

11. COP-AX (Motor Output Stage)

COP-AX 611145800

The COP-AX module has two motor output stages. All popular motor types are supported. Incremental or SinCos encoders can be connected as feedback systems. In addition, an integrated braking resistor (ballast resistor) is available.



For the motor control, a COP-MAS or COP-MAS2 module with a free processor core is needed in the same COP case. Only a maximum of four COP-AX/AX2 modules can be used per COP node.



If a COP node contains COP-AX/AX2 modules, they must start with the rotary switch address 0. Further COP-AX/AX2 modules follow with increasing addressing. This means when using one module the address is set to 0. When using three modules, the addresses are set to 0, 1 and 2. All other COP module types receive the subsequent rotary switch addresses.



If the motor has Hall sensors, a COP-IO module is required in the same COP node. Hall sensors must be connected to the ascending numbered digital inputs. For example, Hall 1 at DIN 1, Hall 2 at DIN 2 and Hall 3 at DIN 3.



The external enable pin (Ext_En) cannot be interpreted as Safe Torque Off (STO). To achieve no-voltage on the axis, the motor supply voltage (Mot_Ucc) has to be turned off completely.



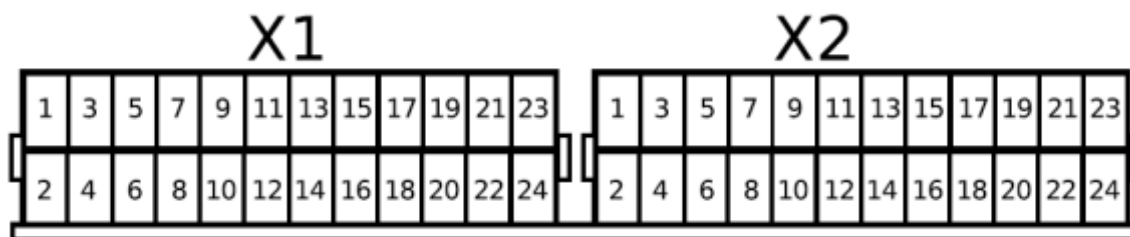
11.1. Technical Specifications

Motor Output Stage		
Number of output stages	2	
Integrated braking resistor	56Ω/5W	
Rated intermediate circuit voltage	48	V _{DC}
Maximum intermediate circuit power supply	60	V _{DC}
Continuous current per final stage ¹⁾	2.5	A _{RMS}
Peak current (max 5s) per final stage ¹⁾	5	A _{RMS}
Motor		
Minimum inductance	1	mH
Minimum resistance	0.2	Ω
Maximum cable length	20	m
Motor cable	Shielded	
Motor types	Synchronous servo motors, DC motors, stepper motors, Linear motors	

Incremental Encoder Interface		
Level	RS422	
Input impedance	120	Ω
Maximum input frequency	2.5	MHz
Maximum current load at 5V output	200	mA
Power cable	Shielded	
SinCos Interface		
Level	1	V _{RMS}
Input impedance	120	Ω
Maximum input frequency	200	kHz
Maximum current load at 5V output	200	mA
Analogue input resolution	16	Bit
Analogue input use	12	Bit
Power cable	Double shielded, pair-twisted	
Module		
Maximum power consumption at 24V node power supply	-	mA

- 1) Additional ventilation may be needed to dissipate the waste heat generated.

11.2. Pin Assignment

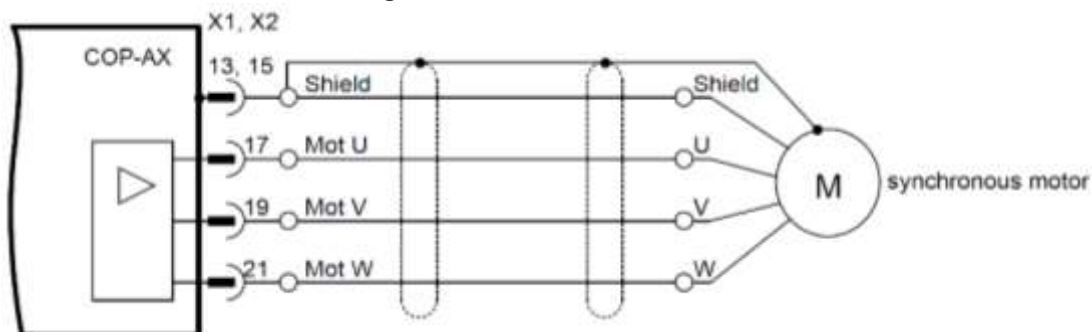


X1					
No.	Dir	Id.	Id.	Dir	No.
2	In	Inc0 A+ Clk+	Sin+ 0	In	1
4	In	Inc0 A- Clk-	Sin- 0	In	3
6	In	Inc0 B+ Data+	Cos+ 0	In	5
8	In	Inc0 B- Data-	Cos- 0	In	7
10	In	Ref+	GEN+ 0	Out	9
12	In	Ref-	GEN- 0/ Enc_12V	Out	11
14	Out	Enc_5V	Shield		13
16		GND	Shield		15
18	In	MTmp 0	Mot 0 U	Out	17
20	In	Ext_En	Mot 0 V	Out	19
22		GND	Mot 0 W	Out	21
24	In	Mot_Ucc	Mot 0 X	Out	23

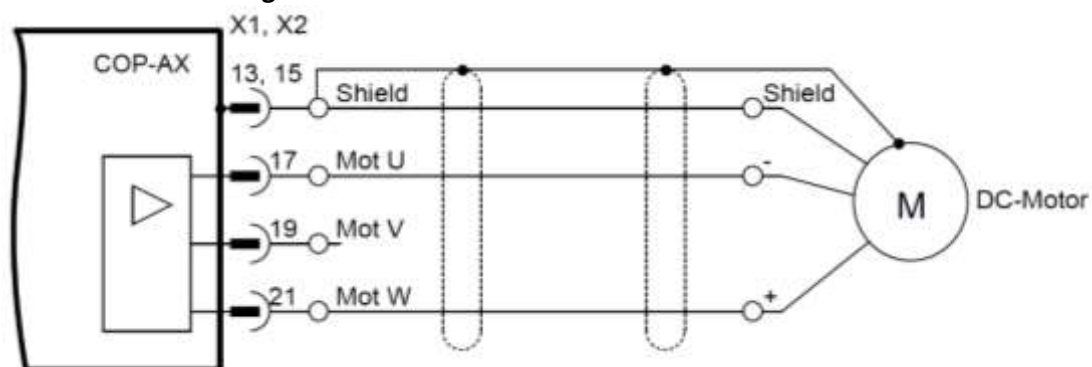
X2					
No.	Dir	Id.	Id.	Dir	No.
2	In	Inc1 A+ Clk+	Sin+ 1	In	1
4	In	Inc1 A- Clk-	Sin- 1	In	3
6	In	Inc1 B+ Data+	Cos+ 1	In	5
8	In	Inc1 B- Data-	Cos+ 1	In	7
10	In	Ref+	GEN+ 1	Out	9
12	In	Ref-	GEN- 1/ Enc_12V	Out	11
14	Out	Enc_5V	Shield		13
16		GND	Shield		15
18		MTmp 1	Mot 1 U	Out	17
20	In	Ext_En	Mot 1 V	Out	19
22		GND	Mot 1 W	Out	21
24	In	Mot_Ucc	Mot 1 X	Out	23

11.3. Connection Examples

Synchronous motor at a final stage



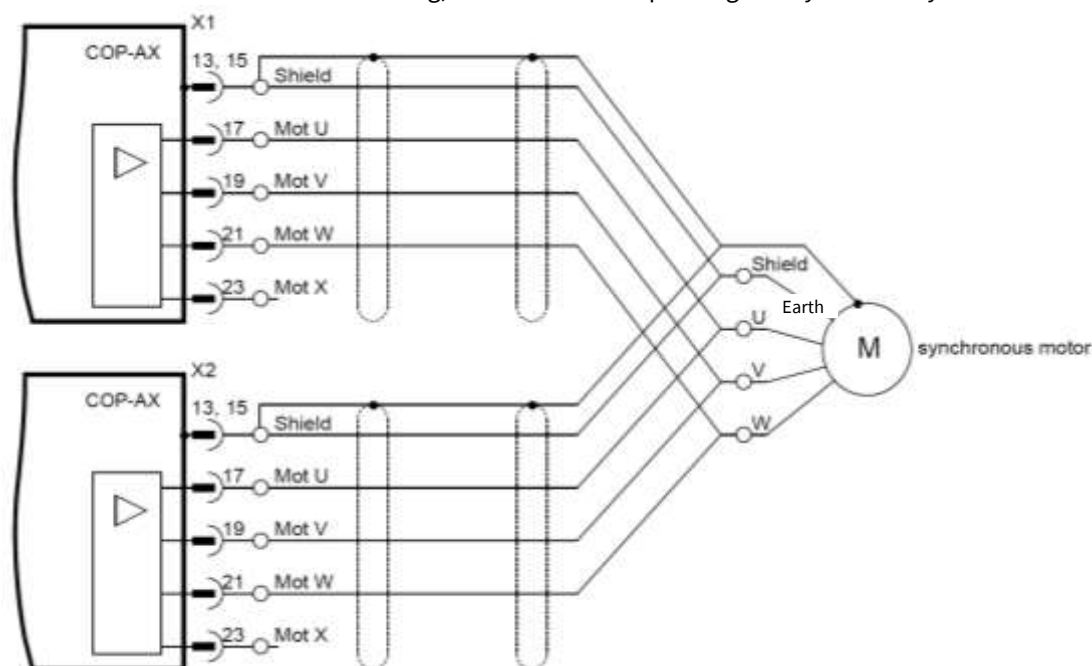
DC motor at a final stage



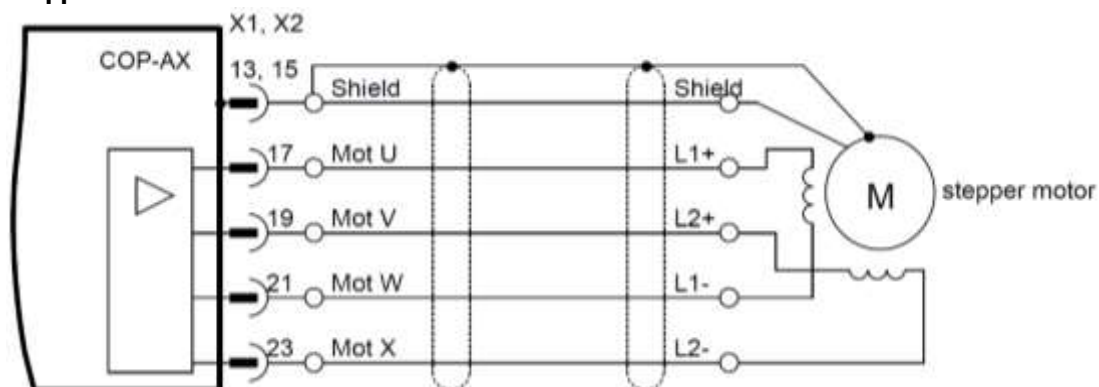
Synchronous motor at two parallel output stages



The Y cables must be at least 25cm long, otherwise the output stages may be destroyed.



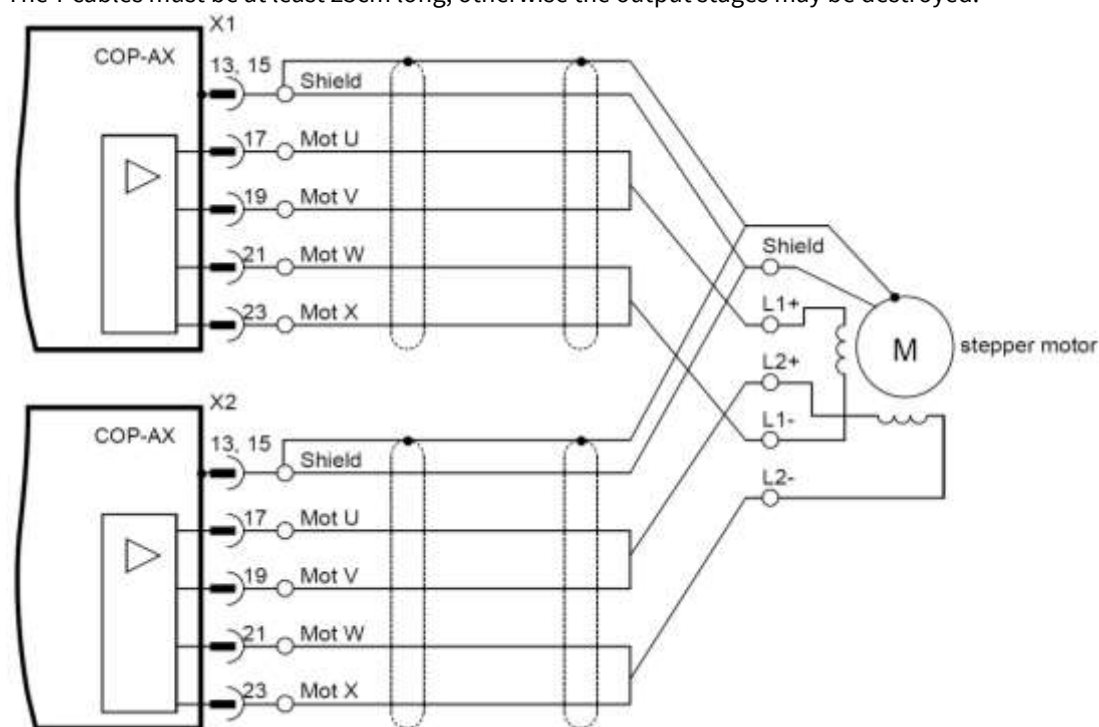
Stepper motor



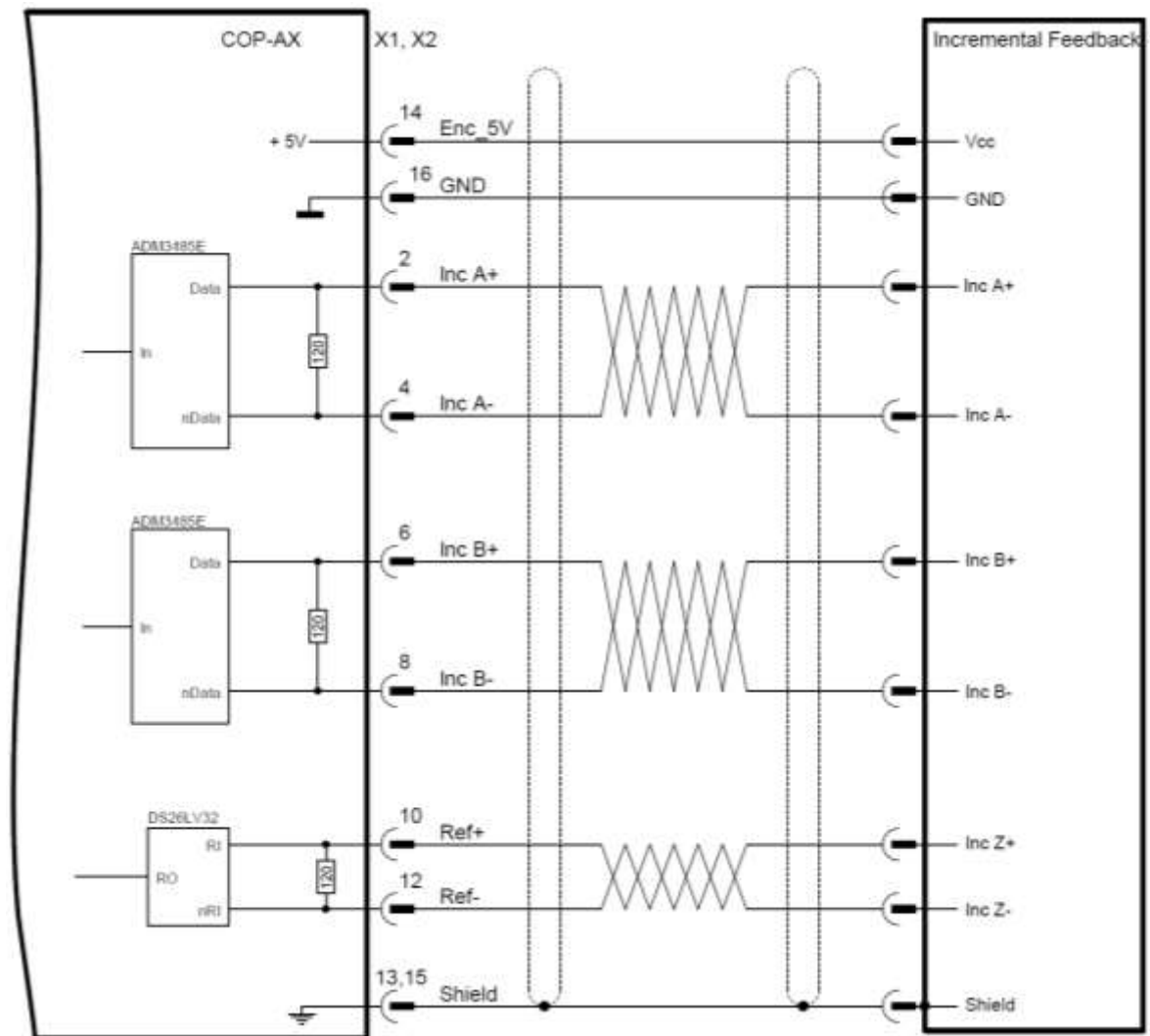
Stepper motor at two parallel output stages



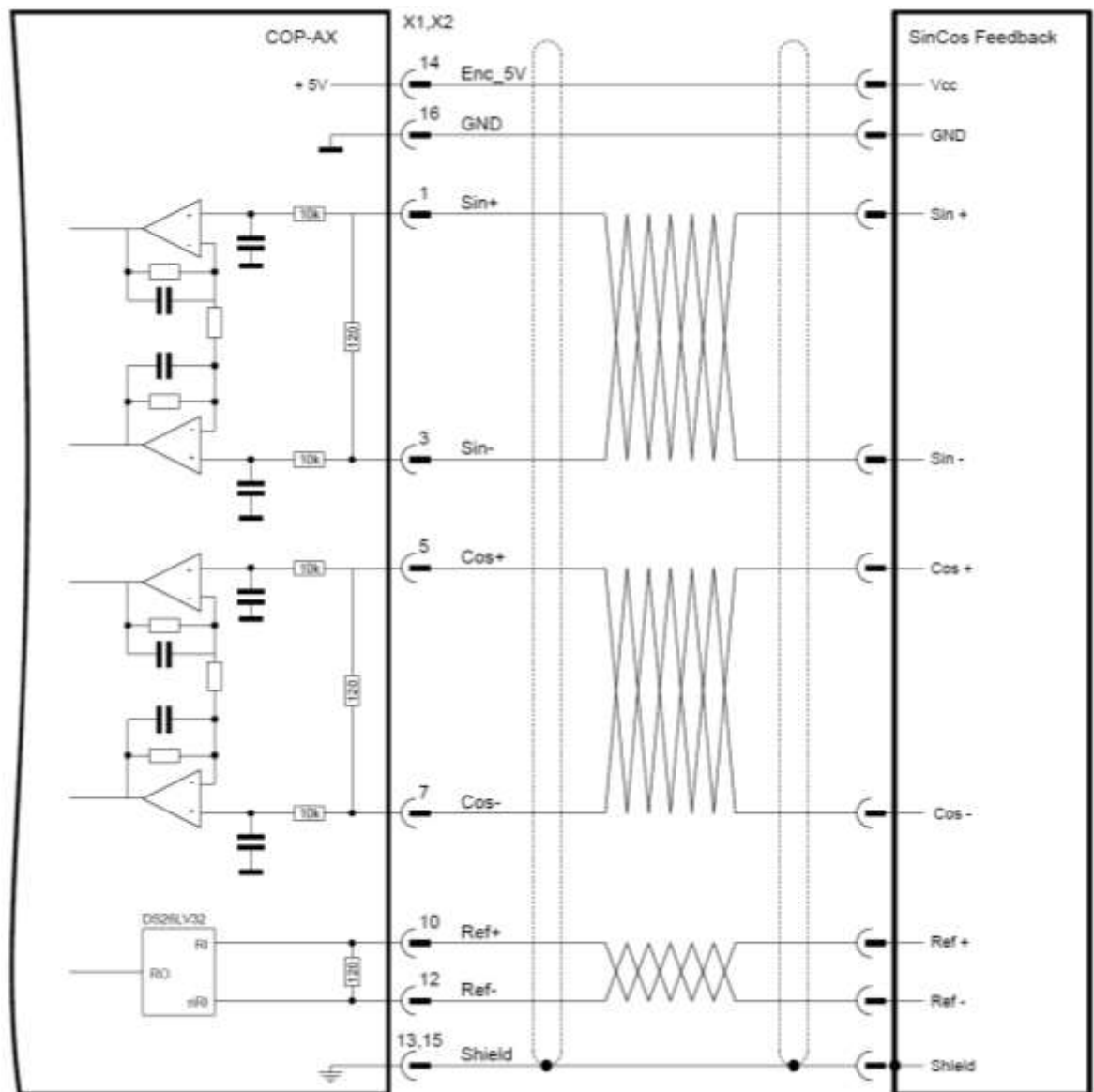
The Y cables must be at least 25cm long, otherwise the output stages may be destroyed.



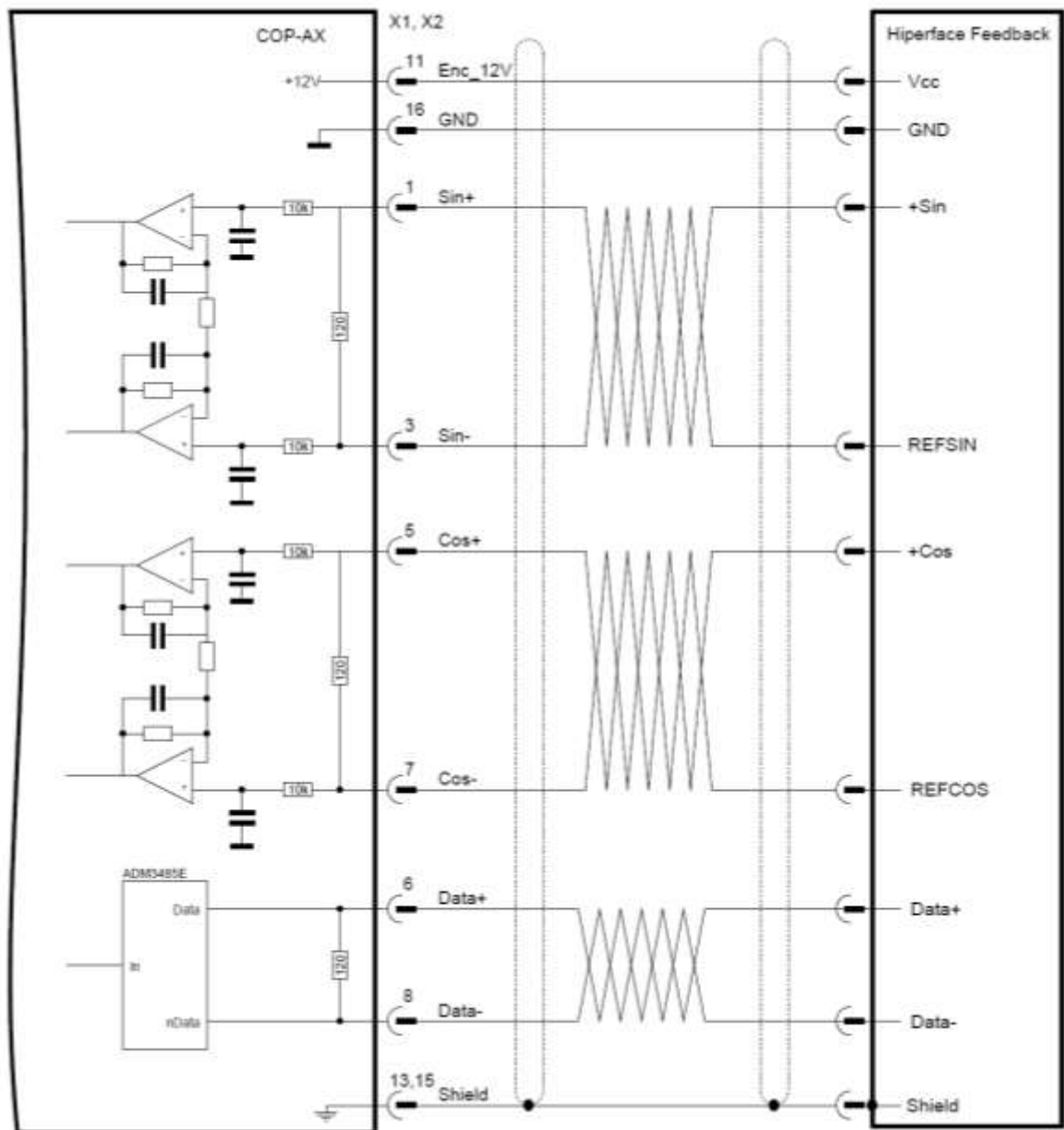
Incremental encoder feedback



SinCos feedback



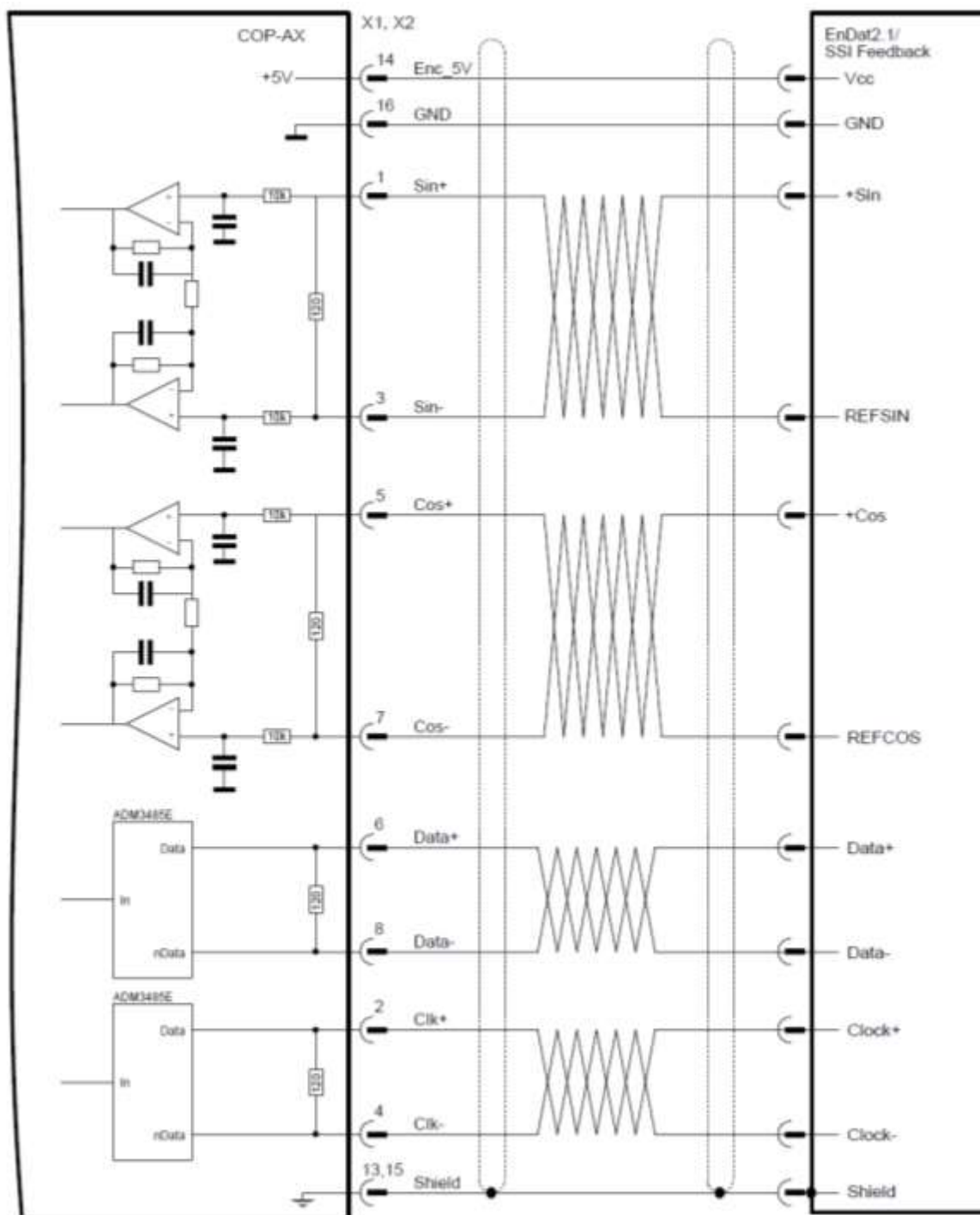
Hiperface Feedback



EnDat2.1 / SSI Feedback



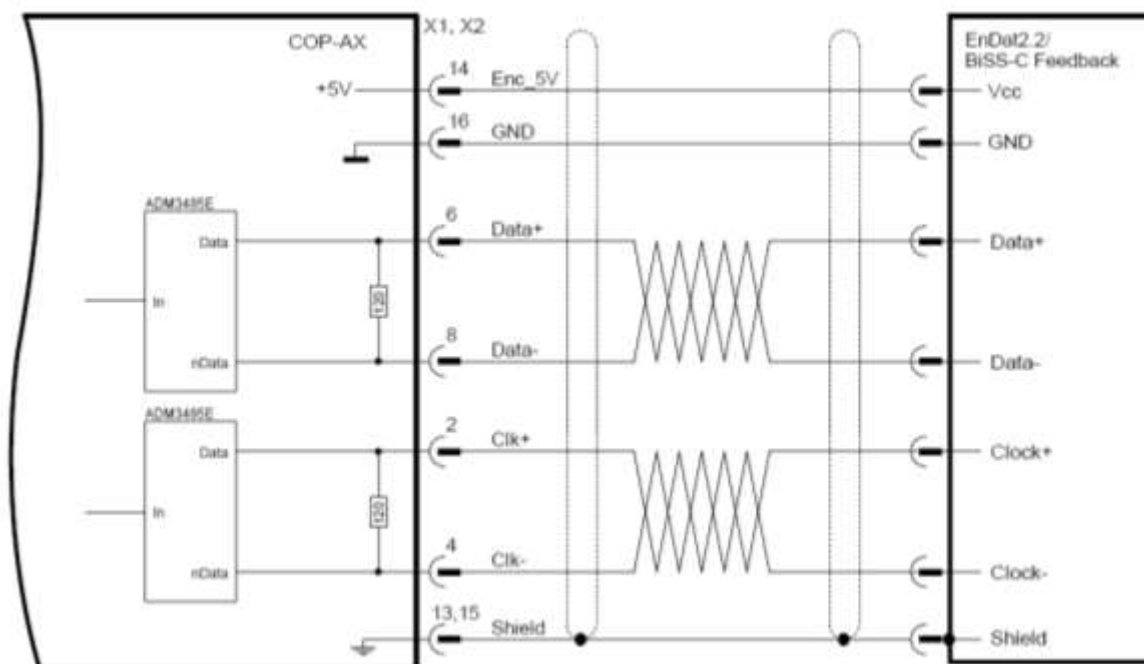
If the supply voltage of the feedback system is >12V use Enc_12V (Pin 11) instead of Enc_5V.



EnDat2.2 / BiSS-C Feedback



If the supply voltage of the feedback system is >12V use Enc_12V (Pin 11) instead of Enc_5V.



The purely digital control on the fast absolute encoders is currently not available for the COP modules!

11.4. Available Options

Item Number	Label	Option	Description
611145800	COP-AX		• 2 x motor output stage, • PM, SM, DC motors • SinCos feedback or • Incremental encoder feedback • Hiperface • EnDat 2.1 • SSI