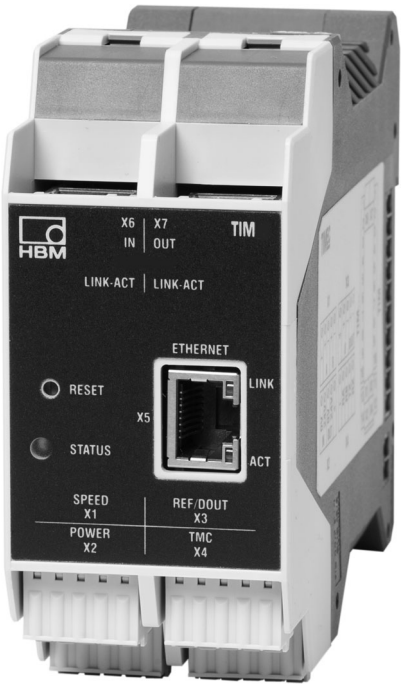


TIM-PN

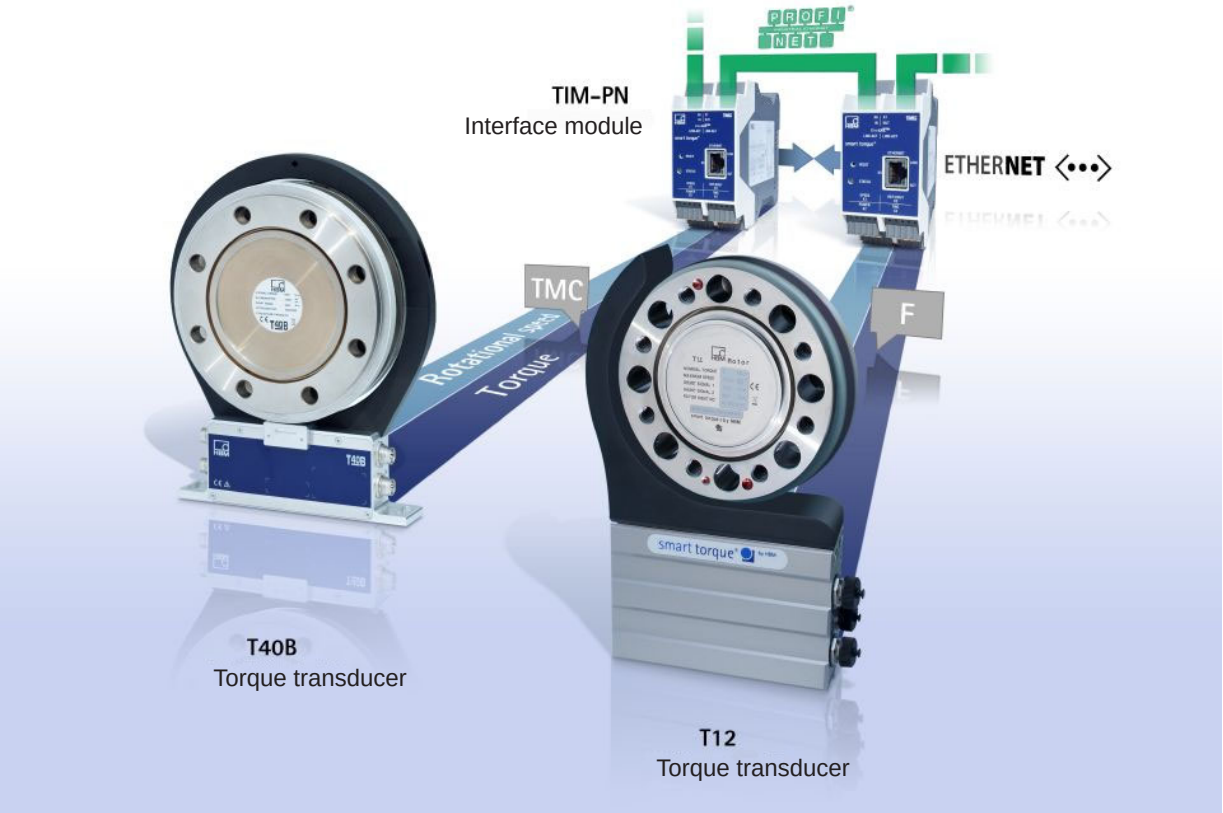
PROFINET
Interface Module

Data sheet

Special features

- **Real-time PROFINET interface module**
- **Real Time Classes - RT Class 1, RT Class 3 (IRT)**
- **Output of torque, speed, angle of rotation and power**
- **Very high dynamics (up to 4 kHz)**
- **Input resolution up to 25 bit**
- **Low latency time**
- **Diagnostic functions**
- **Integrated web server**
- **Flexible to use**
- **Modular design, expandable**

Overall concept



Specifications

Type		TIM-PN
Supply		
Supply voltage	V_{DC}	24 ±10%
Galvanic isolation Torque, speed, PROFINET. Ethernet and supply voltage are electrically isolated from each other		
Isolation voltage	V	500
Voltage discontinuity Test based on PLC standard DIN EN 61131-2: 24 V -10%	ms	10
Power consumption Without supply to transducers	W	<5
Communication interface		
Ethernet		
Data link		IEEE 802.3, 10Base-T / 100Base-TX
Protocol/addressing		TCP/IP (direct address or DHCP), HTTP, UDP
Plug connection		RJ45, 8-pin
Line length	m	≤100
Cable type (minimum requirements)		Cat-5, SFTP
PROFINET IO		
Function		PROFINET Device, acc. to Specification V2.31
Data link		IEEE 802.3, 100Base-TX
Plug connection		RJ45 socket, shielded
Line length	m	≤100
Cable type (minimum requirements)		Cat-5, shielded
Baud rate	Mbit/s	≤100
Update rate	kHz	4
Slave synchronization		No
Cyclic process input data, max. (device -> controller)	bytes	1024
Cyclic process output data, max. (controller -> device)	bytes	1024
Configuration data	kBytes	≤8
Parameter data	kBytes	≤8
Minimum cycle time	ms	250
Conformance class		C
Topology recognition		LLDP, SNMP, MIB2
Supported protocols		RTC - Real Time Cyclic RT Class 1 RT Class 3 (IRT) RTA - Real Time Acyclic PTCP - Precision Transparent Clock Protocol (IRT) DCP - Discovery and Configuration LLDP - Link Layer Discovery SNMP - Simple Network Management Fast startup
Control via PROFINET		Zero balance / shunt trigger / parameter set selection
Parameter set (stored in the device, selected via PROFINET)		32
Flags		
Torque transducer (via TMC), TIM-PN		Status (diagnosis)
Torque / speed / power		Status (diagnosis), measured values, overflow

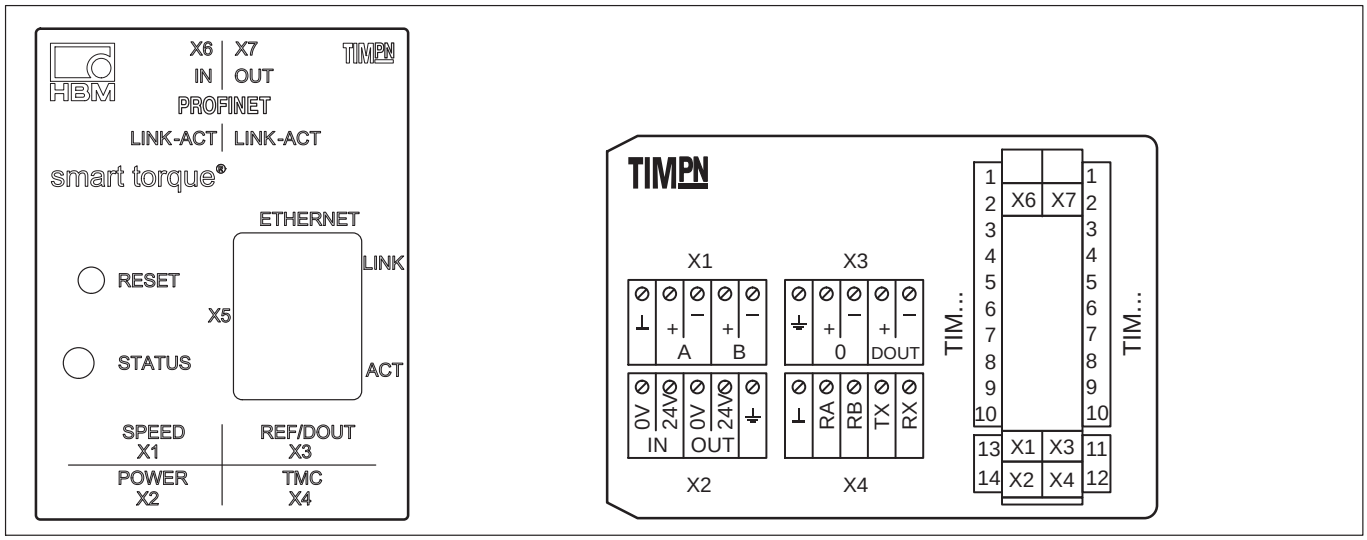
Specifications (continued)

Ambient conditions		
Nominal (rated) temperature range	°C	+10 … +60
Operating temperature range		-10 … +60
Storage temperature range		-20 … +70
Permissible relative humidity, non-condensing	%	10 … 90
Housing		
Material		Polyamide PA 6.6
Dimensions (W x H x D), without connections	mm	45x99x107
Weight, approx.	g	230
Mechanical stress capability		
Vibration test based on IEC/DIN EN 60 068, Part 2-6	m/s^2	10 (5 … 8 Hz)
(30 mins in each direction)	m/s^2	25 (10 … 65 Hz)
Impact test based on IEC/DIN EN 60 068, Part 2-27		
(3 times in each direction, shock duration 11 ms)	m/s^2	200
Mounting		Support rail DIN EN 60 715
Connector		Plug terminal
Degree of protection		IP20
EMC conformity		
Emission (EME)		DIN EN 61 326:2006, Class A
Immunity from interference		DIN EN 61 326:2006, industrial environment
Torque		
TMC connection input		
Signal type		TMC (digital serial data)
Data rate	Hz	approx. 39000
Resolution	bit	16
Signal type		FM (frequency modulation via TMC connection)
Data rate	Hz	approx. 39000
Resolution	bit	25
Frequency measurement resolution, min.		
10 +/- 5kHz	mHz	1
60 +/- 30 kHz		8
240 +/- 120 kHz		16
Accuracy		
Frequency measurement rel. to act. value	%	<=0.01
Temperature effect per 10 K, rel. to act. value	%	<=0.01
Internal sampling rate	MHz	125
Termination resistor, internal	ohm	120
Low pass filter, 4th order	Hz	0.1 / 1 / 10 / 100 / 1000 / 3000 / Off
Filter		CASMA-Filter Crank Angle Synchronous Moving Average-Filter
Runtimes of filters 1 and 2		
Filter off	µs	0.944
3000 Hz	µs	54.4
1000 Hz	µs	212
100 Hz	ms	2.6
10 Hz	ms	26.8
1 Hz	ms	230
0.1 Hz	s	3.12

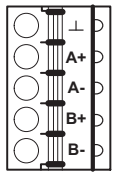
Specifications (continued)

Linearization for full range 1:1 and partial range 1:5 or 1:10 (right, left, up to 11 points)		Direct entry of calibration coefficients
Maximum cable length for TIM-PN/torque transducer	m	50
Speed		
Input signal		Quadrature / single / direct for T40 family
Signal type		RS422
Data rate	Hz	approx. 39000
Measuring range of pulse frequency measurement		Determined automatically from max. speed and pulses/revolution of the transducer
Resolution	bit	25
Frequency measurement resolution, min.		
Measuring range 20 kHz	mHz	1
Measuring range 200 kHz		10
Measuring range 1000 kHz		125
Accuracy		
Frequency measurement rel. to act. value	%	<=0.01
Temperature effect per 10 K, rel. to act. value	%	<=0.01
Internal sampling rate	MHz	125
Input filter/glitch filter time constant (adjustable)		80 ns, 800 ns, 8 ms, 80 ms
Low pass filter, 4th order	Hz	0.1 / 1 / 10 / 100 / 1000 / 3000 / Off
Runtimes of filters 1 and 2		
Filter off	µs	0.944
3000 Hz	µs	54.4
1000 Hz	µs	212
100 Hz	ms	2.6
10 Hz	ms	26.8
1 Hz	ms	230
0.1 Hz	s	3.12
Maximum cable length for TIM-PN/torque transducer/speed encoder	m	50
Angle of rotation		
Resolution		1x / 2x / 4x with interpolation
Zero balance		360° / 720° / 1440° PROFINET / manual / zero index
Power		
Low pass filter, 4th order	Hz	0.1 / 1 / 10 / 100
Runtimes, filter 1		
Filter off	µs	0.944
100 Hz	ms	2.6
10 Hz	ms	26.8
1 Hz	ms	230
0.1 Hz	s	3.12
When HBM torque transducers with integrated speed measurement are used, the power calculation is adjusted to the runtime		

Terminal assignment



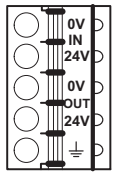
Terminal X1, speed encoder



Pin	Assignment
1	DGND (digital GND), color code black[1] / brown[2]
2	A + F1 speed measurement signal, pulse sequence, 5 V, 0°, color code red
3	A + F1 speed measurement signal, pulse sequence, 5 V, 0°, color code white
4	B + F2 speed measurement signal, pulse sequence, 5 V, phase-shifted 90°, color code gray
5	B + F2 speed measurement signal, pulse sequence, 5 V, phase-shifted 90°, color code green

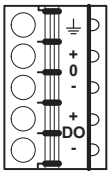
1) KAB153 rotational speed cable
2) KAB164 rotational speed cable

Terminal X2, voltage supply



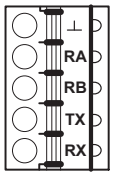
Pin	Assignment
	Connection for energy supply, input
1	GND (TIM-PN and stator supply)
2	+24 V ± 10% supply (TIM-PN and stator)
	Output for the supply voltage of the torque transducer
3	GND (looped through from X2-1): color code black
4	+24 V (looped through from X2-2): color code blue
5	Shield (TMC), connected with ground

Terminal X3, speed encoder



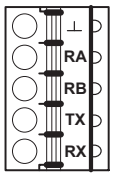
Pin	Assignment
1	Shield (speed), connected with ground
2	+, reference signal (1 pulse/revolution), 5 V, color code blue
3	-, reference signal (1 pulse/revolution), 5 V, color code black
4	Reserved
5	Reserved

Terminal X4, torque transducer - frequency



Pin	Assignment
1	Measurement signal 0 V; symmetrical, color code gray
2	RA, torque measurement signal 5 V, color code red
3	RB, torque measurement signal 5 V, color code white
4	Not in use
5	Not in use

Terminal X4, torque transducer - TMC



Pin	Assignment
1	DGND (digital GND), color code purple
2	RS-422 RA, color code red
3	RS-422 RB, color code white
4	RS-232-TX, color code gray
5	RS-232-RX, color code green

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