisted wire	Signal	Description
	White		M+	+ Motor terminal
	Brown		M-	- Motor terminal
	Black		Motor shield	Cable shield

Cable end sleeve (Motor): 0.25 mm²
 Cable end sleeve (Shield): 1.00 mm²

Note:

For EMC-compliant installation the cable shield should be connected to the motor housing.

8 EPOS 24/1 motor / Hall sensor cable (Connector J10)

Order number: EPOS 24/1 motor / Hall sensor cable **302948**



Figure 10: EPOS 24/1 motor / Hall sensor cable 302948

The “EPOS 24/1 motor / Hall sensor cable” is a 3 x 0.25 mm², shielded, 3 m length cable and a 5 x 0.14 mm², shielded, 3 m length cable.



Figure 11: EPOS 24/1 motor / Hall sensor cable head A

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 connector “J10 “

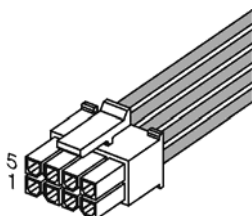


Figure 12: Pin assignment EPOS 24/1 motor / Hall sensor cable head A

Pin No.	Colour	Twisted wire	Signal	Description
1	White (0.14mm ²)		Hall sensor 3	Hall sensor 3 Input
2	Brown (0.14mm ²)		Hall sensor 2	Hall sensor 2 Input
3	Green (0.25mm ²)		Motor winding 3	Winding 3
4	White (0.25mm ²)		Motor winding 1	Winding 1
5	Grey (0.14mm ²)		+V _{Hall}	Hall sensor supply voltage +5 VDC / 30 mA
6	Green (0.14mm ²)		Hall sensor 1	Hall sensor 1 Input
7	Yellow (0.14mm ²)		GND	Ground of Hall supply
8	Brown (0.25mm ²)		Motor winding 2	Winding 2

Connector: Molex Micro-Fit 3.0™ 6 poles (430-25-0800)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)

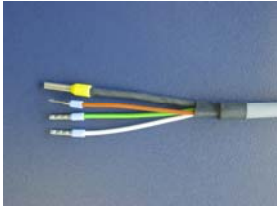


Figure 13: Motor cable head B

Connect this cable end to the EC motor

Pin No.	Colour	Twisted wire	Signal	Description
	White		Motor winding 1	Winding 1
	Brown		Motor winding 2	Winding 2
	Green		Motor winding 3	Winding 3
	Black		Motor shield	Cable shield

Cable end sleeve (Motor): 0.25 mm²
 Cable end sleeve (Shield): 1.00 mm²

Note:

For EMC-compliant installation the cable shield should be connected to the motor housing.



Figure 14: Hall sensor cable head B

Connect this cable end to the Hall sensor

Pin No.	Colour	Twisted wire	Signal	Description
	Green		Hall sensor 1	Hall sensor 1 Input
	Brown		Hall sensor 2	Hall sensor 2 Input
	White		Hall sensor 3	Hall sensor 3 Input
	Yellow		GND	Ground of Hall supply
	Grey		+V _{Hall}	Hall sensor supply voltage +5 VDC / 30 mA
	Black		Hall shield	Cable shield

Cable end sleeve (Hall): 0.14 mm²
 Cable end sleeve (Shield): 1.00 mm²

Note:

For EMC-compliant installation the cable shield should be connected to the motor housing.

9 EPOS encoder cable (Connector J11)

Order number: EPOS encoder cable **275934**



Figure 15: EPOS encoder cable 275934

The “EPOS encoder cable“ is a 10 x AWG28, round-jacket, twisted pair flat cable, pitch 1.27 mm, 3.20 m length cable.



Figure 16: EPOS encoder cable head A

The used DIN 41651 female connector fits to EPOS 24/1 connector “J11 Encoder“

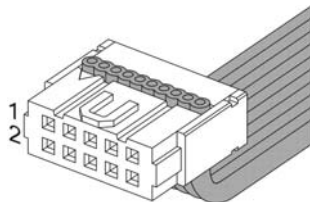


Figure 17: Pin assignment EPOS encoder cable head A

Pin No.	Colour	Twisted wire	Signal	Description
1	Brown	Pair 1	Motor + ¹	DC motor: + Motor
2	White	Pair 1	+5 VDC / 100 mA	Encoder supply voltage
3	Red	Pair 2	GND	Ground
4	White	Pair 2	Motor –	DC motor: - Motor
5	Orange	Pair 3	Channel A\	Channel A complement
6	White	Pair 3	Channel A	Channel A
7	Yellow	Pair 4	Channel B\	Channel B complement
8	White	Pair 4	Channel B	Channel B
9	Green	Pair 5	Channel I\	Index complement
10	White	Pair 5	Channel I	Index

Connector: DIN 41651 female connector, pitch 2.54 mm, 10 poles, plug strain relief

¹ Only in use with maxon DC motors with integrated motor/encoder ribbon cable



Figure 18: EPOS encoder cable head B

Connect this cable end to the encoder

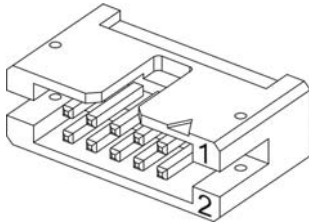


Figure 19: Pin assignment EPOS encoder cable head B

Pin No.	Colour	Twisted wire	Signal	Description
1	Brown	Pair 1	Motor + ¹	DC motor: + Motor
2	White	Pair 1	+5 VDC / 100 mA	Encoder supply voltage
3	Red	Pair 2	GND	Ground
4	White	Pair 2	Motor -	DC motor: - Motor
5	Orange	Pair 3	Channel A\	Channel A complement
6	White	Pair 3	Channel A	Channel A
7	Yellow	Pair 4	Channel B\	Channel B complement
8	White	Pair 4	Channel B	Channel B
9	Green	Pair 5	Channel I\	Index complement
10	White	Pair 5	Channel I	Index

Connector: DIN 41651 Plug, pitch 2.54 mm, 10 poles, plug strain relief

Note:

EPOS encoder cable head B, the pin out suits for example:

- maxon digital MR-Encoder type S, M, ML, L all with Line Driver
- maxon digital encoder HEDL 55_ with Line Driver RS 422

¹ Only in use with maxon DC motors with integrated motor/encoder ribbon cable

10 EPOS RS232-COM cable (Connector J12)

Order number: EPOS RS232-COM cable **275900**



Figure 20: EPOS RS232-COM cable 275900

The "EPOS RS232-COM cable" is a 2 x 2 x 0.14 mm², twisted pair, shielded, 3 m length cable.



Figure 21: EPOS RS232-COM cable head A

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 connector "J12 RS-232"

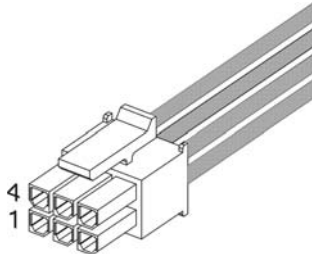


Figure 22: Pin assignment EPOS RS232-COM cable head A

Pin No.	Colour	Twisted Wire	Signal	Description
1	Yellow	Pair 1	EPOS RxD	EPOS RS232 receive
2	White	Pair 2	EPOS TxD	EPOS RS232 transmit
3	Not connected			
4	Green	Pair 1	GND	RS232_Ground
5	Brown	Pair 2	GND	RS232_Ground
6	Black		Shield	Cable shield

Connector: Molex Micro-Fit 3.0™ 6 poles (430-25-0600)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)



Figure 23: EPOS RS232-COM cable head B

Connect this cable end to your COM interface

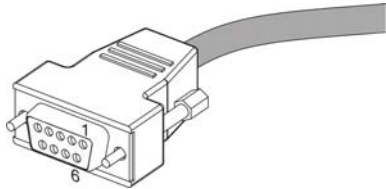


Figure 24: Pin assignment EPOS RS232-COM cable head B

Pin No.	Colour	Twisted wire	Signal	Description
1	Not connected			
2	White	Pair 2	RS232 RxD	COM RS232 receive
3	Yellow	Pair 1	RS232 TxD	COM RS232 transmit
4	Not connected			
5	Brown Green	Pair 2 Pair 1	RS232 GND RS232 GND	COM RS232_Ground COM RS232_Ground
6	Not connected			
7	Not connected			
8	Not connected			
9	Not connected			
x	Shield		Cable shield	Soldered on connector housing

Pin assignment according to RS-232 standard

Connector: Female D-Sub connector DIN 41652, 9 poles, with mounting screws

11 EPOS CAN-COM cable (EPOS 24/1 CAN Y-cable head A or B)

Order number: EPOS CAN-COM cable **275908**



Figure 25: EPOS CAN-COM cable 275908

The “EPOS CAN-COM cable” is a 2 x 2 x 0.14mm², twisted pair, shielded, 3 m length cable.



Figure 26: EPOS CAN-COM cable head A

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 CAN Y-cable (order number: 319471)

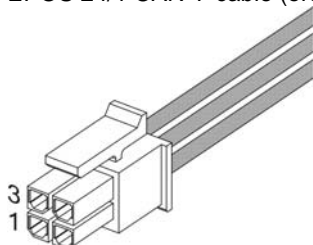


Figure 27: Pin assignment EPOS CAN-COM cable head A

Pin No.	Colour	Twisted wire	Signal	Description
1	Yellow	Pair 1	CAN high	CAN high bus line
2	Green	Pair 1	CAN low	CAN low bus line
3	Brown		CAN GND	CAN Ground
4	Black		CAN shield	Cable shield

Connector: Molex Micro-Fit 3.0™ 4 poles (430-25-0400)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)



Figure 28: EPOS CAN-COM cable head B

Connect this cable end to your CAN Master

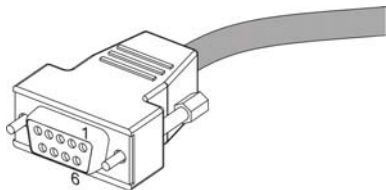


Figure 29: Pin assignment EPOS CAN-COM cable head B

Pin No.	Colour	Twisted wire	Signal	Description
1	Not connected			
2	Green	Pair 1	CAN low	CAN low bus line
3	Brown		CAN GND	CAN Ground
4	Not connected			
5	Shield		CAN shield	Cable shield
6	Not connected			
7	Yellow	Pair 1	CAN high	CAN high bus line
8	Not connected			
9	Not connected			

Pin assignment according to CiA DS102-2

Connector: Female D-Sub connector DIN 41652, 9 poles, with mounting screws

12 EPOS 24/1 CAN Y-cable (Connector J13)

Order number: EPOS 24/1 CAN Y-cable **319471**

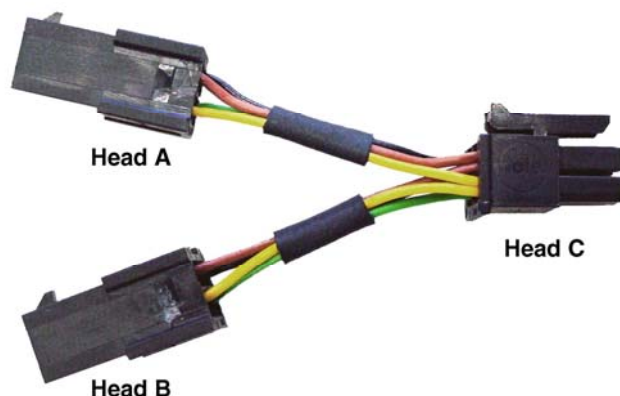


Figure 30: EPOS 24/1 CAN Y-cable

The "EPOS 24/1 CAN Y-cable" consist of 50mm long single wire with cross section of 0.14mm²

Head A / Head B			Head C		
The used Molex Micro-Fit 3.0™ connector fits to: - EPOS CAN-COM cable (#275908) head A - EPOS CAN-CAN cable (#275926) - EPOS CAN termination plug (#275937)			The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 connector "J13 CAN"		
<p>Figure 31: Pin assignment EPOS 24/1 CAN Y-cable head A and B</p>			<p>Figure 32: Pin assignment EPOS 24/1 CAN Y-cable head C</p>		
Pin	Colour	Signal	Pin	Colour	Signal
1	Green	CAN low	1	Yellow	CAN high
2	Yellow	CAN high	2	Green	CAN low
3	Black	CAN shield	3	Brown	CAN GND
4	Brown	CAN GND	4	Black	CAN shield
<p>Connector: Molex Micro-Fit 3.0.™ 4 poles (430-20-0401)</p>			<p>Connector: Molex Micro-Fit 3.0.™ 4 poles (430-25-0400)</p>		
<p>Crimp terminals: Molex Micro-Fit 3.0™ male crimp terminals (430-31-0010)</p>			<p>Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0007)</p>		
<p>Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)</p>			<p>Hand crimper: Molex hand crimper (Europe: 69008-0982; America: 63811-2800)</p>		

13 EPOS CAN-CAN cable (EPOS 24/1 CAN Y-cable head A or B)

Order number: EPOS CAN-CAN cable **275926**



Figure 33: EPOS CAN-CAN cable 275926

The “EPOS CAN-CAN cable” is a 2 x 2 x 0.14mm², twisted pair, shielded, 3 m length cable.



Figure 34: EPOS CAN-CAN cable head A

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 CAN Y-cable (order number: 319471)

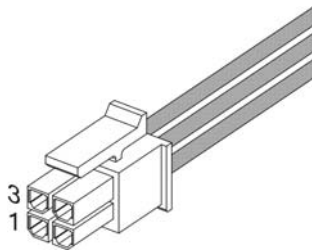


Figure 35: Pin assignment EPOS CAN-CAN cable head A

Pin No.	Colour	Twisted wire	Signal	Description
1	Yellow	Pair 1	CAN high	CAN high bus line
2	Green	Pair 1	CAN low	CAN low bus line
3	Brown		CAN GND	CAN Ground
4	Shield		CAN shield	Cable shield

Connector: Molex Micro-Fit 3.0™ 4 poles (430-25-0400)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)



Figure 36: EPOS CAN-CAN cable head B

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 CAN Y-cable (order number: 319471)

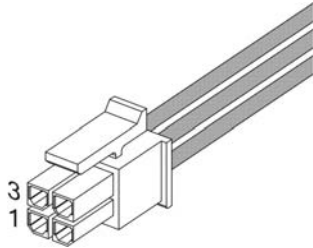


Figure 37: Pin assignment EPOS CAN-CAN cable head B

Pin No.	Colour	Twisted Wire	Signal	Description
1	Yellow	Pair 1	CAN high	CAN high bus line
2	Green	Pair 1	CAN low	CAN low bus line
3	Brown		CAN GND	CAN Ground
4	Shield		CAN shield	Cable shield

Connector: Molex Micro-Fit 3.0™ 4 poles (430-25-0400)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)

14 EPOS CAN termination plug (EPOS 24/1 CAN Y-cable head A or B)

Order number: EPOS CAN termination plug **275937**



Figure 38: EPOS CAN termination plug 275937

The used Molex Micro-Fit 3.0™ connector fits to EPOS 24/1 CAN Y-cable (order number: 319471)

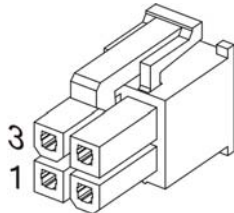


Figure 39: Pin assignment EPOS CAN termination plug

Pin No.	Colour	Twisted wire	Signal	Description
1			Resistor terminal 1	120 Ohm bus termination
2			Resistor terminal 2	120 Ohm bus termination
3	Not connected			
4	Not connected			

Connector: Molex Micro-Fit 3.0™ 4 poles (430-25-0400)
 Crimp terminals: Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)
 Hand crimper: Molex hand crimper (Europe: 69008-0983; America: 63811-2800)

15 EPOS 24/1 connector set

Order number: EPOS 24/1 connector set **303807**

Complete connector set contains:

Connector	Specification	Number
J10	Molex Micro-Fit 3.0™ 8 poles (430-25-0800)	1
J12	Molex Micro-Fit 3.0™ 6 poles (430-25-0600)	1
J13	Molex Micro-Fit 3.0™ 4 poles (430-25-0400)	1
J14	Molex Micro-Fit 3.0™ 16 poles (430-25-1600)	1
	Molex Micro-Fit 3.0™ female crimp terminals (430-30-0010)	40
	Tyco C42334-A421-C42 (right), encoder clip right	1
	Tyco C42334-A421-C52 (left), encoder clip left	1

Useful accessories (not available at maxon motor ag):

Hand crimper : Molex hand crimper (Europe: 69008-0983; America: 63811-2800)