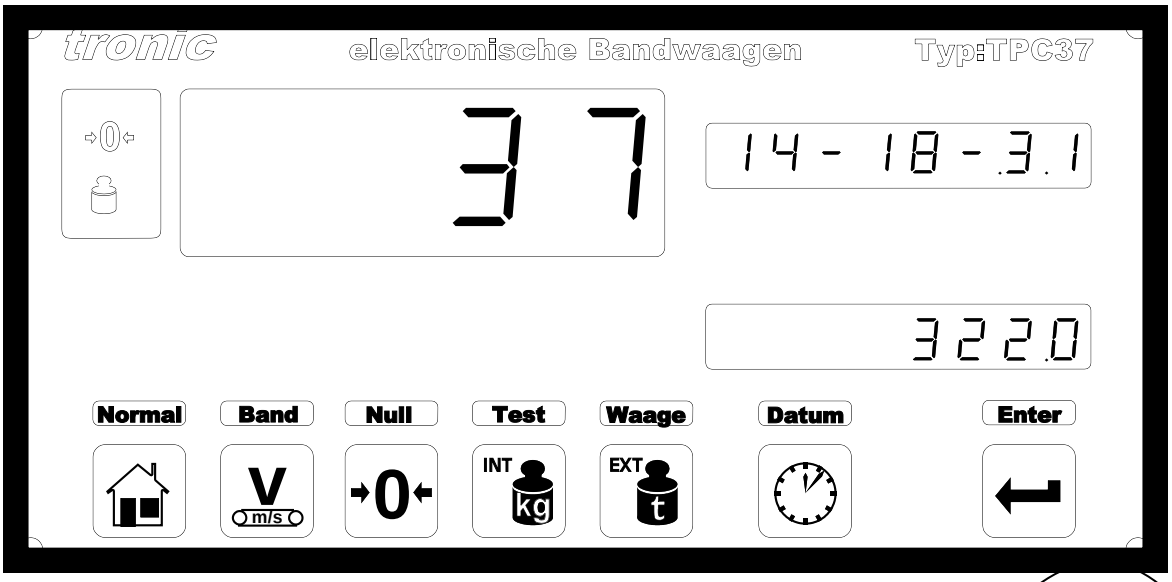


TPC 37 DMS

- **Processor controlled**
- **Easy to use**
- **Automatic tare**
- **Test mode with test weight integrated**
- **Insensitive measuring system**
- **High resolution and reproducibility**
- **Integrated clock**
- **Two galvanically isolated outputs for PLC**
- **Serial interface**
- **Current loop interface 0(4) - 20mA**

Technical Overview

Mechanics:

The mechanical part of our weighbelts is deliberately robust because experience has shown that, particularly in mobile applications, the weighing stations are subjected not only to the applied weight force of the conveyed material, but also to heavy vibrations and overloading when the conveyor belts are in motion.
In the weighing station, care was taken to ensure that all moving parts at the conveyor belt frame have adequate clearance. This measure prevents falling conveyed material from impeding the movement of the station by jamming. This experience gathered on site led us to decline cost-reducing savings in the mechanics.

Measuring transducers:

For the force transducers, a load cell system was chosen.
The idle wheel for speed measurement is held in triple bearings and has a rubber running surface which minimises slippage between the idle wheel and the conveyor belt.

Function:

A pressure and travel signal generated by the measuring transducer is converted electronically into a corresponding digital signal and is processed by a microprocessor.
The belt speed information is measured by an impulse generator.
The conveying rate and the conveyed quantity are calculated by these two values.
The values measured by the weighbelt can also be transferred through diverse interfaces to other control systems such as computers, printers, pen recorders and relay controllers.
Many faults such as open circuits and faults in the measuring transducer can be detected and displayed by the evaluation circuitry.

Electronics

Measurement acquisition electronics:

The electronic system of the weighbelt consists of two parts. One part is located directly at the mechanical part of the weighbelt. The very small signal of the measuring transducer is processed here to create a signal of 4-20mA. This has two advantages: 1. the signal generated in this way is extremely insensitive to externally generated interference fields and the length of the cable can be changed without recalibration. 2. if the evaluation circuitry is replaced, it is unnecessary to calibrate the measuring transducer.
With the current loop interface, it is also possible to detect open circuits and short-circuits.
The 2nd part of the electronic system is the evaluating circuitry.

Evaluation circuitry:

Case: To DIN 43700 with the following dimensions 192 X 96 X 64 (WxHxD)
The DIN case (protection class IP 55) consists of fibreglass reinforced NORYL GFN2 SE1

Displays: 3 displays are installed.
- 1 x 5 digit 20mm display height
- 2 x 8 digit 8mm display height

In normal operation of the weighbelt, the following data is displayed constantly:
-Average conveying rate in t/h
-Current time
-Tonnes per day in 0.1t steps

Furthermore, the belt speed, date, annual ton counter and special displays for calibration and zeroing can be accessed.

Keys: 7 keys are available for the operation of the weighbelt. These are arranged and marked clearly. The keys are also easy to distinguish by their different icons.
To avoid faults caused by penetrating dust, film keys are used.

Overview of the equipment characteristics

Mechanics:	Lever arm mechanism with Load Cell Tacho generator for belt speed	
Belt width:	400-1500 mm	
Case:	Control panel case to DIN 43700	
Electronics:	-Supply	24VDC or 100-240VAC, 50/60Hz (option)
	-Power consumption	max. 12VA
	-Working temp. range	-20 to +50° Celsius
	-Accuracy	better than 1 %
	-Cable length	up to 200m
Measuring range:	depending on the design, from 20 t/h to 3000 t/h	
Displays:	Conveying rate in steps of 1 t/h Tonne counter in 0.1 t steps Maximum indicated tonnes 9999999.9 t Daily and annual counter, belt speed Date, time	
Means of adjustment:	Automatic zeroing Calibration with test weight or test weighing Limits for max. and min. conveying rate Limits for min. speed	
Outputs:	Analogue and digital interfaces are programmable to order	

Outputs

Analog Interface 0(4)-20mA

The active current interface is sending a propotional current signal of the actual conveyor capacity. The scaling of current and capacity can be adjusted. You can use this signal with an PLC Analog Input.

Pulse Output 100kg

This is an opto isolated Ouput for an PLC Input. Every 100kg this output sends a signal for a defineable time.
A PLC can count this pulse on a normal input and sum it for visualising of the quantity of conveyed material.

Pulse Output 1kg

This is an opto isolated Ouput for an PLC Input. Every 1kg this output sends an impuls.
A PLC can count this pulse on a special count input and sum it for visualising of the quantity of conveyed material.

RS232

This is the serial port for Printers.
The communication parameters are: 9600Bd,n,8,1

Parameters which can be calibrated

Values in brackets are default values.

P0: Range of value 0-255 (0)
This parameter will adjust 0 or 4 mA currency interface.
It indicates current for conveying capacity of 0 t/h.
Value of 0 corresponds to 0 mA.
Value of 47 corresponds to 4 mA.
Output of actual current will be passed to the interface during calibration.

P1: Range of value 0-255 (245)
This parameter is a reference value for maximal current of 20 mA.
Value of 246 corresponds to 20 mA.

P2: Range of value 0-255 (10)
This parameter gives pulse duration for pulse outputs.
0 = 20 ms
1 = 20 ms
2 = 40 ms
3 = 60 ms ------> 20 = 400ms

P3: Range of value 0-23 (13)
For configuration of current output 0 (4)-20 mA it is necessary to introduce conveying capacity for current of 20 mA.
0 = 50 t/h 1 = 60 t/h 2 = 70 t/h 3 = 80 t/h 4 = 90 t/h
5 = 100 t/h 6 = 150 t/h 7 = 200 t/h 8 = 250 t/h 9 = 300 t/h
10 = 350 t/h 11 = 400 t/h 12 = 450 t/h 13 = 500 t/h 14 = 550 t/h
15 = 600 t/h 16 = 650 t/h 17 = 700 t/h 18 = 750 t/h 19 = 800 t/h
20 = 850 t/h 21 = 900 t/h 22 = 950 t/h 23 = 1000 t/h
If Bit 1 in P6 ist true, you must divide this value bei 10

P4: Printer Textnumber
P5: Printer Mode

P6: bit0- 0= Eine Tachofahne 1= 4 Tachofahnen
Bit1 0 = Normal Modus 1 = wenig Modus

P7: min Speed 35 = 0,6m/s 70 = 0,3m/s 140 = 0,15m/s

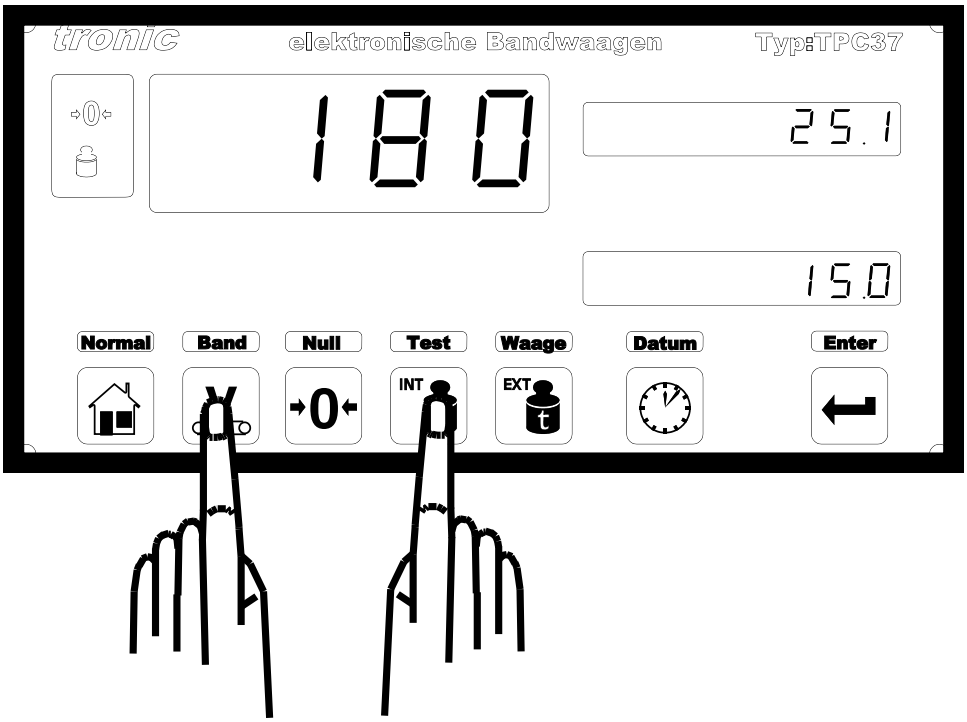
P9: Limit value for automatic switch-off
P10: Time value for automatic switch-off
P11: Noise Gate Value default 30

P12: Profibusaddress Range 0 – 255

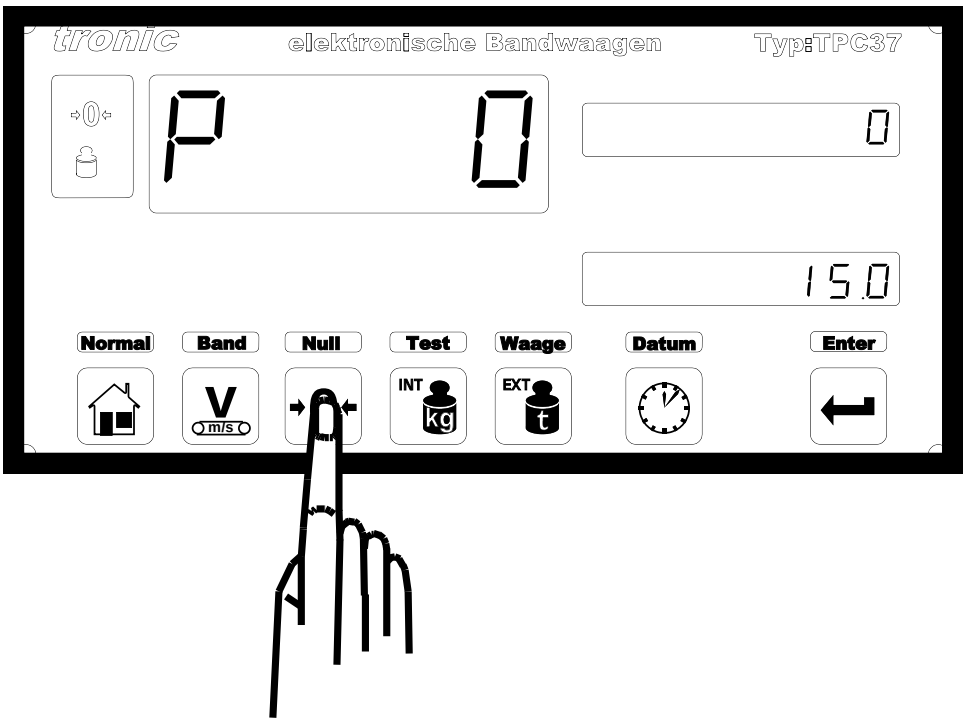
Belt weigher – Input of parameters

Input parameters by following steps:

1. **Press “BAND” and additionally “TEST” button during 1 second and release buttons.**

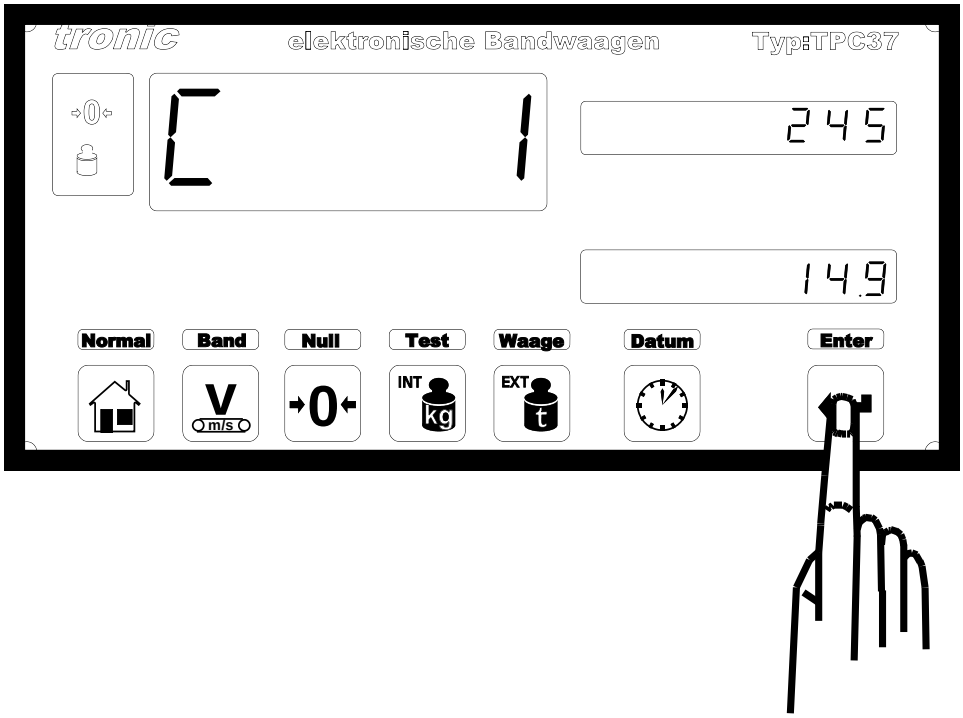


2. **Press “NULL”**



3. **On display 1 appears: P___O**
   Numbers of parameters can be modified by “DATUM” or “WAAGE” buttons.

4. **After selection of the required parameter press “ENTER” button.**



5. **Display 1 will change from P to C.**
   Now you can modify the value of the parameter using “DATUM” and “WAAGE” buttons.
   The new value will be assumed pressing “ENTER” button. If you don’t want to assume the value you can press “NORMAL” button.

   You will quit the adjustment menu by repeated pressing of “NORMAL” button.

Error Codes

Error 20: **Current from tachogenerator to high.**
Short circuit in Cable or Printed Circuit board

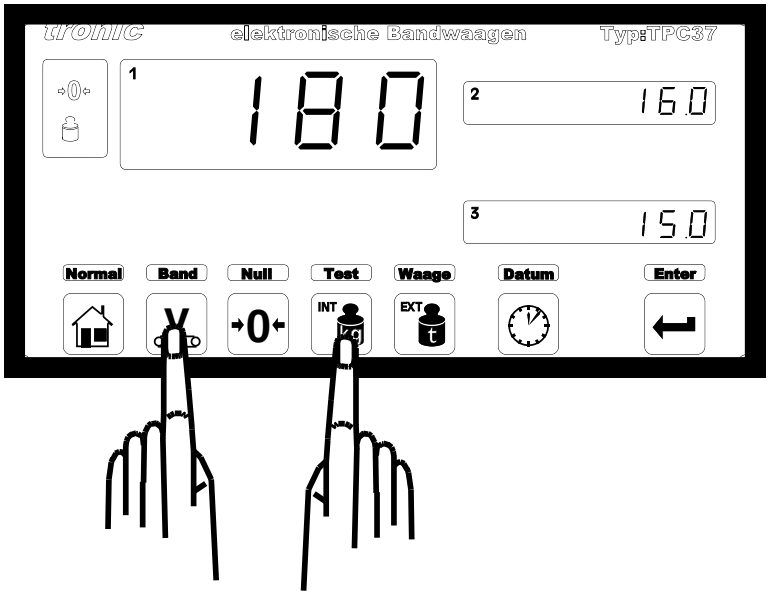
Error 21: **Current consumption of Tachogenator is low.**
Broken wiring.

Error 30: **Current of DMS Signal is to high.**
Defect DMS electronic. Improper adjustment of amplifier

Error 31: **Current of DMS Signal ist to low.**
Improper adjustment of offset .
Broken wiring.

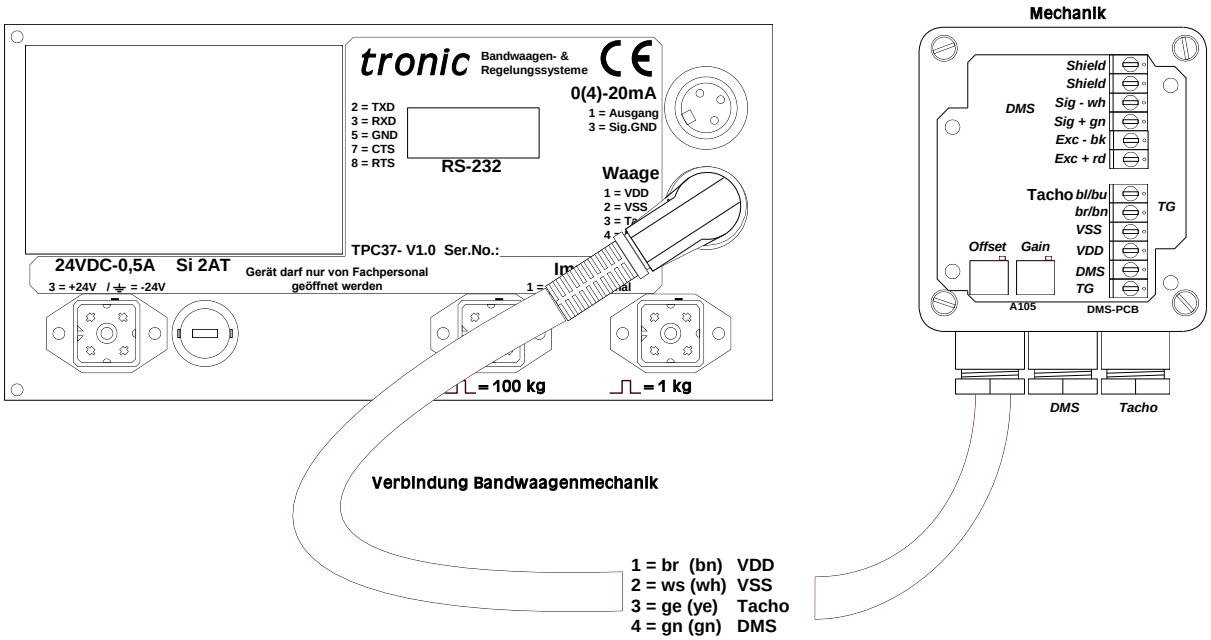
Diagnostic Values

Press “BAND” and additionally “TEST” button during 1 second and release buttons.



The value on Display 1 schould be between 200 to 220 with no material on the conveyor belt. If this value is not ok please check if there is something wrong at the mechanic.

If there is everything right at the mechanic, you have to adjust the Offset at the amplifier unit.
It is a 20 turn trimmer.

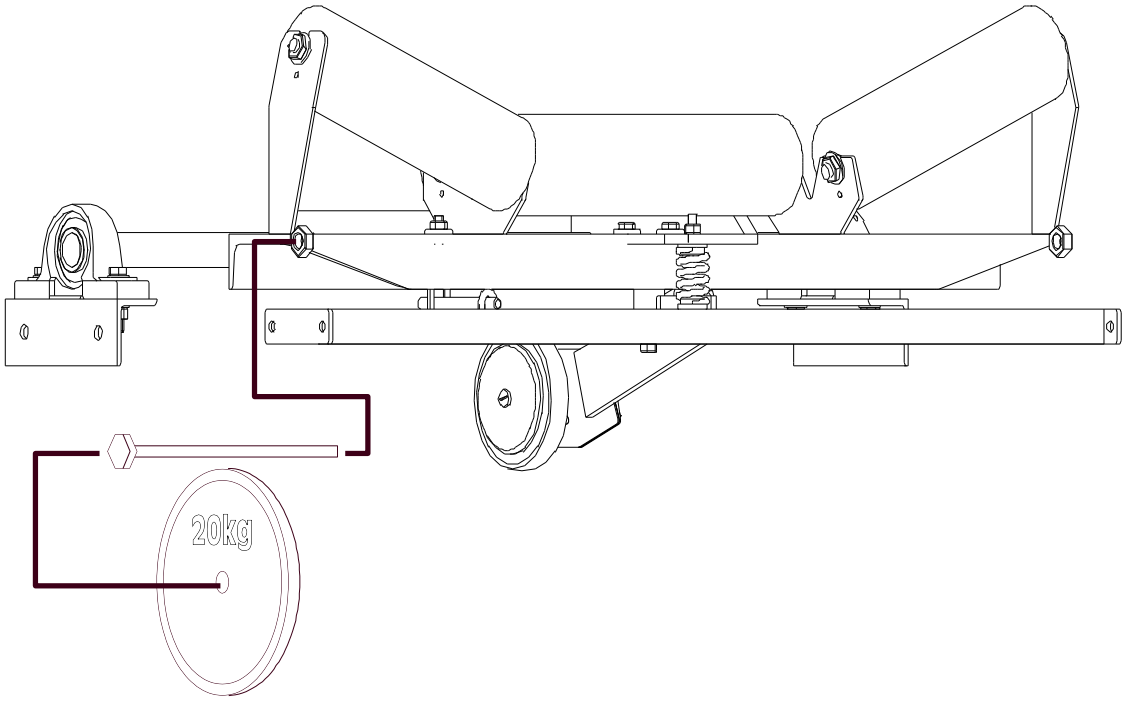


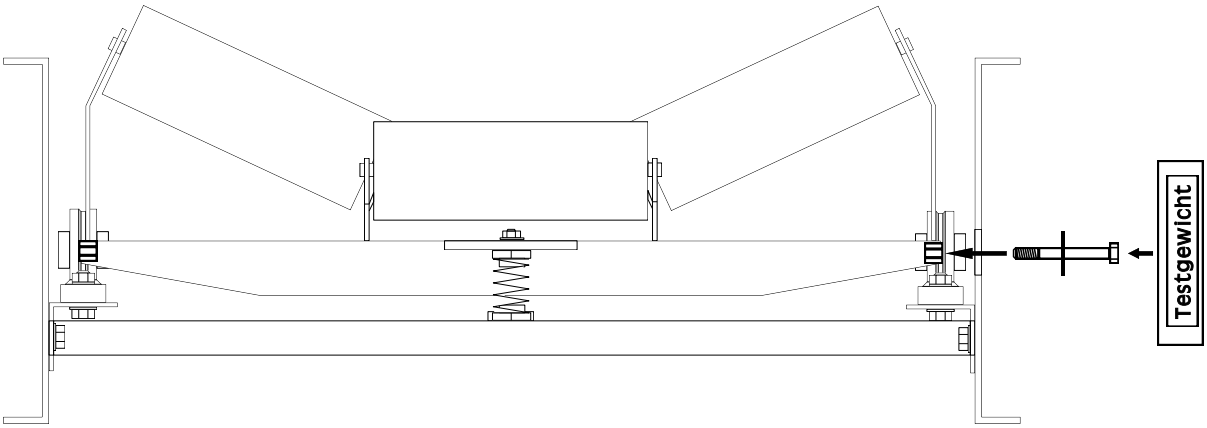
The second Value on Display 2 ist the actual current from the tachogenerator. This value should be about 15.0-17,0 or 24.0-25.5. By turning the wheel of the tachogenerator slowly this 2 states shall be displayed.
A value of 0,0 is a broken wiring.

The value on Display 3 ist the actual internal voltage supply. It should between 14,8 and 15,2.

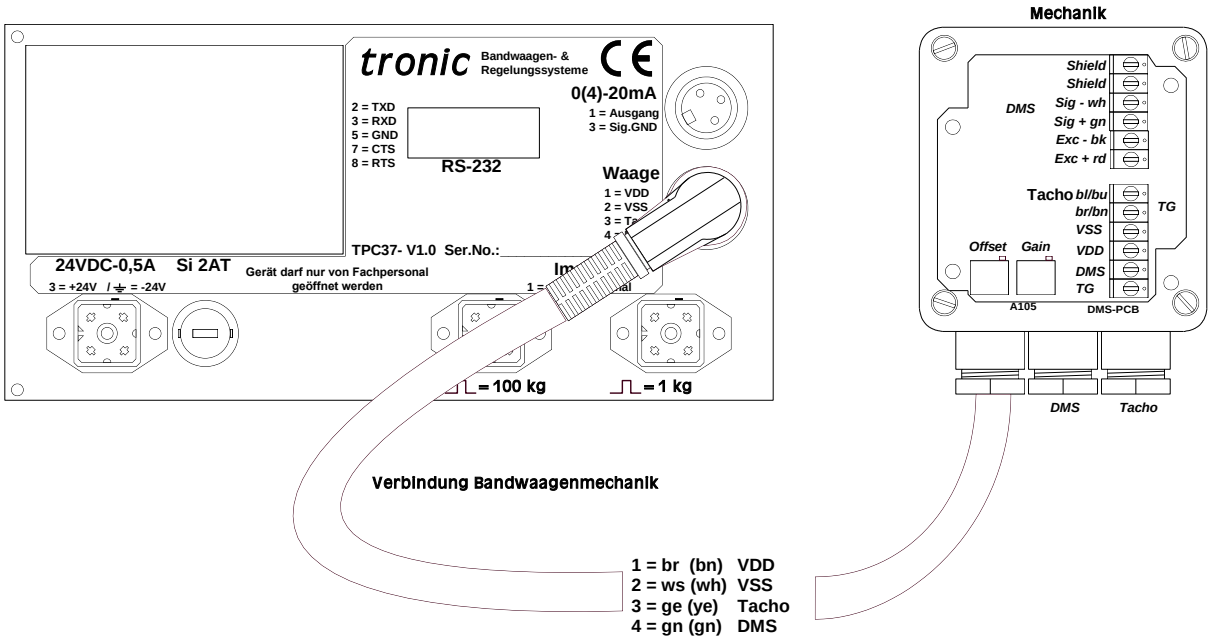
To leave the Diagnostic mode press the “NORMAL” button.

How to apply the 20kg Testweight

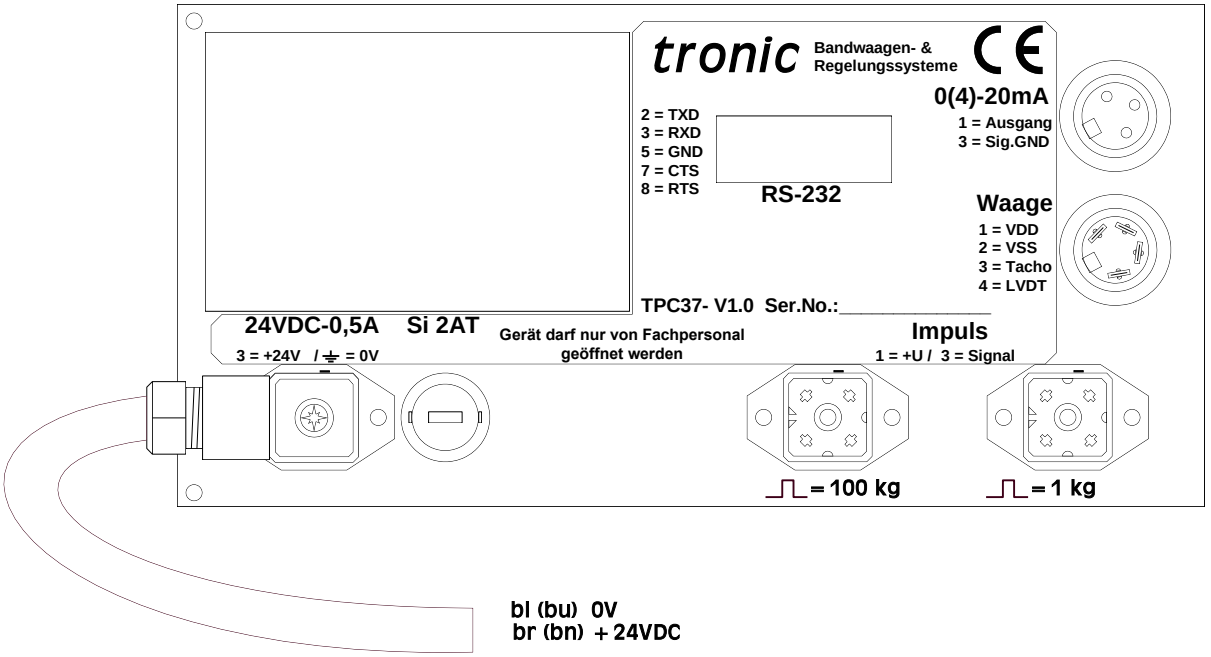




Connection Electronic ➔ Mechanic



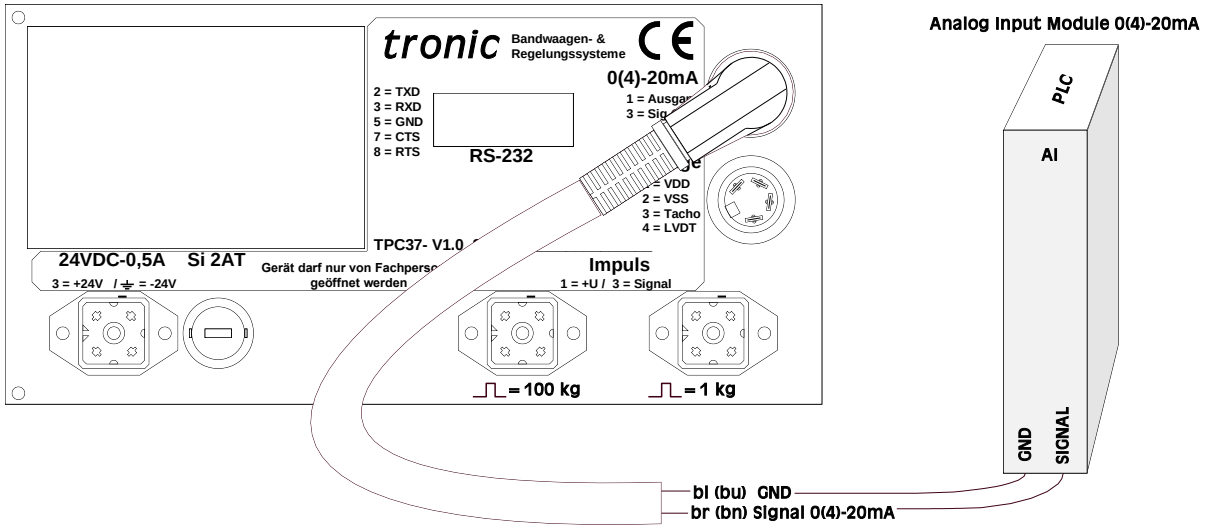
Connection Power Consumption



Connection 0(4)-20mA Signal

Analog Interface 0(4)-20mA

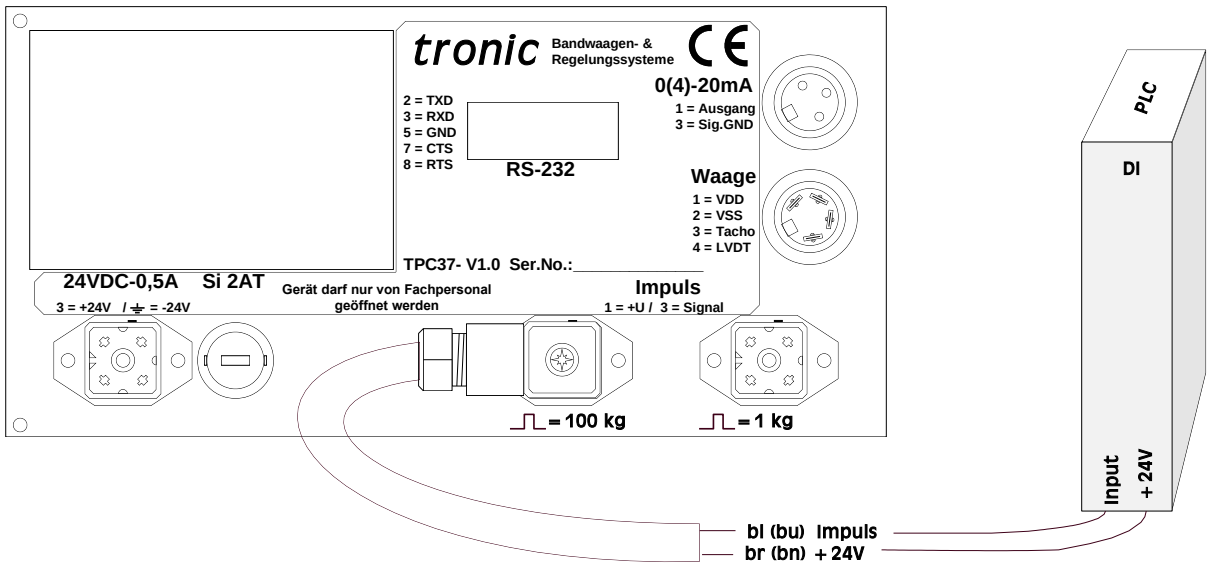
The active current interface is sending a propotional current signal of the actual conveyor Capacity. The scaling of current and capacity can be adjusted. You can use this signal with an PLC Analog Input.



Connection Impuls Output 100kg

Pulse Output 100kg

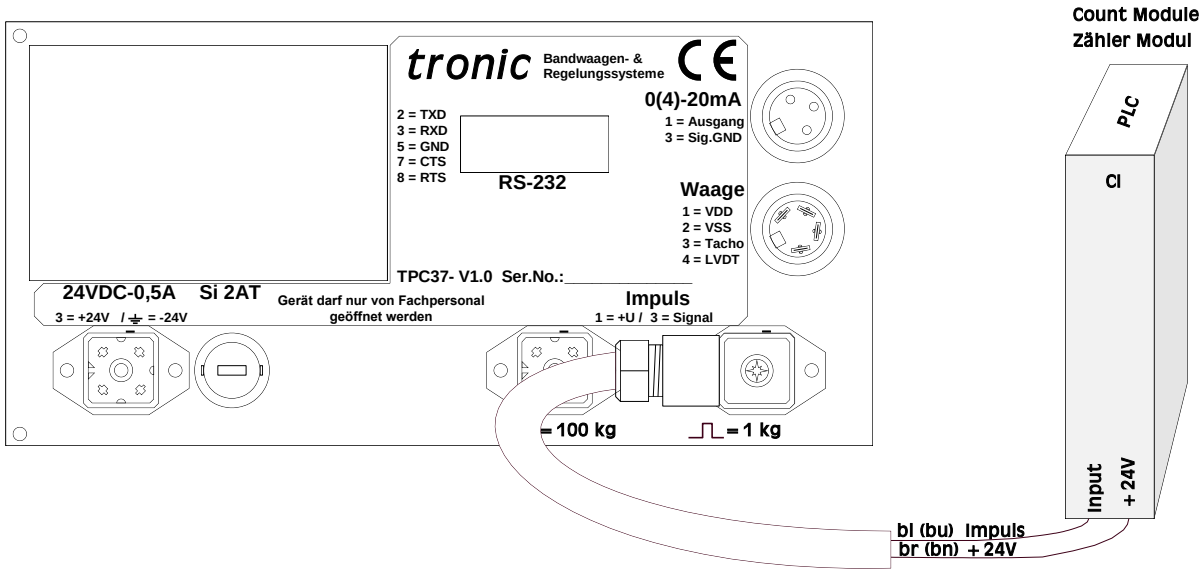
This is an opto isolated Ouput for an PLC Input. Every 100kg this output sends a signal for a defineable time.
A PLC can count this pulse on a normal input and sum it for visualising of the quantity of conveyed material.



Connection Impuls Output 1kg

Pulse Output 1kg

This is an opto isolated Ouput for an PLC Input. Every 1kg this output sends an impuls.
A PLC can count this pulse on a special count input and sum it for visualising of the quantity of conveyed material.



PROFIBUS

In the Profibus option is a 9 pin SUB-D connector.
In the Profinet version is a Network Connector

All Datawords are Low Byte / High Byte

Structure of PROFIBUS/NET data:

Inputs in the sight of PLC

INPUT: 2 Byte (1 word) Pressure value
INPUT: 2 Byte (1 word) t/h
INPUT: 2 Byte (1 word) Speed in cm/s
INPUT: 2 Byte (1 word) DMS Value
INPUT: 4 Byte (2 word) Counter 1 in steps of 100kg
INPUT: 4 Byte (2 word) Counter 2 in steps of 100kg
INPUT: 2 Byte (1 word) Calibration Value
INPUT: 2 Byte (1 word) Zeropoint Value
INPUT: 1 Byte Temperature (option)
INPUT: 1 Byte Control Word

BIT 0 Zeroing is running
BIT 1 Testmode running
BIT 2 Test weighing is running

BIT 5 Value is negative (Minus in display)
BIT 6 State of first impulse output
BIT 7 Stato of second impulse output

INPUT: 1 Byte Error NumberFehlermeldung

Outputs in the sight of PLC

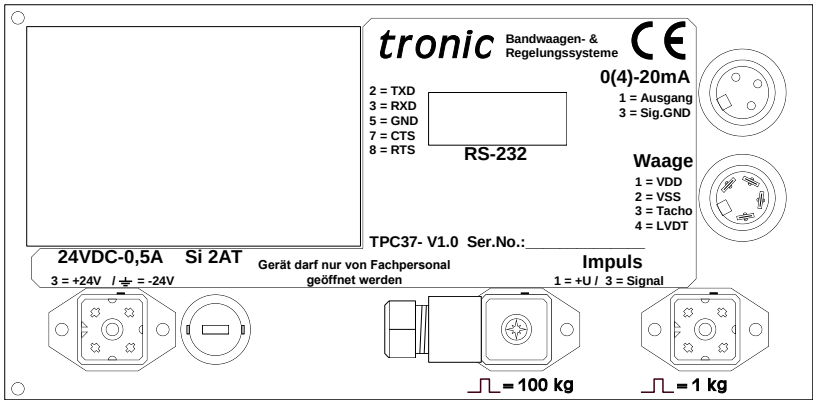
OUTPUT: 1 Byte Controlword 1

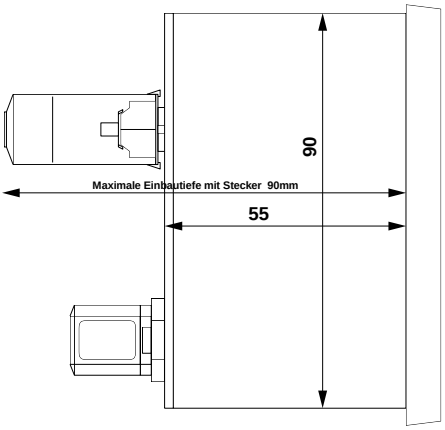
Action starts on change from 0 to 1
BIT 0 Start zeroing
BIT 1 Start testmode
BIT 2 Start test weighing
BIT 3
BIT 4
BIT 5
BIT 6 Clear Counter 1
BIT 7 Clear counter 2

OUTPUT: 1 Byte Controlword 2 (trigger)

BIT 5 Accept reference value
BIT 6 Accept zero value
BIT 7 Accept calibration value

OUTPUT: 2 Byte (1 word) Calibration value
OUTPUT: 2 Byte (1 word) Zeropoint value
OUTPUT: 2 Byte (1 word) Refference value



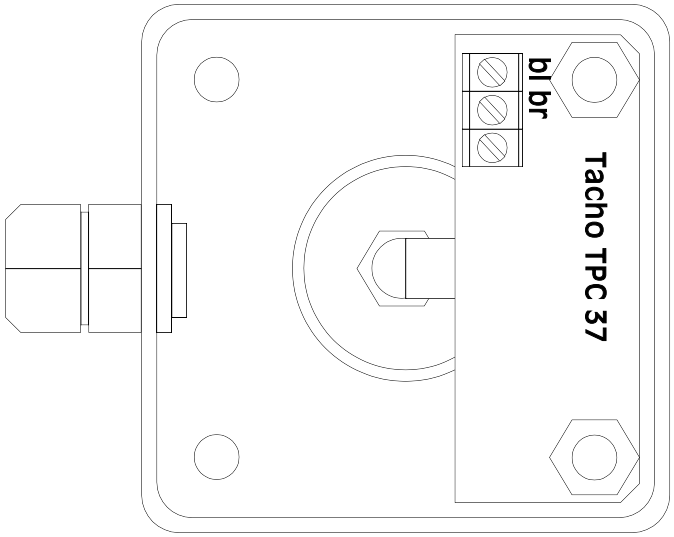


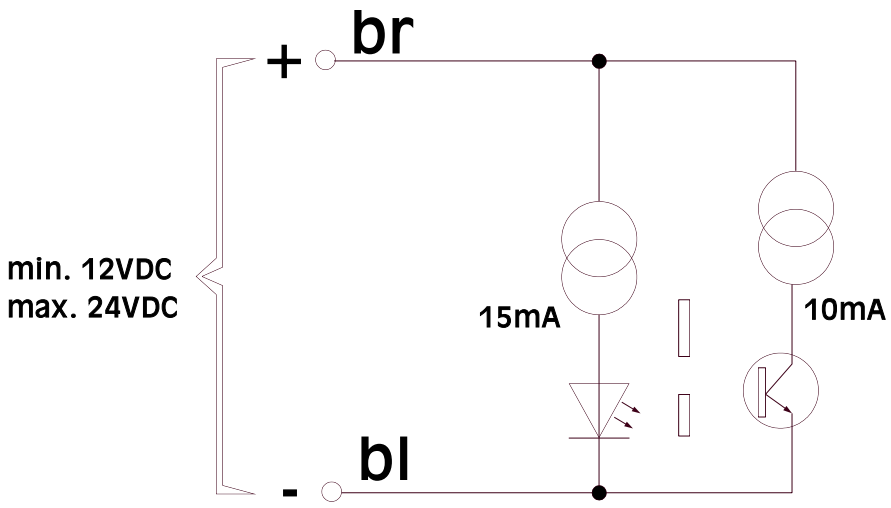
Panel cutout

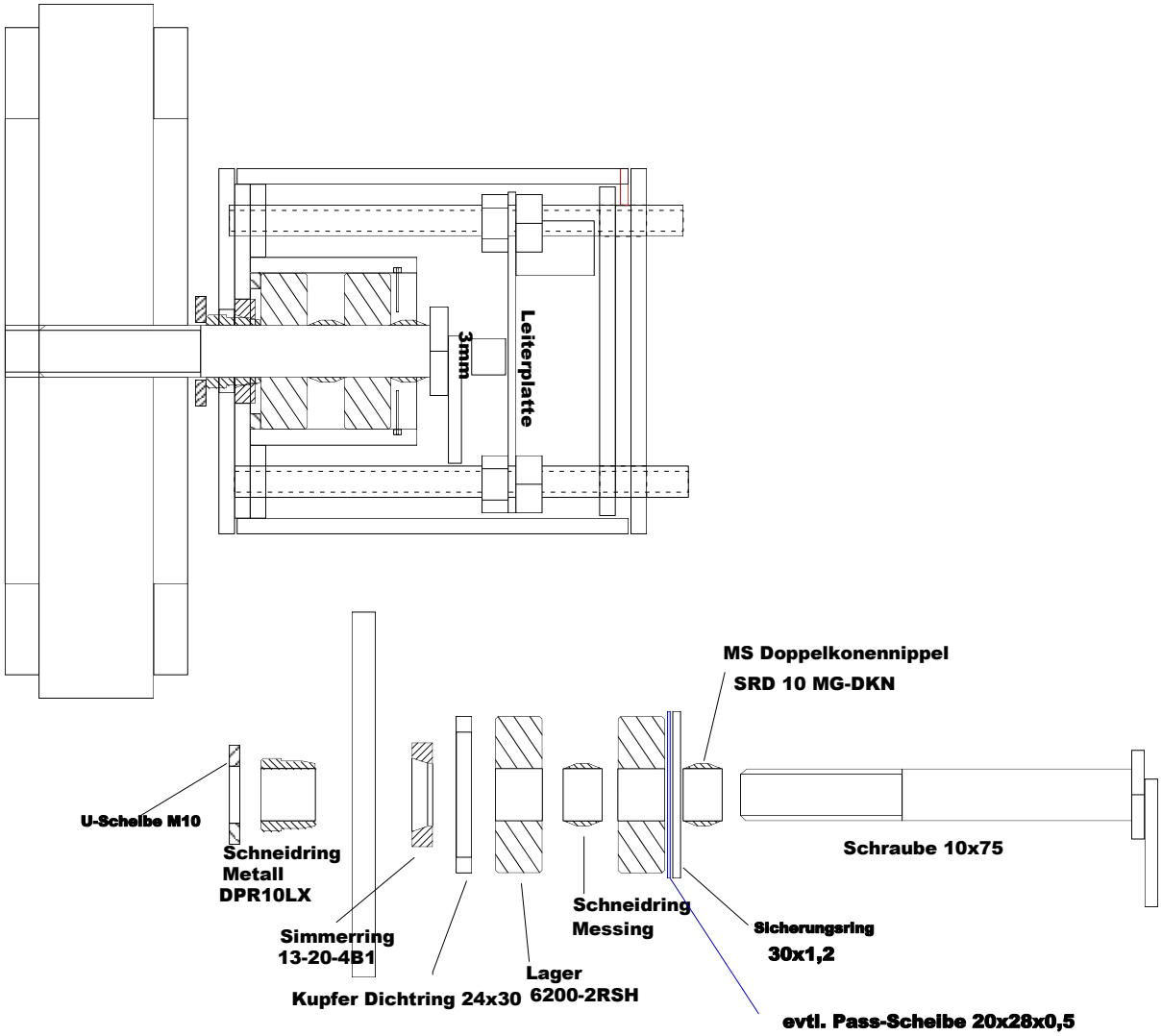
186 x 92

Verwendungsbereich								Maßstab 1:1	Gewicht
						Datum	Name	Benennung	
					Bearb.	230497		Bandwaage TPC37	
					Gepr.				
					Norm				
								Zeichnungsnummer	Blatt
								37rueck.tdr	Bl.
Zust.	Änderung		Datum	Name					

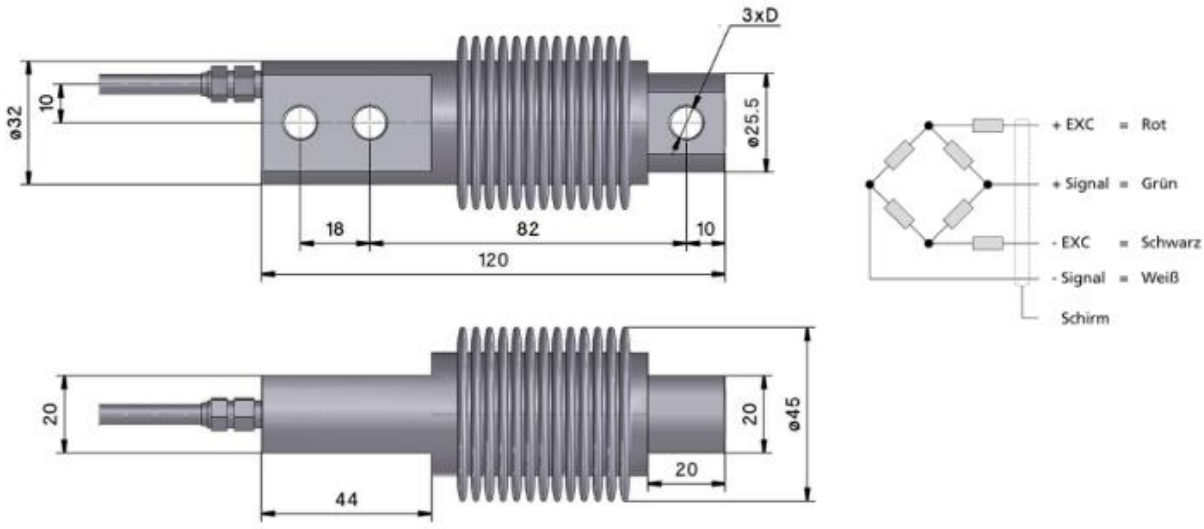
Tachogenerator Datasheet






3mm
Leiterplatte
MS Doppelkonennippel
SRD 10 MG-DKN
U-Scheibe M10
Schneidring
Metall
DPR10LX
Simmerring
13-20-4B1
Kupfer Dichtring 24x30
Lager
6200-2RSH
Schneidring
Messing
Sicherungsring
30x1,2
Schraube 10x75
evtl. Pass-Scheibe 20x28x0,5

DMS Datasheet



Nominal Force: 75kg

Anzahl der Teilungswerte (n_{LC})		3000
Nennkennwert (C_n) / Kennwerttoleranz	mV/V	2,0 ± 0,002
Kennwert vom relativen Mindestteilungswert d. WZ (Y = Emax / vmin):	% von Emax	10.000 %
Mindestvorlast (E_{min})		0
Grenzlast (EL) Bruchlast (Ed)	% von Emax	120 150
Empfohlene Speisespannung (Uref) Maximal zulässige Speisespannung (BU)	V	5 - 12 15
Nullabgleich	% v. Cn	≤ ± 5%
Eingangswiderstand (RLC) bei Referenztemperatur	Ω	400 ± 20
Ausgangswiderstand (RO) bei Referenztemperatur	Ω	352 ± 3
Isolationswiderstand	MΩ	>5.000
Nenntemperaturbereich (BT)	°C	- 10 ... + 40
Schutzart nach (DIN 40.050 / EN 60529)		IP 65
Kabellänge	m	3 m
Werkstoff		Legierter Stahl

1	2	3	4	5	6
Pos.	Menge	Ein-heit	Benennung	Sachnummer	Bemerkung
	1	Stück	Traverse	3700-1	Bandrahmenbreite angeben
	1	Stück	Meßschwinge	3700-2	dito
	2	Stück	Lagerbefestigung	3700-3	abhängig von Band-körper Ausführung
	2	Stück	Pendelkugellager YAR 206-2F mit Gehäuse SY506M	3700-4	
	4	Stück	Bügel-Lagerbefestigung	3700-5	
	3	Stück	Förderbandrollen 89mm	Rolle 200 / Rolle 250 / Rolle 320 Rolle 400	Entsprechende Größe angeben
	2	Stück	Meßfeder	3700-7	
	4	Stück	Federaufnahme	3700-8	
	1	Stück	Bremse	3700-9	nicht für stationären Einbau
	1	Stück	Testgewicht	3700-0	
	1	Stück	Schraube für Testgewicht	3700-6	benötigte Länge angeben
	1	Stück	Meßaufnehmer LVDT	LVDT-10	
	1	Stück	Stift für Meßaufnehmer LVDT	STIFT-10	
	1	Stück	Tachogenerator mit Stromausgang	TG137	
	1	Stück	Elektronik für Tachogenerator TG137	TG137-PCB	
	1	Stück	Elektronik für Meßaufnehmer LVDT-10 mit 4-20mA Ausgang	LVDT-PCB	
	1	Stück	Gehäuse für Meßaufnehmer-Elektronik	A105	Bopla 01105000
	2	Stück	HTS Stifteinsatz 10 polig	HTS 43121040	nicht für stationären Einbau
	1	Stück	HTS Anbaugehäuse mit Kabeleinführung	HTS 42631006	nicht für stationären Einbau
	2	Stück	HTS Steckergehäuse	HTS 42421005	nicht für stationären Einbau
	2	Stück	HTS Buchseneinsatz 10 polig	HTS 43221040	nicht für stationären Einbau
	40	Meter	Bandwaagenkabel	Ölflex-100 SY 4 x 0,5	Bei Bestellung Länge angeben

1	2	3	4	5	6
Pos.	Menge	Ein-heit	Benennung	Sachnummer	Bemerkung
	1	Stück	Auswerte-Elektronik TPC37 komplett	3711	
	1	Stück	Display für TPC37	3707	
	1	Stück	CPU-Karte TPC37	3709	
	1	Stück	Netzteil TPC37 bei 220V-Version	3704	
	1	Stück	Stecker 0(4)-20mA 3 polig	WKV30	
	1	Stück	Stecker LVDT 4 polig	WSV40	
	1	Stück	Buchse 24V Versorgungsspannung	G20W3F 3+E	
	1	Stück	Buchse 230V Versorgungsspannung	G20W3F 1+2	
	1	Stück	Buchse Impulsausgang	G20W3F 1+2+E	
	2	Stück	Befestigungsspannge Form B	Spange	
	1	Stück	Sicherung - Fein 2AT	träge 2,0A	

					Maßstab	
				Datum	Name	Partlist TPC37
			Bearb.	10.12.24	Rink	
			Gepr.			
			Norm			
						Blatt 2von2
			Bandwaagen			Bl.
Zust.	Änderung	Datum	Name			37Stückdoc