EMERSON
Industrial Automation

Application Note
CTAN #256

The Application Note is pertinent to the Unidrive SP Family

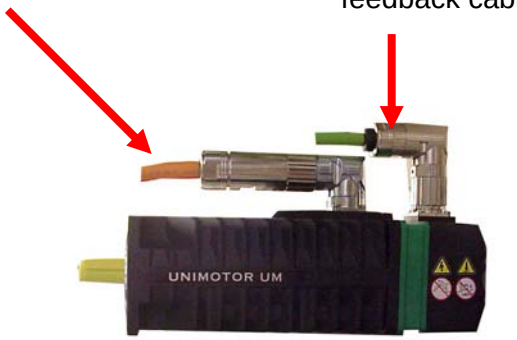
Setting up with the Stegmann Sin/Cos Hiperface Absolute Encoder

This document assists in the start up of the equipment shown below.
It will be applicable to similar hardware as well.

SP 1401

PSBAA002 Power Cable

SSBBC002 Sin Cos feedback cable



75UMB400CARAA Unimotor with Sin/Cos Hiperface encoder

The SRS50(single-turn) and SRM50 (multi-turn) encoders are fitted to the Unimotor when absolute positioning is required. Stegmann manufactures these encoders. The entire specification tables and feature information for the encoder can be viewed in the attached document. Adobe reader will be needed to open it.

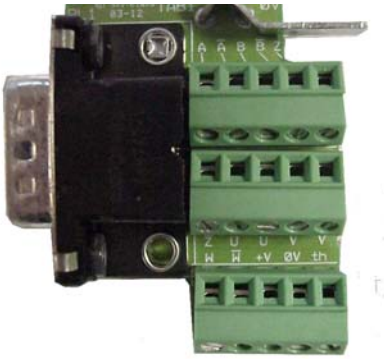
http://www.emersonct.com/download_usa/appNotes/stegmannDataSheet.pdf

Connecting the Hardware

The SP drive, feedback cable, and encoder must all be connected properly to achieve correct operation. Even one wire on the wrong terminal will cause problems. The SM-ETC terminal strip break out connector is a good choice for the drive feedback port. Molded cables can also be purchased but they do not permit measurement of signals in the event troubleshooting becomes necessary. The motor power connections are clearly labeled U, V, and W. They should be connected to the drive accordingly. The diagram below shows the wiring and pinouts between the devices for feedback only.

SM-ETC Front View

SM-ETC Top View



The terminals on the SM-ETC are labeled for a standard Quadrature Incremental Differential encoder with commutation channels. These labels will not match up with the wiring for a Stegmann Sin/Cos Absolute Hiperface encoder. The figure below shows the cross-reference.

SM-ETC Terminal #'s			SSBBC002 Feed back Cable		SRM50 Terminal #'s	
Label	**Function**	**Pin**	**COLOR**		**Function**	**Pin**
/A	Ref Cosine	2	RED		Ref Cosine	1
Z	EIA485 +	5	BLUE		EIA485 +	2
/Z	EIA485 -	6	VIOLET		EIA485 -	3
A	Cosine	1	ORANGE		Cosine	4
B	Sine	3	BROWN		Sine	5
/B	Ref Sine	4	BLACK		Ref Sine	6
th	Motor Thermistor	15	YELLOW		Motor Thermistor	7
0V	Motor Thermistor	14	GREEN		Motor Thermistor	8
0V	Screen	14	SCREEN		Screen	9
0V	0V	14	BLUE/WHITE		0V	10
V +	8VDC	13	RED/WHITE		8VDC	12

Programming the Drive Parameters

The drive will need to be programmed to accept the SinCos absolute encoder after the wiring is complete. The changes made to the SP1401 to accommodate the motor and feed back device are shown below. These were test parameters that are shown after phasing was completed. They may be different for your drive/motor combination.

Parameter	Description	Default	Memory	Units
01.06	Maximum reference clamp	3000.0	**4000.0**	RPM
01.14	Reference selector	A1.A2	**Pad**	
02.11	Acceleration rate 1	0.200	**10.000**	s/1000 RPM
02.21	Deceleration rate 1	0.200	**10.000**	s/1000 RPM
03.25	Encoder phase angle	0.0	**1.3**	°
03.33	Drive encoder turn bits	16	**12**	
03.34	Drive encoder lines per revolution	4096	**1024**	
03.35	Drive encoder single turn comms resolution	0	**15**	
03.36	Drive encoder supply voltage	5V	**8V**	
03.38	Enable frequency slaving	Ab.Servo	**SC.Hiper**	
03.41	Drive encoder auto-configuration	Off	**On**	
04.12	Current demand filter1	0.0	**2.0**	ms
04.13	Current controller Kp gain	150	**55**	
04.14	Current controller Ki gain	2000	**1031**	
05.07	Motor rated current	0.00	**1.90**	A
05.08	Rated load rpm / rated speed	3000.00	**4000.00**	RPM
05.09	Rated voltage	460	**294**	V
05.17	Stator resistance	0.000	**6.965**	Ohm
05.24	Transient inductance (sLs)	0.000	**15.878**	mH
06.01	Stop mode	no.rP	**rP**	
06.08	Hold zero speed	On	**Off**	
06.21	Powered-up time: hours.minutes	0.00	**0.08**	hh.mm
11.44	Security status	L1	**L2**	

Parameter #3.41 can be set to on. If the Hiperface EIA485 connections are wired properly the drive will interrogate the encoder and set #3.33, #3.34, and #3.35. If the drive trips with **EncB** these parameters will need to be entered manually.

Testing Hiperface Communications

The hardware and drive software should be configured at this point. The motor should run up to full speed and maintain stability. The next step is confirming the drive can read the absolute position provided by the encoder. This can be easily done as long as the motor shaft can be rotated by hand.

1. Display parameter #3.29 on the drive. Rotate the shaft of the motor until it is as close to zero as possible then rotate the shaft ¼ turn clockwise.

2. Mark the position of the shaft relative to the motor housing with tape or a marker.

3. Record the value in #3.29 (encoder position).

4. Go to parameter #3.28 (revolution counter) and record the value.

5. Power down the drive and rotate the shaft of the motor exactly 5 times in the clockwise direction ending up where you made the mark.

6. Power the drive back up and view parameter #3.28. It should have incremented 5 times.

7. Parameter #3.29 should be close to the original recorded value prior to power down. It will not be exact. The position parameter resolution is too high to get it perfect by hand rotation of the motor shaft.

Repeat the procedure above but every time it requires a clockwise motion rotate counter clockwise instead. #3.28 should decrement by 5 when the drive is powered back on.

For Additional Information consult **CTAN307**

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