TECHNA-CHECK® MODEL TC-USB

TC-USB

User Manual

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1. TC-USB Technical Specification

Technical Specification:

Mechanical

Housing:	Polycarbonate.
Mounting:	35 mm DIN-rail.
Protection Class:	IP40.
Temp. Range:	-15 to + 50 C.
Weight:	App. 70g.
Dimensions:	D 105 x W 35 x H 60 mm.
Connections:	Max 1,5 mm^2 .

Electrical

USB:	Version 2.0
Supply:	From USB interface max. 0.5 Amp.
TTBUS:	Electrically Isolated RS485.
Profibus(Option):	Electrically Isolated RS485.
On Led:	USB Power is Supplied
TTBUS Led:	TTBus Communication Active
Profibus Led:	Profibus Communication Active
Error Led:	TTBus CRC error or timeout

1.1 Tool Monitoring System Overview

The TC-USB is a main component of a Tool Monitor System. The TC-USB is connected to an available USB Port of the PC, which is going to run the Tool Monitoring Application, usually TTMON. The TC USB interfaces TechnaCheck TTbus based sensors or Profibus based sensors to the Tool Monitoring System. The TC-USB card could be installed into a CNC controller which is Windows based or the unit could be used in a stand alone PC (desktop) or Industrial PC installed in the machine.

The TC-USB is a communication controller; the actual Tool-Monitoring is realized by the application TTMON, running on the PC. TTMON implements a maximum of a 20 channel (spindle) Tool Monitoring System with the capability of monitoring 128 cuts per channel.

1.2 The Tool Monitoring 'System' Concept

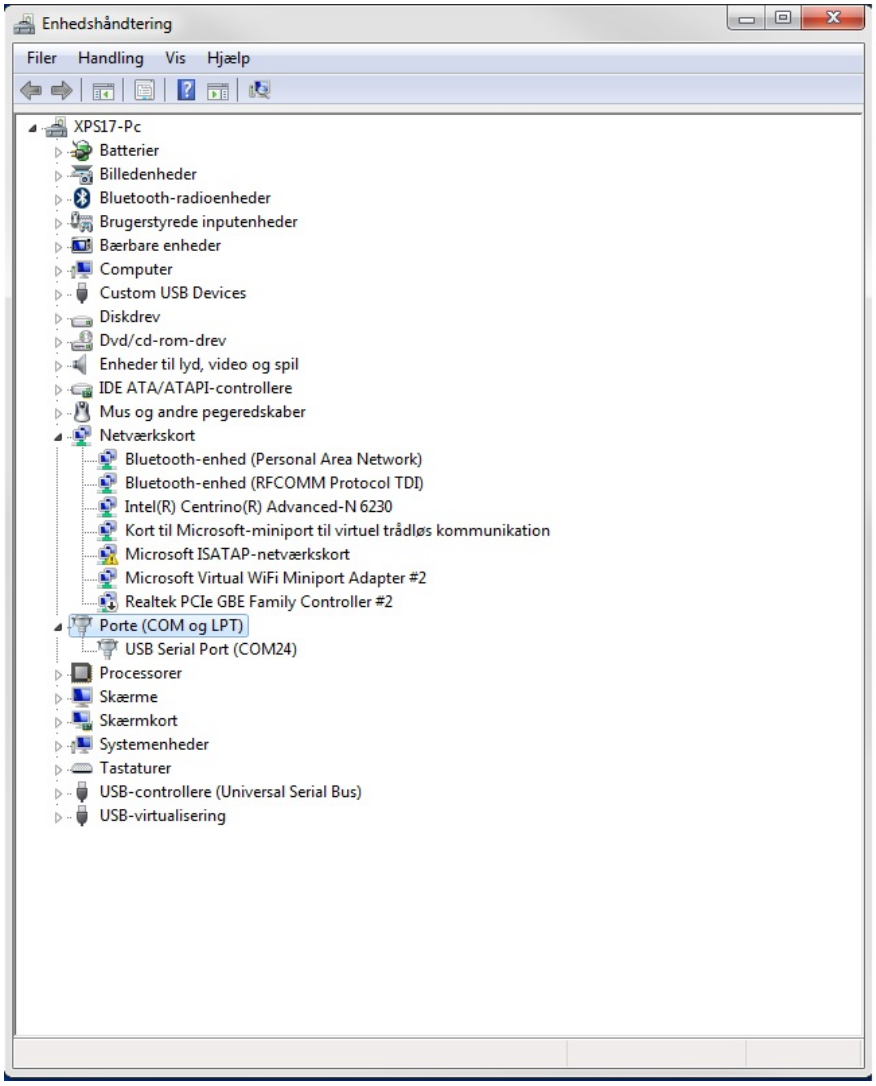
The Tool Monitoring System provides a common interface to different types of Tool Monitoring Sensors. Monitoring is based on either ***Power*** or ***Vibration***. The NC-controller provides control signals (Start, Learn and Reset), Cut Number and in some cases Measurement Values to the Tool Monitoring System. The Tool Monitoring System returns Alarms in case of Tooling Faults.

2. TC-USB PC Installation

The TC-USB does require a driver to work. The actual driver is part of the windows operating system but installation is still required. Please use the driver installation file named 'mchpcdc.inf' to instruct Windows which driver to use with the TC/USB unit.

The COM Port number can bee seen in the ControlPanel->System->DeviceManager. In the example below the unit is assigned COM Port number 24 (COM24). Be aware that the assigned COM Port number depends on the actual USB port used. If the USB cable is moved to another location then a new COM Port number will be assigned by the PC.

This COM Port number needs to be assigned to the TTMON application in order for it to be able to communicate with the TC-USB unit.



3. TTBUS Networking

The TTBUS is a Proprietory Communication Bus designed to interface multiple Measurement Transducers and/or Digital I/O units to the Tool-Monitoring-System. The TTBUS is based upon traditional RS485 hardware.

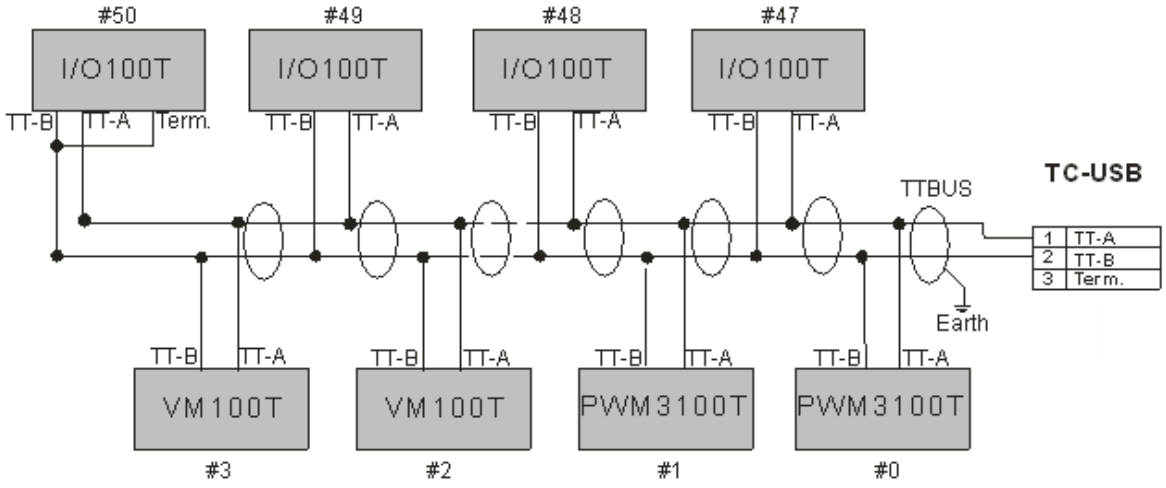
Today 4 different TTBUS devices have been developed.

PWM350T	**3-Phase Power Transducer**
VM100T	**Vibration Sensor Interface Unit**
I/O100T	**Digital I/O Unit**.
PWM3100T	**3-Phase Power Transducer with Hall-Sensors**

In the future other type of sensors may be added.

Detailed specifications of the TTBUS units are found in the appendices of this manual. Each TTBUS unit is assigned a unique address on the network. The address is programmed by 2 BCD switches located on the front of the transducers. The Tool Monitoring System automatically locates transducers on the TTBUS. A Channel Mapping menu in TTMON is used to map the different transducers to the different channels.

3.1 TTBUS Wiring



Important note:

Please use **good-quality** low-resistance twisted and shielded cable earth-connected at one or both ends for the TTBUS network. The last unit in the TTBUS network chain **must** be terminated.

Termination is possible in all units by adding external wire. Please make the stubs as short as possible.

4. Profibus Networking

4.1 Profibus Address

The Profibus address is assigned from the PC-application usually “TTMON”. The Profibus Address is supplied to the TC-USB from the serial USB interface. The Profibus protocol is 100% identical to the protocol used by the TPCI120 PCI card. The. GSD file is also the same file as used with the PCI card.

4.1 Profibus Cycle-Time Considerations

The Profibus cycle time should be a maximum of 10 -15 ms (milliseconds) equal to 67 - 100 profibus telegram transfers per second. To achieve this a Profibus transmission speed (baud rate) of 1Mb and higher is probably required. If this requirement is not met the synchronization from cycle to cycle is affected and also measurement accuracy may be lost (if the measurement value is supplied from the Profibus network).

4.2 The output telegram from the Profibus Master to the TC-USB

The output telegram length is 80 bytes. Data is always sent for 20 channels no matter how many channels are actually used. Data sent for channels not present should be zero. The purpose of the output telegram is to supply control signals, cut number and possibly measurement value to the Tool Monitoring System.

Output Telegram Format:

Byte 0							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #1 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #1	Learn Signal Channel #1	Start Signal Channel #1

Byte 1							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #1							

Byte 2							
7	6	5	4	3	2	1	0
Measurement (low order bits 7-0) Channel #1							

Byte 3							
7	6	5	4	3	2	1	0
Cut Number (0—127) Channel #1							

Byte 4							
7	6	5	4	3	2	1	0
Channel #2 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #2	Learn Signal Channel #2	Start Signal Channel #2

Byte 5							
7	6	5	4	3	2	1	0
Measurement (high order bits 15-8) Channel #2							

Byte 6							
7	6	5	4	3	2	1	0
Measurement (low order bits 7-0) Channel #2							

Byte 7							
7	6	5	4	3	2	1	0
Cut Number (0—127) Channel #2							

Byte 8							
7	6	5	4	3	2	1	0
Channel #3 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #3	Learn Signal Channel #3	Start Signal Channel #3

Byte 9							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #3							

Byte 10							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #3							

Byte 11							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #3							

Byte 12							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #4 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #4	Learn Signal Channel #4	Start Signal Channel #4

Byte 13							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #4							

Byte 14							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #4							

Byte 15							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #4							

Byte 16							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #5 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #5	Learn Signal Channel #5	Start Signal Channel #5

Byte 17							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #5							

Byte 18							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #5							

Byte 19							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #5							

Byte 20							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #6 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #6	Learn Signal Channel #6	Start Signal Channel #6

Byte 21							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #6							

Byte 22							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #6							

Byte 23							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #6							

Byte 24							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #7 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #7	Learn Signal Channel #7	Start Signal Channel #7

Byte 25							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #7							

Byte 26							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #7							

Byte 27							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #7							

Byte 28							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #8 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #8	Learn Signal Channel #8	Start Signal Channel #8

Byte 29							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #8							

Byte 30							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #8							

Byte 31							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #8							

Byte 32							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #9 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #9	Learn Signal Channel #9	Start Signal Channel #9

Byte 33							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #9							

Byte 34							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #9							

Byte 35							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #9							

Byte 36							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #10 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #10	Learn Signal Channel #10	Start Signal Channel #10

Byte 37							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #10							

Byte 38							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #10							

Byte 39							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #10							

Byte 40							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #11 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #11	Learn Signal Channel #11	Start Signal Channel #11

Byte 41							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #11							

Byte 42							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #11							

Byte 43							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #11							

Byte 44							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #12 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #12	Learn Signal Channel #12	Start Signal Channel #12

Byte 45							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #12							

Byte 46							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #12							

Byte 47							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #12							

Byte 48							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #13 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #13	Learn Signal Channel #13	Start Signal Channel #13

Byte 49							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #13							

Byte 50							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #13							

Byte 51							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #13							

Byte 52							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #14 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #14	Learn Signal Channel #14	Start Signal Channel #14

Byte 53							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #14							

Byte 54							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #14							

Byte 55							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #14							

Byte 56							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #15 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #15	Learn Signal Channel #15	Start Signal Channel #15

Byte 57							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #15							

Byte 58							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #15							

Byte 59							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #15							

Byte 60							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #16 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #16	Learn Signal Channel #16	Start Signal Channel #16

Byte 61							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #16							

Byte 62							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #16							

Byte 63							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #16							

Byte 64							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #17 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #17	Learn Signal Channel #17	Start Signal Channel #17

Byte 65							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #17							

Byte 66							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #17							

Byte 67							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #17							

Byte 68							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #18 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #18	Learn Signal Channel #18	Start Signal Channel #18

Byte 69							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #18							

Byte 70							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #18							

Byte 71							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #18							

Byte 72							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #19 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #19	Learn Signal Channel #19	Start Signal Channel #19

Byte 73							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #19							

Byte 74							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #19							

Byte 75							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #19							

Byte 76							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #20 Present	0 Reserved	0 Reserved	0 Reserved	0 Reserved	Reset Signal Channel #20	Learn Signal Channel #20	Start Signal Channel #20

Byte 77							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (high order bits 15-8) Channel #20							

Byte 78							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Measurement (low order bits 7-0) Channel #20							

Byte 79							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Cut Number (0—127) Channel #20							

4.3 The input telegram from TC-USB to the Profibus Master

The input telegram (to the Profibus Master) is always 40 bytes long – 2 bytes for each channel. Channel #1 is first and Channel #20 is the last byte. The purpose of the inputs is to report Alarms and other status information to the master (NC controller). The last 20 bytes reports measurement values from the TTBUS Transducers. This information is used rarely and should just be ignored in most applications.

Telegram Format:

Byte 0							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #1 Break ALarm	Channel #1 Blunt Alarm	Channel #1 Missing	Channel #1 BluntCount	Channel #1 Idle Alarm	Channel #1 Touched	0 Reserved	Channel #1 Active

Byte 1							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #2 Break ALarm	Channel #2 Blunt Alarm	Channel #2 Missing	Channel #2 BluntCount	Channel #2 Idle Alarm	Channel #2 Touched	0 Reserved	Channel #2 Active

Byte 2							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #3 Break ALarm	Channel #3 Blunt Alarm	Channel #3 Missing	Channel #3 BluntCount	Channel #3 Idle Alarm	Channel #3 Touched	0 Reserved	Channel #3 Active

Byte 3							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #4 Break ALarm	Channel #4 Blunt Alarm	Channel #4 Missing	Channel #4 BluntCount	Channel #4 Idle Alarm	Channel #4 Touched	0 Reserved	Channel #4 Active

Byte 4							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #5 Break ALarm	Channel #5 Blunt Alarm	Channel #5 Missing	Channel #5 BluntCount	Channel #5 Idle Alarm	Channel #5 Touched	0 Reserved	Channel #5 Active

Byte 5							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #6 Break ALarm	Channel #6 Blunt Alarm	Channel #6 Missing	Channel #6 BluntCount	Channel #6 Idle Alarm	Channel #6 Touched	0 Reserved	Channel #6 Active

Byte 6							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #7 Break ALarm	Channel #7 Blunt Alarm	Channel #7 Missing	Channel #7 BluntCount	Channel #7 Idle Alarm	Channel #7 Touched	0 Reserved	Channel #7 Active

Byte 7							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #8 Break ALarm	Channel #8 Blunt Alarm	Channel #8 Missing	Channel #8 BluntCount	Channel #8 Idle Alarm	Channel #8 Touched	0 Reserved	Channel #8 Active

Byte 8							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #9 Break ALarm	Channel #9 Blunt Alarm	Channel #9 Missing	Channel #9 BluntCount	Channel #9 Idle Alarm	Channel #9 Touched	0 Reserved	Channel #9 Active

Byte 9							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #10 Break ALarm	Channel #10 Blunt Alarm	Channel #10 Missing	Channel #10 BluntCount	Channel #10 Idle Alarm	Channel #10 Touched	0 Reserved	Channel #10 Active

Byte 10							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #11 Break ALarm	Channel #11 Blunt Alarm	Channel #11 Missing	Channel #11 BluntCount	Channel #11 Idle Alarm	Channel #11 Touched	0 Reserved	Channel #11 Active

Byte 11							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #12 Break ALarm	Channel #12 Blunt Alarm	Channel #12 Missing	Channel #12 BluntCount	Channel #12 Idle Alarm	Channel #12 Touched	0 Reserved	Channel #12 Active

Byte 12							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #13 Break ALarm	Channel #13 Blunt Alarm	Channel #13 Missing	Channel #13 BluntCount	Channel #13 Idle Alarm	Channel #13 Touched	0 Reserved	Channel #13 Active

Byte 13							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #14 Break ALarm	Channel #14 Blunt Alarm	Channel #14 Missing	Channel #14 BluntCount	Channel #14 Idle Alarm	Channel #14 Touched	0 Reserved	Channel #14 Active

Byte 14							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #15 Break ALarm	Channel #15 Blunt Alarm	Channel #15 Missing	Channel #15 BluntCount	Channel #15 Idle Alarm	Channel #15 Touched	0 Reserved	Channel #15 Active

Byte 15							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #16 Break ALarm	Channel #16 Blunt Alarm	Channel #16 Missing	Channel #16 BluntCount	Channel #16 Idle Alarm	Channel #16 Touched	0 Reserved	Channel #16 Active

Byte 16							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #17 Break ALarm	Channel #17 Blunt Alarm	Channel #17 Missing Alarm	Channel #17 BluntCount Alarm	Channel #17 Idle Alarm	Channel #17 Touched	0 Reserved	Channel #17 Active Ready

Byte 17							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #18 Break ALarm	Channel #18 Blunt Alarm	Channel #18 Missing Alarm	Channel #18 BluntCount Alarm	Channel #18 Idle Alarm	Channel #18 Touched	0 Reserved	Channel #18 Active Ready

Byte 18							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #19 Break ALarm	Channel #19 Blunt Alarm	Channel #19 Missing	Channel #19 BluntCount	Channel #19 Idle Alarm	Channel #19 Touched	0 Reserved	Channel #19 Active

Byte 19							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel #20 Break ALarm	Channel #20 Blunt Alarm	Channel #20 Missing Alarm	Channel #20 BluntCount Alarm	Channel #20 Idle Alarm	Channel #20 Touched	0 Reserved	Channel #20 Active Ready

Byte 20							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TTBus Measurement Channel #1 (Seldom used, mostly ignore data)							

Byte 21							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TTBus Measurement Channel #2 (Seldom used, mostly ignore data)							

Byte 22							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TTBus Measurement Channel #3 (Seldom used, mostly ignore data)							

Byte 23							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #4 (Seldom used, mostly ignore data)							

Byte 24							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #5 (Seldom used, mostly ignore data)							

Byte 25							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #6 (Seldom used, mostly ignore data)							

Byte 26							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #7 (Seldom used, mostly ignore data)							

Byte 27							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #8 (Seldom used, mostly ignore data)							

Byte 28							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #9 (Seldom used, mostly ignore data)							

Byte 29							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #10 (Seldom used, mostly ignore data)							

Byte 30							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #11 (Seldom used, mostly ignore data)							

Byte 31							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #12 (Seldom used, mostly ignore data)							

Byte 32							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #13 (Seldom used, mostly ignore data)							

Byte 33							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #14 (Seldom used, mostly ignore data)							

Byte 34							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #15 (Seldom used, mostly ignore data)							

Byte 35							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #16 (Seldom used, mostly ignore data)							

Byte 36							
7	6	5	4	3	2	1	0
TTBus Measurement Channel #17 (Seldom used, mostly ignore data)							

Byte 37							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TTBus Measurement Channel #18 (Seldom used, mostly ignore data)							

Byte 38							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TTBus Measurement Channel #19 (Seldom used, mostly ignore data)							

Byte 39							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TTBus Measurement Channel #20 (Seldom used, mostly ignore data)							

4.3 The Profibus GSD File TPCI0A0B.GSD

```
;================================================
; Techna Tool Inc.
;
; File : TPCI0A0B.GSD
; Revision : 1.2
; Last Modification : 25/01/2013
; ================================================
;
#Profibus_DP
; General device information
GSD_Revision                    = 1
Vendor_Name                     = "Techna Tool Inc."
Model_Name                      = "TPCI120"
Revision                        = "V1.2"
Ident_Number                    = 0x0A0B
Protocol_Ident                  = 0             ; 0 = PROFIBUS-DP only
Station_Type                    = 0             ; 0 = DP-Slave
FMS_supp                        = 0             ; FMS is not supported
Hardware_Release                = "A1"
Software_Release                = "V1.1"

; Supported baudrates
9.6_supp                        = 1
19.2_supp                       = 1
45.45_supp                      = 1
93.75_supp                      = 1
187.5_supp                      = 1
500_supp                        = 1
1.5M_supp                       = 1
3M_supp                         = 1
6M_supp                         = 1
12M_supp                        = 1

; MaxTsdr default values for supported baudrates
MaxTsdr_9.6                     = 60
MaxTsdr_19.2                    = 60
MaxTsdr_45.45                   = 60
MaxTsdr_93.75                   = 60
MaxTsdr_187.5                   = 60
MaxTsdr_500                     = 100
MaxTsdr_1.5M                    = 150
MaxTsdr_3M                      = 250
MaxTsdr_6M                      = 450
MaxTsdr_12M                     = 800

; General supported features
Redundancy                      = 0             ; Redundancy not supported
Repeater_Ctrl_Sig               = 2             ; RTS Signal with TTL level
24V Pins                        = 0             ;
Implementation_Type             = "ASIC_solution, VPC3+"
```

```
; DP Slave related information
Freeze_Mode_supp                = 0             ; Freeze-Mode not supported
Sync_Mode_supp                  = 0             ; Sync.-Mode not supported
Auto_Baud_supp                  = 1             ; Automatic baud control supported
Max_Diag_Data_Len               = 6
Set_Slave_Add_supp              = 0             ; Set Slave address not supported
User_Prm_Data_Len               = 05            ;
User_Prm_Data                   = 0x00, 0x00,0x00,0x00,0x00 ;
Min_Slave_Intervall             = 5             ; 500us
Slave_Family                    = 1@TT@TPCI

; Modules information
Modular_Station                 = 0
Max_Module                      = 1
Max_Input_Len                   = 40
Max_Output_Len                  = 80
Max_Data_Len                    = 120

Module = "80 Byte out/ 20 Byte In" 0x2f,0x2f,0x2f,0x2f,0x2f,0x1f,0x1f,0x17

EndModule
```

Appendix A. PWM3100T Technical Specification

TECHNA-CHECK® PWM3100T Load Transducer

Load Transducer for 1- or 3-phase AC & DC Loads

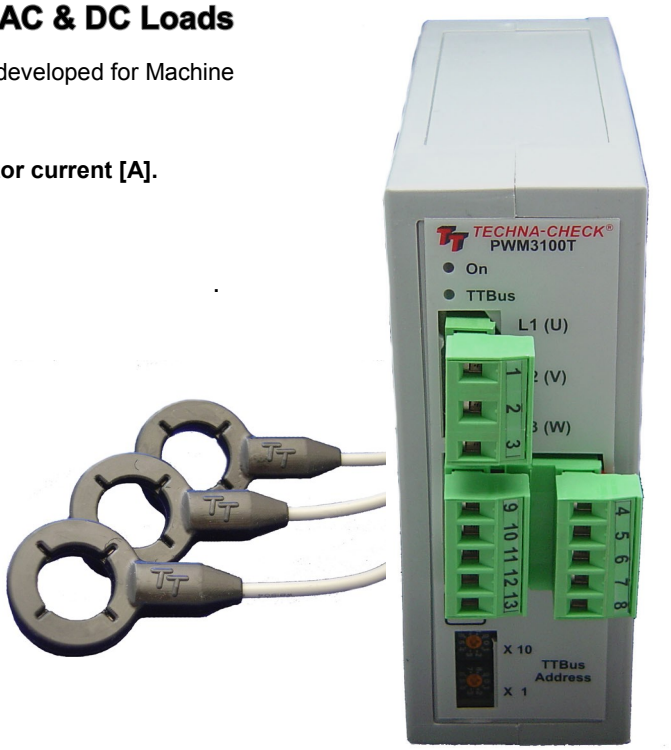
An ultra-fast measurement transducer specifically developed for Machine Tool Monitoring applications.

PWM3100T measures motor power [kW] or motor current [A].

- **TTBus Output**
  RS485 type Sensor Bus
- **8 Programmable Measurement Ranges**
  1, 2.5, 5, 10, 15, 25, 50 or 100 [%]

Digital Design

4 quadrant digital multiplication.
Measures power or current before or after variable frequency inverter.



Technical Specification

Mechanical

Housing:	Polycarbonate.
Mounting:	35 mm DIN-rail.
Protection Class:	IP40.
Temp. Range:	-15 to + 50 C.
Weight:	App. 250g.
Dimensions:	D 118 x B 45 x H 137,5 mm.
Connections:	Max 2.5 mm^2 (AVG 24).

Electrical

Voltage Input:	3 x 0-500 VAC/VDC max.
Current Input:	3 x 100 Amp. 0 Hz - 35kHz
Power Range:	0 - 86.5 kW AC. 0 - 50 kW DC.
Supply:	18-36 V DC max. 2.0 Watt.
TTbus output:	RS485 - proprietory protocol.
CE marked to:	TBD

Range Select:

The measurement-range is selected from the Tool Monitoring Application TTMON.

Range	[%]
0	1
1	2.5
2	5
3	10
4	15
5	25
6	50
7	100

Features

The PWM3100T is designed primarily for measuring AC or DC power or current delivered to motors by variable frequency inver-ters. AC power is measured from the formula:

$$P = \sqrt{3} \times U \times I \times \cos\varphi$$

DC power is measured from the formula:

$$P = U \times I$$

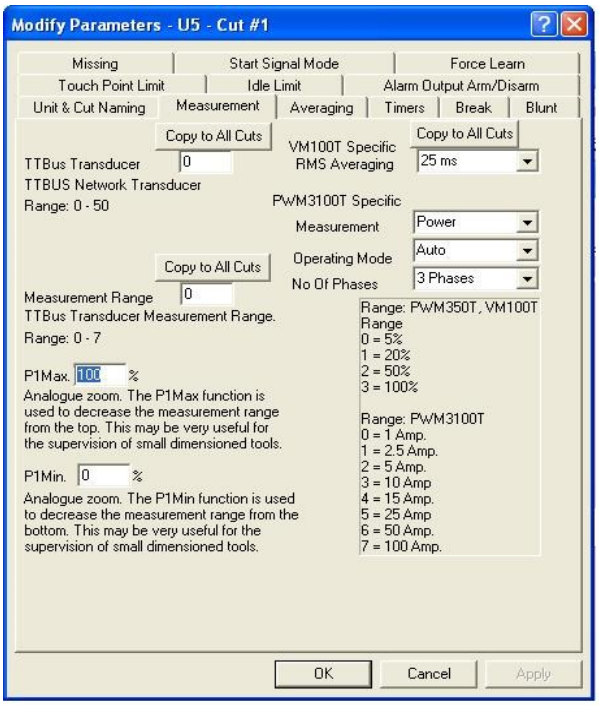
The PWM3100T Power or Current Transducer is specifically developed to function as a load transducer for the ***TECHNA - CHECK®*** Range of Machine Tool Monitors.

The transducer interface to Tool Monitor Applications via the TTBus interface.

The three motor wires **must** pass through the external hall sensors in the **same direction** to the motor either fromTop-Bottom or from Bottom-Up.

Using the PWM3100T

The operating mode is selected from the Tool Monitoring Application, usually TTMON. Parameters are accessed from the menu Modify Parameters->Measurement page.



Range.

8 programmable current ranges—see the dialog box above.

Operating Mode.

Auto = This is the default AC-measurement mode. The PWM3100T measures the current frequency and uses this as a time base for the measurement. The measurement speed and reaction speed of the unit increases as the spindle speed increases. This mode cannot be used in DC-measurement mode.
10ms = Fixed measuring interval 10 ms (millisecond). May be used in both AC- and DC-mode
25 ms = Fixed measuring interval 25 ms (millisecond). May be used in both AC- and DC-mode
100ms = Fxed measuring interval 100 ms (millisecond). May be used in both AC- and DC-mode

No. of phases:

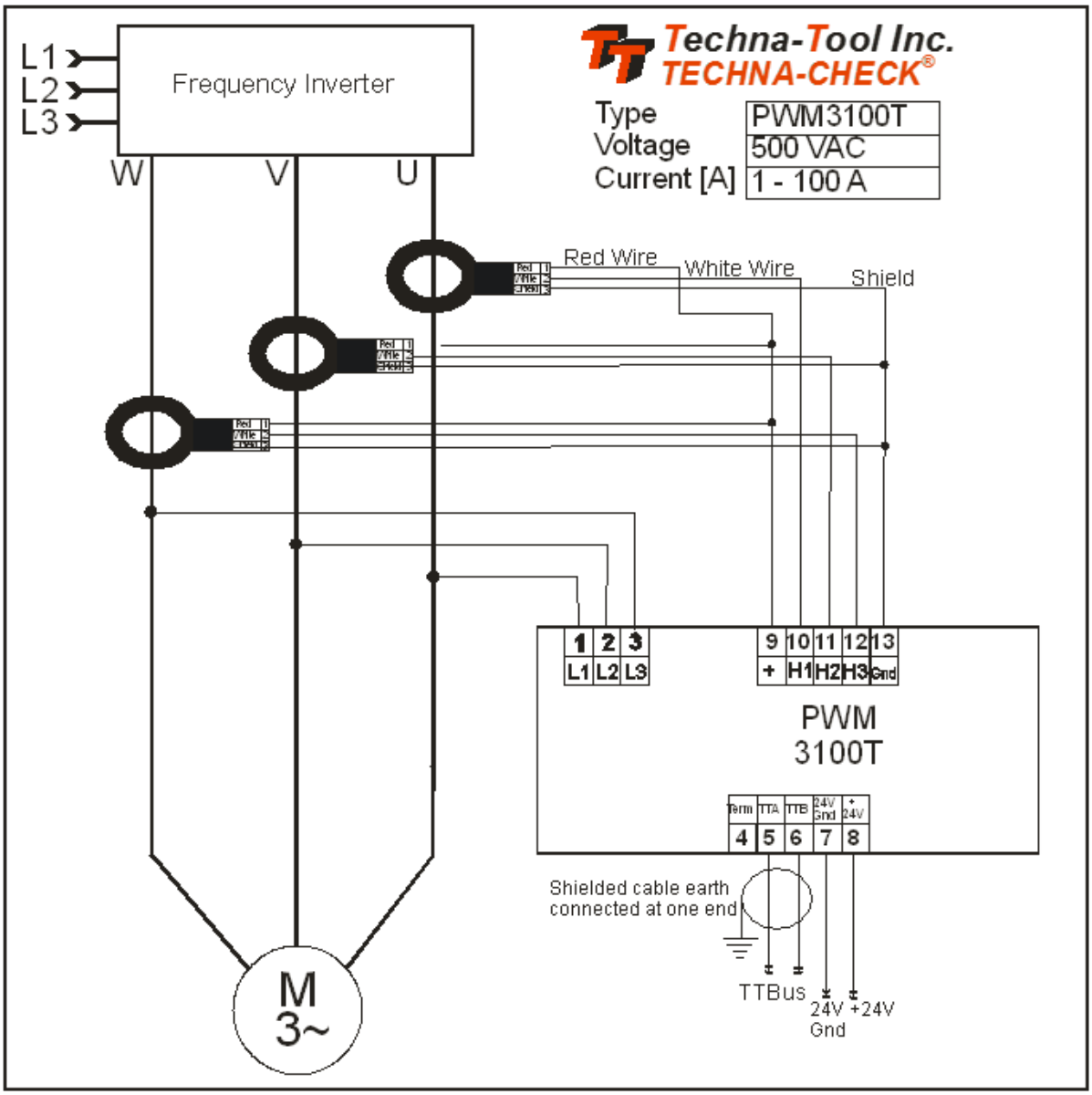
3 Phases = 3 phase measurement
Single Phase = Single phase measurement—usually used with DC-measurement

Power/Current Measurement.

Power or Current measurement may be selected from the dialog box above. When power is measured after a variable frequency inverter a certain amount of noise is introduced. The noise comes from the high frequency voltage switching (PWM Voltage). In some applications the noise can be eliminated by measuring current only. Measuring current after a frequency converter often has similar sensitivity as power-measurement, but the noise is significantly reduced. The current measurement may be used for monitoring smaller dimension tools. When current is measured the voltage connection terminals 1, 2 and 3 are not used and may be left open.

Offset Zeroing:

Offset zeroing is a function that calibrates the Hall-Sensors to the unit. Offset zeroing **must be done once** after the Hall Sensors are connected and the spindle (motor) is **NOT** running. The offset button must be activated for 5 seconds and the green on-led flashes for 5 seconds during the offset adjustment. Calibration values are maintained after power off (saved in EEPROM).



Note!

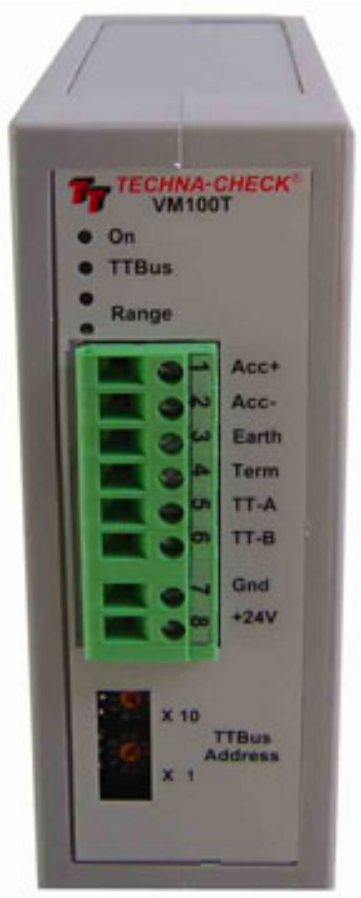
Please use **good-quality** low-resistance twisted and shielded cable earth-connected at one or both ends for the TTBUS network.

Appendix B. VM100T Technical Specifications

TECHNA-CHECK® VM100T Vibration Interface

Vibration Sensor Interface

A measurement transducer, which provides Vibration Monitoring for the ***TECHNA CHECK®*** *units.*



VM100T measures vibration (acceleration).

- TTBUS Networked Unit
- 4 Remotely Programmable Measurement Ranges
- 4 Remotely Programmable RMS averaging periods
- Remotely Programmable filters

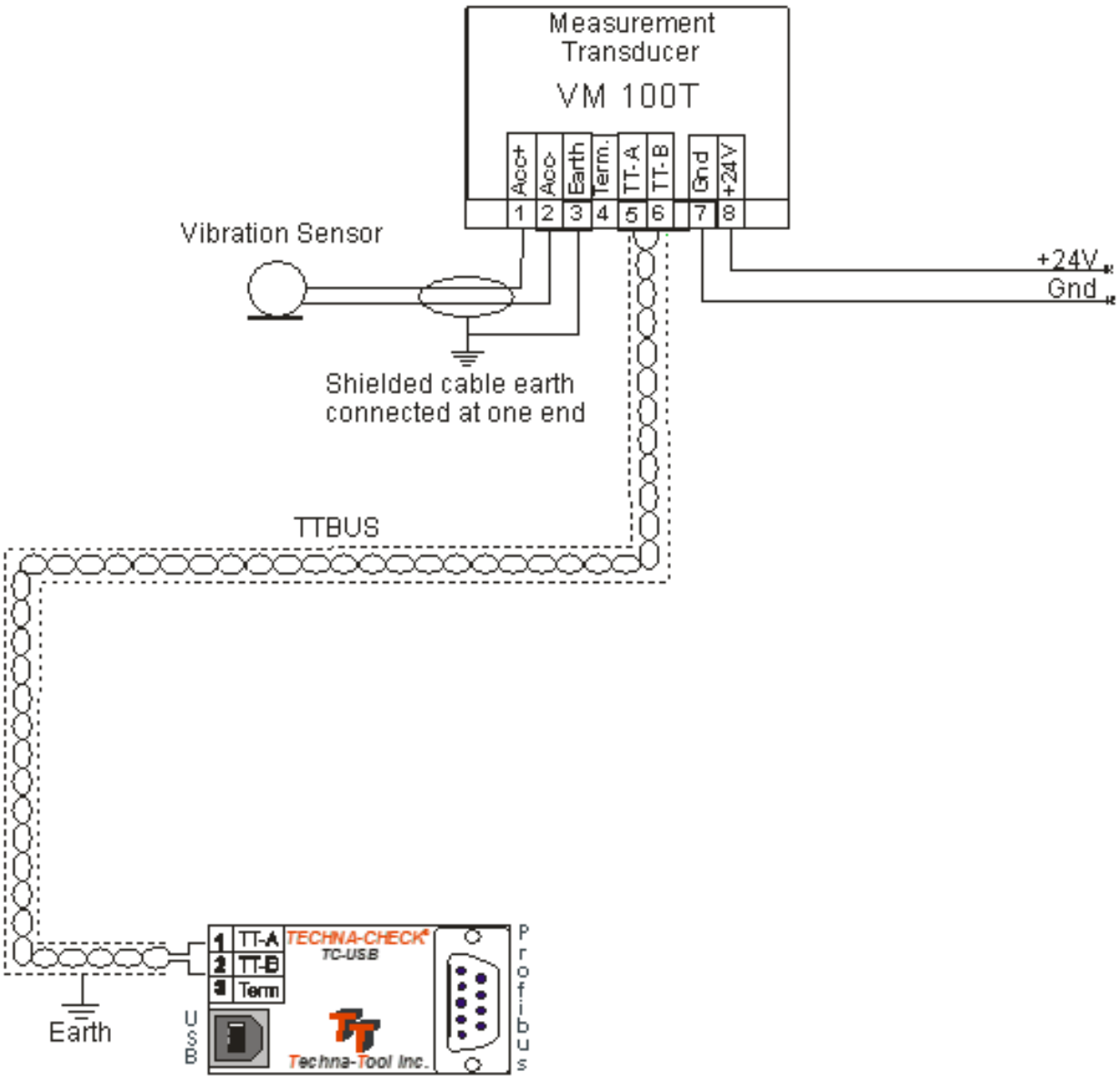
Technical Specification

Mechanical	
Housing:	Polycarbonate.
Mounting:	35 mm DIN-rail.
Protection Class:	IP40.
Temp. Range:	-15 to + 50 C.
Weight:	App. 300g (1 lb).
Dimensions:	D 118 x B 45 x H 137,5 mm.
Connections:	Max 2,5 mm^2 (AVG 24).
Electrical	
Sensor Input:	Proprietory. Sensor supplied with unit.
Vibration Range:	+- 0.5G, 0 - 1000 Hz
Supply:	18-24 V DC max. 2.5 Watt.
TTBUS:	RS485.

The VM100T interfaces a propriety acceleration sensor to the existing ***TECHNA CHECK®*** range of Machine Tool Monitors.

The purpose of the vibration monitoring is to catch for instance the damage of a tool like for instance a miller, which has damaged one of its inserts. When one insert is broken the next insert is forced to cut twice the amount of material, which will generate machine vibrations to be picked up by the VM100T.

Another application is to protect high-speed spindles against operation with an unbalanced tool, which may lead to a rapid wearing and destruction of the spindle bearings.



Note!

Please use **good-quality** low-resistance twisted and shielded cable earth-connected at one or both ends for the TTBUS network.

Appendix C. IO100T Technical Specifications

TECHNA-CHECK®

IO100T Digital I/O Interface

Parallel Digital I/O Interface

An interface unit which interfaces traditional parallel I/O to the ***TECHNA CHECK***® TPCI120 unit, TC6400 unit or TC-USB unit.

IO100T features.

- ♦ TTBUS Networked Unit
- ♦ 3 Relay Alarm Outputs
- ♦ 7 Digital Inputs for Cut-Number
- ♦ Digital Input for START and RESET

Technical Specification

Mechanical

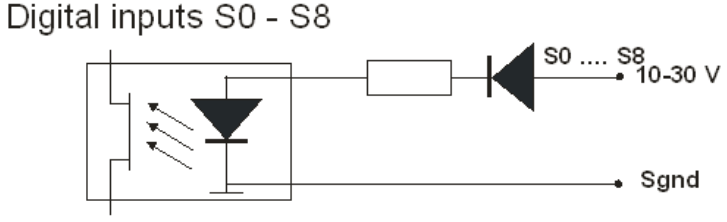
Housing:	Polycarbonate.
Mounting:	35 mm DIN-rail.
Protection Class:	IP40.
Temp. Range:	-15 to + 50 C.
Weight:	App. 300g (1 lb).
Dimensions:	D 118 x B 45 x H 137,5 mm.
Connections:	Max 2,5 mm^2 (AVG 24).

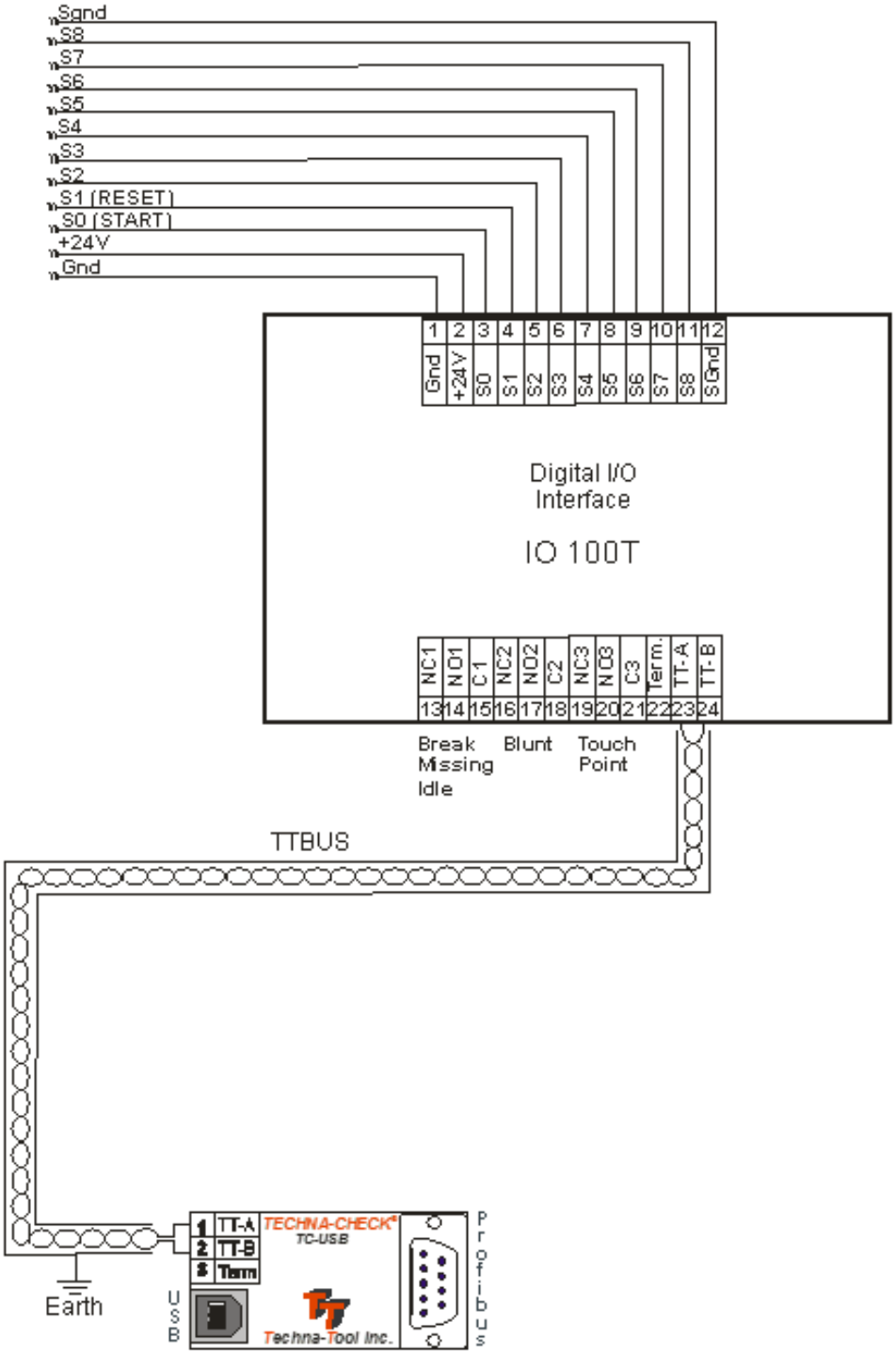
Electrical

Digital Inputs:	10-30 VDC.
Relay Outputs:	250 VAC max, 5 A max.
Sensor Input:	Proprietory. Sensor supplied with unit.
Supply:	18-24 V DC max. 2.5 Watt.
TTBUS:	RS485.

The IO100T interfaces traditional NC-controllers, which are not Profibus capable, to the ***TECHNA CHECK***® TC-USB Tool-Monitor-System.

It is possible for multiple channels (spindles) to share a single IO100T. Could be a round-table machine where all stations changes operation (production change) simultaneously. In this case the alarms outputs is the logical OR of alarms generated by the channels. Thus if one channels makes an alarm the corresponding alarms relay is activated.





Note!

Please use **good-quality** low-resistance twisted and shielded cable earth-connected at one or both ends for the TTBUS network.