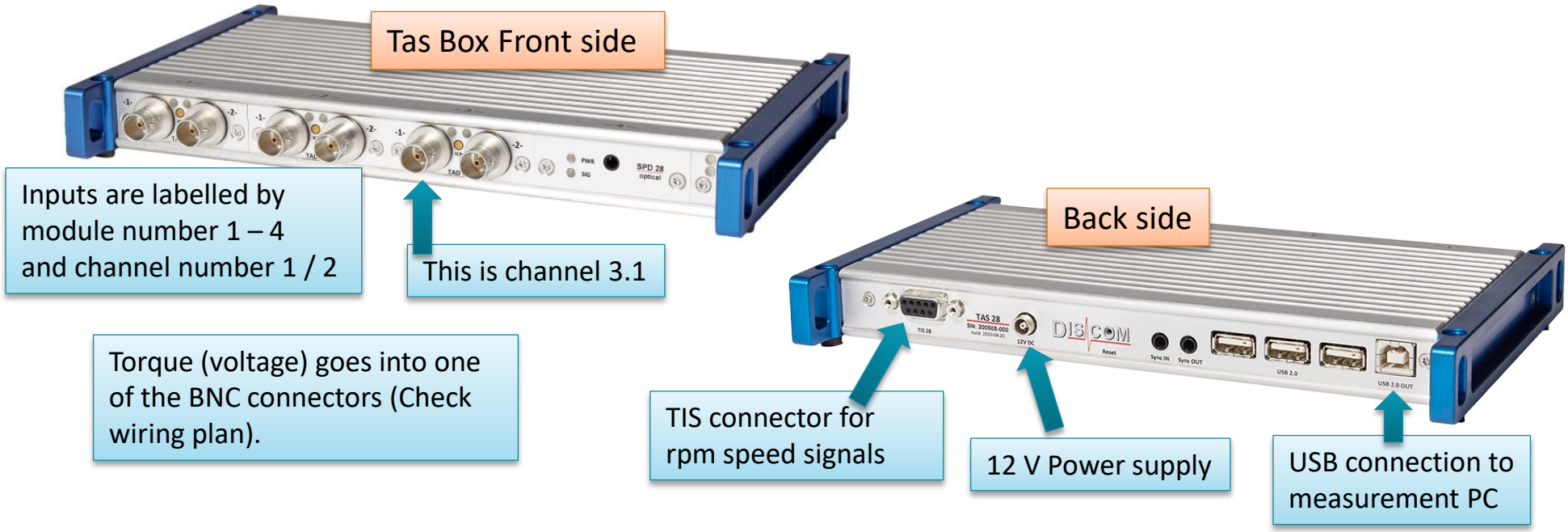
Connecting HBM Torque Transducers to Discom Tas Box

Connecting rpm speed pulse signal
and torque voltage signal

General Information

HBM Torque transducers provide a number of different signals, including torque as frequency modulation signal, torque as voltage signal, and rpm speed pulses. Torque as voltage and rpm speed pulses can be directly wired to the Tas Box.

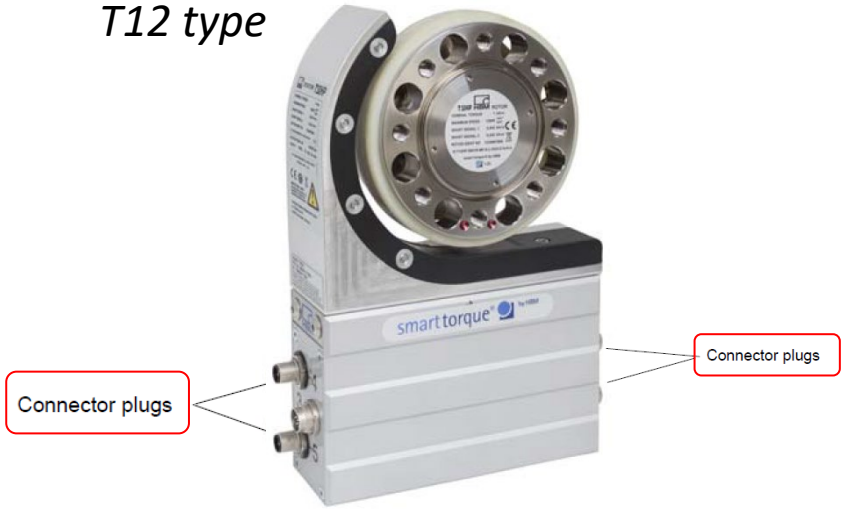
The torque voltage signal is connected to one of the A/D converter inputs on the front side of the Tas Box, while the rpm speed pulses are connected to the TIS input connector on the back side.



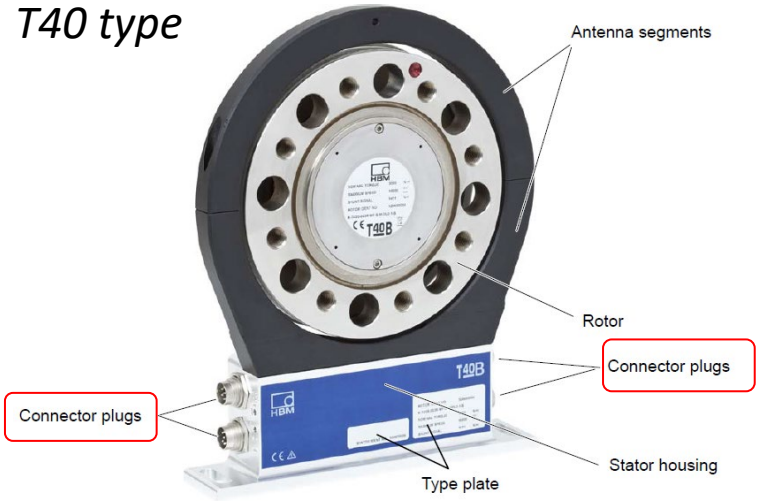
HBM Torque Transducer Connectors T12, T40

HBM torque flanges have up to 5 connectors on the base, which are clearly labelled with numbers. Consult the HBM documentation if in doubt.

T12 type



T40 type



Rpm speed pulses are on plug 2 for both T12 and T40 type, and **torque as voltage is available on plug 3**.

See next pages for details.

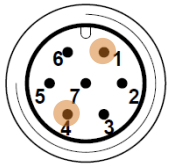
For T210 type, see page 8

Torque Connection T12, T40

Wire pins 1 and 4 of plug 3 to a BNC cable and plug into the according front input of the Tas Box.

Assignment for plug 3:

Supply voltage and voltage output signal.

HBM Device plug	Plug pin	Assignment
 Top view	1	Torque measurement signal (voltage output; 0 V)
	2	Supply voltage 0 V;
	3	Supply voltage 18 V to 30 V DC
	4	Torque measurement signal (voltage output; ± 10 V)
	5	Not in use
	6	Shunt signal trigger 5 V to 30 V
	7	Shunt signal 0 V;
		Shielding connected to housing ground

BNC cable: shield

BNC cable: line

Check the connection plan (block diagram) in the Discom system documentation for information on where to connect torque to the Tas Box.

Channel assignment can be changed in the Discom software, if necessary.

Speed Pulse Wiring T12, T40

Speed pulses are available as differential signals (see next page for more information).

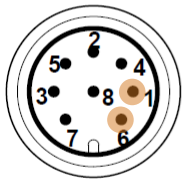
Connect HBM plug 2 pins 1/6 (signal pair A+/–) to a pin pair of the TIS input plug (see table below), using shielded twisted pair cable. Alternatively, HBM pins 3/7 (signal pair B+/–) can be used.

(Do not mix up A and B signals. Z signal is only used for specific applications.)

Assignment for plug 2:

Rotational speed output signal, reference signal (optional).

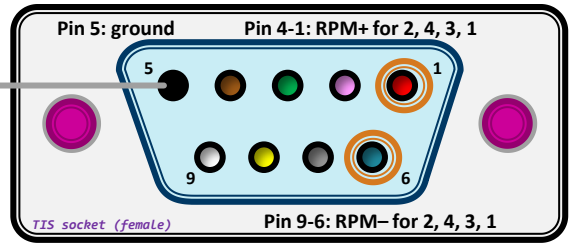
HBM Device plug



Top view

Plug pin	Assignment	
1	Rotational speed measurement signal [1] (pulse string, 5 V; 0°)	A+
2	Reference signal (1 pulse/revolution, 5 V) [1]	Z+
3	Rotational speed measurement signal [1] (pulse string, 5 V; 90° phase shifted)	B+
4	Reference signal (1 pulse/revolution, 5 V) [1]	Z–
5	Not in use	
6	Rotational speed measurement signal [1] (pulse string, 5 V; 0°)	A–
7	Rotational speed measurement signal [1] (pulse string, 5 V; 90° phase shifted)	B–
8	Operating voltage zero	0V
	Shielding connected to housing ground (do not connect to TIS cable)	

[1] RS−422 complementary signals; with cable lengths exceeding 10 m, we recommend using a termination resistor of R = 120 ohms.
TIS input is internally terminated; additional resistor is normally not necessary for Tas Box.



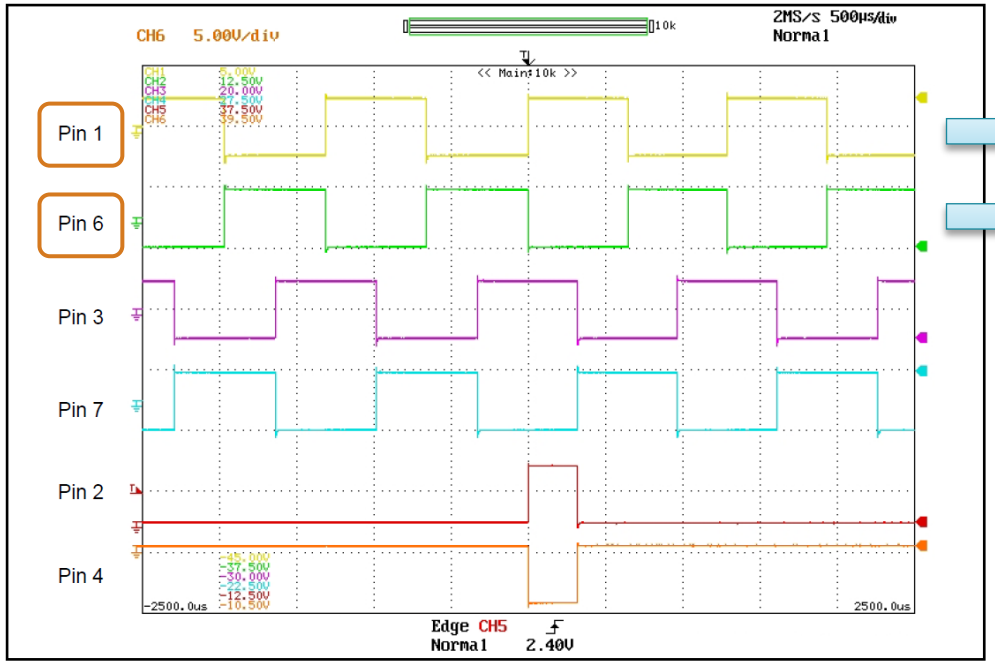
Ground connection: optional; try with and without

speed channel	Pin pair
1	1 / 6
2	4 / 9
3	2 / 7
4	3 / 8

About Differential Speed Pulses

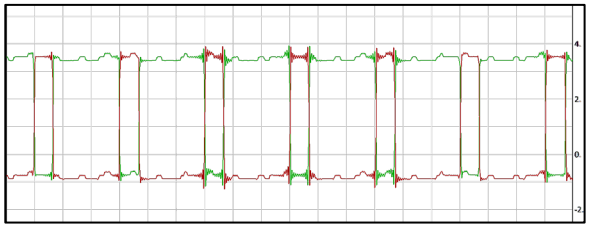
Speed pulses should be transmitted as differential signals (RS422): two parallel lines carry the same pulse signal, but with inverted voltage. The difference between these inverted signals is robust against electrical noise and other disturbances.

Therefore, two corresponding lines have to be wired from the speed encoder to the Tas Box.



A+ signal

A– signal

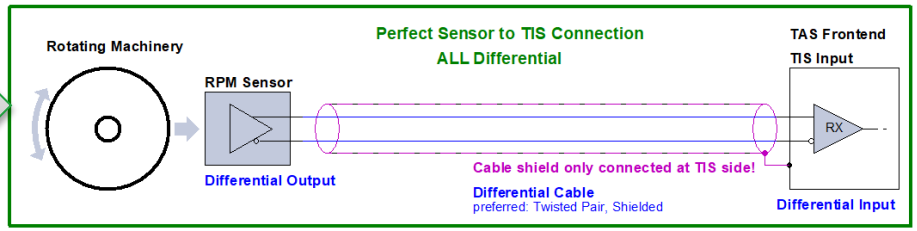


Difference between + and – signal is robust against HF noise.

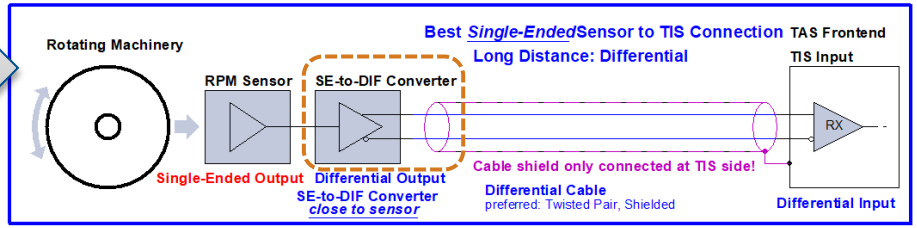
What if I don‘t have a differential signal?

If a differential pair of speed pulse signals is not available,
use a **Single Ended to Differential converter** as close to the encoder as possible (**< 30cm**).

Standard



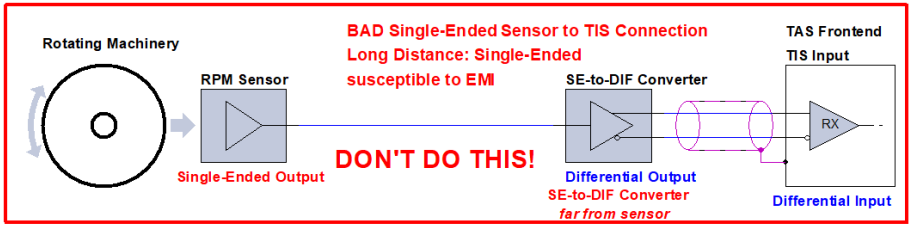
With Converter

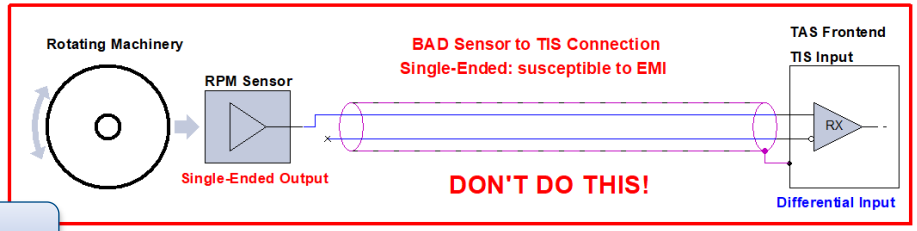


A Single Ended to Differential converter has to be used if the rpm speed encoder generates only one pulse signal (called a “single ended” signal).

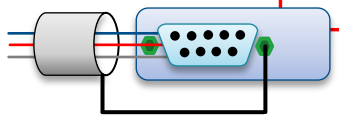
The product of company LEG depicted here is meant as an example. You can use other products as well.

One example for such an encoder is the HBM T210 transducer, another is a proximity probe (see next pages).





Connect *shield of TIS cable* on Tas Box side only to Tas Box ground.

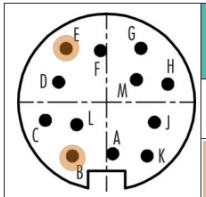


HBM Torque Transducer T210

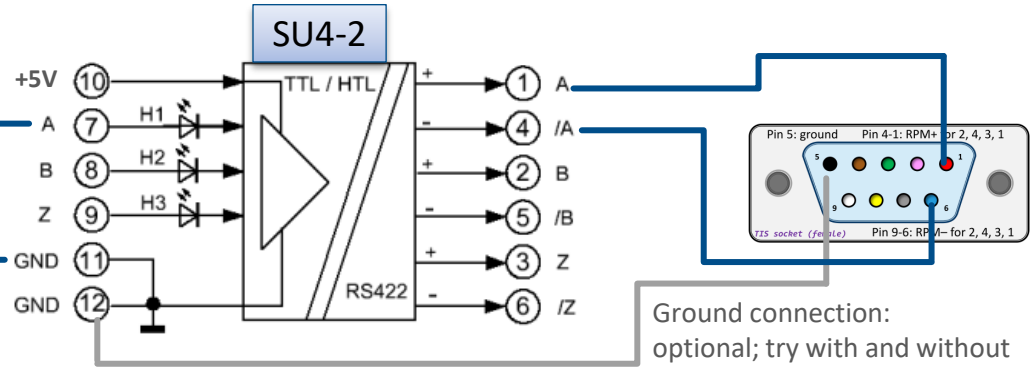
The small HBM T210 torque transducers do not have a differential output for speed pulses, only a single ended pulse output.

Therefore, you have to use a signal converter as explained on the previous page.

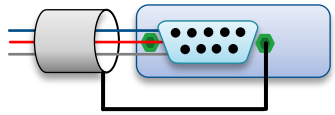
Place the signal converter as close to the torque transducer as possible (less than 30 cm). Use shielded twisted pair cable from signal converter to TIS input.



Pin	Assignment	Wire color	Trigger control signal (without VK20A)
A	Torque measurement signal (frequency output; 5 V)[1) 2)]	bk	
B	Rotational speed/angle of rotation measurement signal A; 5 V	rd	
C	Torque measurement signal ±10 V	br	
D	Torque measurement signal 0 V	wh	
E	Ground (supply+rotational speed/angle of rotation)	ye	
F	Supply voltage 10 V … 30 V	vt	Switch (NO)
G	Rotational speed/angle of rotation measurement signal B; 5 V; lagging by 90°	gn	
H	Rotational speed reference signal Z; 5 V	pk	
J	Measurement signal - ready for measurement	gr	
K	Control signal triggering	gy/pk	
L	Torque measurement signal (frequency output; 5V)[1), 2)]	bl/rd	
M	Not in use	bl	



BNC cable to Tas Box front input (see page 4)



Connect *shield of TIS cable* on Tas Box side only to Tas Box ground.

Appendix: SU4 wiring with proximity probe

Technische Daten

Hilfsenergie:

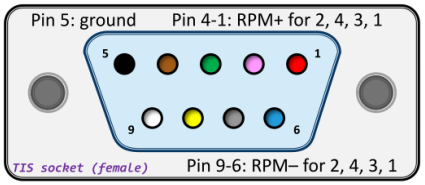
Versorgungsspannung	:	19,2…30VDC
Leistungsaufnahme	:	< 1,5VA

Eingänge:

			Schaltpegel:	Low	High
SU4-1	:	18…30VDC,	2,8…6,5mA	< 5V	> 18V
SU4-2	:	3,5…6,5VDC,	0,5...1mA	< 1V	> 3,5V

Ausgänge:

RS422	:	3 Stück
Übertragungsfrequenz	:	1MHz
Signallaufzeit	:	ON <125ns OFF <75ns
Busabschluß	:	nicht im Lieferumfang, 120Ω



TIS channel	pin
A.0.1	1 / 6
A.0.2	4 / 9
A.0.3	2 / 7
A.0.4	3 / 8

5	(gound)

RS422 differential input signals
TTL-signal as twisted pair lines