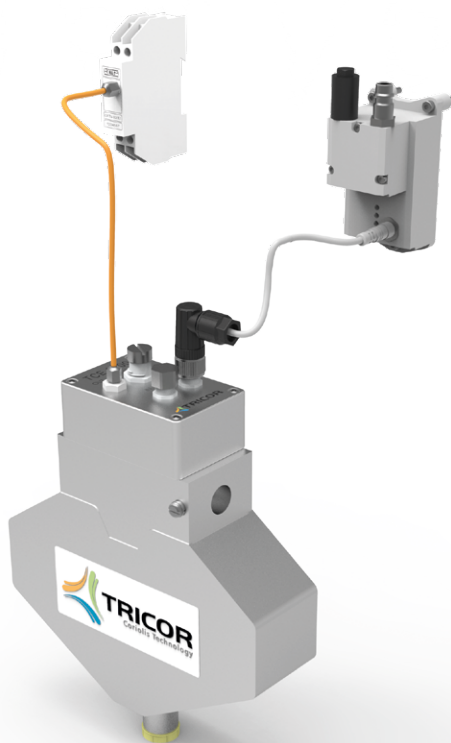




TECHNICAL DATASHEET



TRICOR Coriolis Mass Flow Meter with fiber optic amplifier and light receiver for applications in ESTA systems

- Media independent Coriolis Mass Flow Meter
- Interference-free signal transmission
- Potential separation between flow meter and signal converter (OPTV) by using optical fibre
- Power supply via pneumatic generator
- RS485 Modbus interface for fast parameterization (outside ESTA)



DESCRIPTION

Spraying is a process for coating surfaces with paints and varnishes. In general, the paint is atomized and applied with compressed air using a paint spray gun or paint nozzles. This method is often used, but has the disadvantage that the loss of paint through the spray mist passing components is relatively high.

Electrostatic wet painting is a remedy. This is particularly useful for complicated applications, as coating takes place on all sides. Here, the charged paint droplets are applied on the workpiece under the influence of electrical transport and attraction forces. Main applications are ESTA paintings for highly conductive paints and coatings.

FEATURES

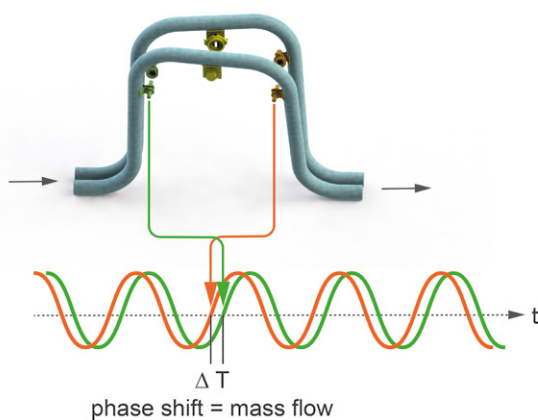
- High material yield and reduced air flow due to less overspray.
- Short coating time due to the electrostatic „wrap-around“ and uniform build-up of the coating thickness in one operation.
- First-class surface properties with regard to: chemical resistance, abrasion resistance, corrosion protection and optical requirements.
- No moving parts in the flow meter.

For this purpose we offer a unique combination of our TRICOR Coriolis Mass Flow Meters with special electronics and signal transmissions for electrostatic applications.

This allows high-precision measurement of flow ranges from 3 up to 65,000 kg/h for system pressure ranges up to 345 bar. A further benefit over conventional measuring techniques is that the flow meter contains no moving parts and thus requires considerably less maintenance than mechanical meters. Due to its media-independent measuring principle, it offers the additional advantage that it can be used for water as well as solvent lacquers with and without fillers.

SETUP CONSISTING OF

- TCM with specially optimized TCE 6000 compact electronics.
- Pneumatic Power Generation Unit that supplies the Coriolis sensor and TCE 6000.
- Fiber optic cable.
- OPTV receiver for converting the light pulses into electrical signals (pulse output).





TCM SENSOR – TECHNICAL DATA FOR LIQUIDS/PAINTS AND COATINGS

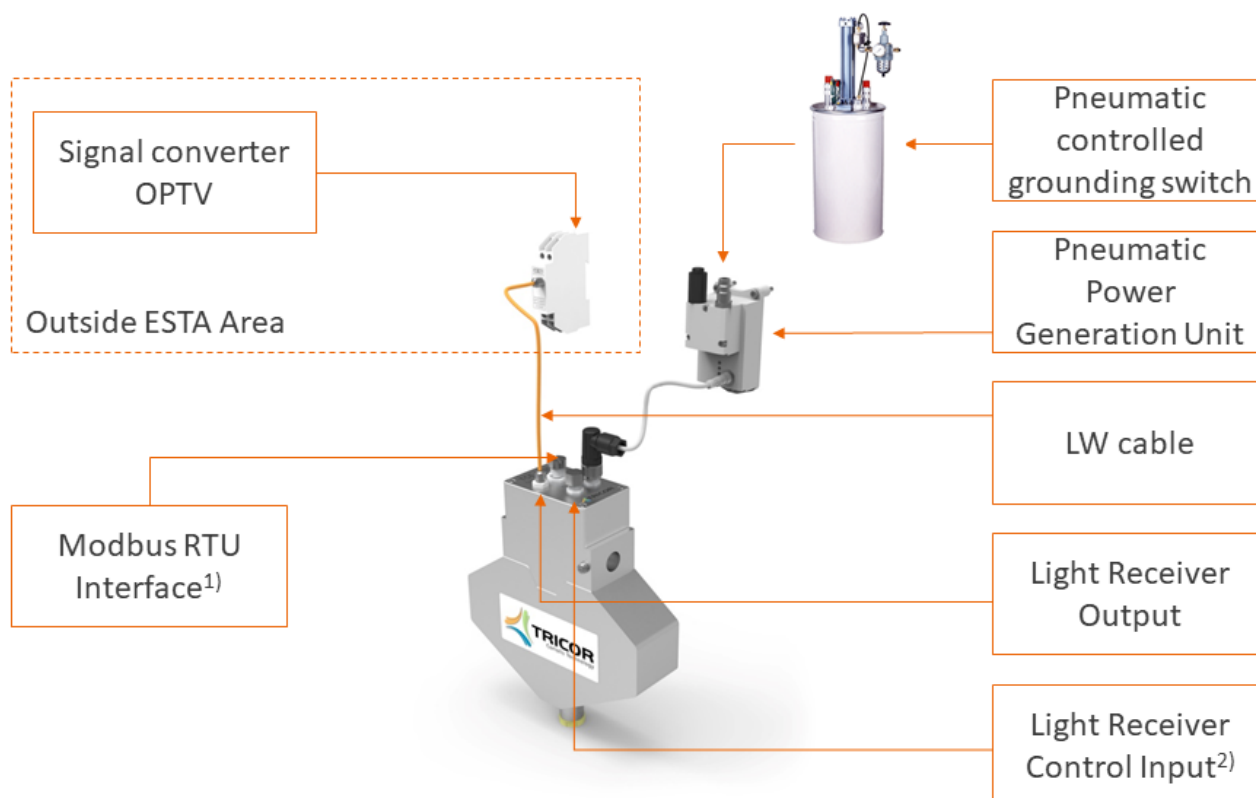
	TCM 0325	TCM 0650	TCM 1550	TCM 3100	TCM 5500	TCM 7900	TCM 028K	TCM 065K
Max. Flow Rate (kg/h)	325	650	1.550	3.100	5.500	7.900	28.000	65.000
Max. Flow Rate (lb/min)	12	24	57	114	202	290	1.029	2.388
Basic Accuracy (Mass Flow)	±0.3 % of flow rate (option: up to 0.1 % of flow rate)							
Basic Accuracy (Volume Flow)	±0.3 % of flow rate (option: up to 0.15 % of flow rate)							
Repeatability	±0.05 % of flow rate							
Zero Stability	±0.01 % of full scale							
Density Range	up to 2,500 kg/m³ [2.5 g/cm3] (higher ranges on request)							
Density Accuracy	±1.0 kg/m³ [±0.001 g/cm³]							
Density Repeatability	±0.5 kg/m³ [±0.0005 g/cm³]							
Process Temperature Range	±1 °C ±0.5 % of reading [±1.8 °F ±0.5 % of reading]							
Temperature Repeatability	±0.2 °C [±0.36 °F]							
Process and Ambient								
Process Connections	female thread ½“ adaptors for flanges, dairy and tri-clamp				flanges EN1092, ANSI B16.5, DIN2512, threaded tri-clamp			
Max. Pressure Standard	200 bar [2,900 psi] option: up to 345 bar [5,000 psi] (not forASME)					100 bar [1,450 psi]		
Pressure Drop at max. Flow	for detail information please contact us							
Process Temperature	-40 °C ... +100 °C [-40 °F ... +212 °F]							
Ambient Temperature	-40 °C ... +70 °C [-40 °F ... +158 °F]							
Protection Class	IP65							
General								
Tube Arrangement	2 serial	2 parallel	2 serial	2 parallel	2 parallel	2 parallel	2 parallel	2 parallel
Tube Inner Diameter	4 mm	4 mm	8 mm	8 mm	7 mm	9 mm	16 mm	28 mm
Tube Material	1.4404 [AISI 316L]							
Housing Material	1.4404 [AISI 316L]							
Dimensions	see dimensional drawings (pages 6 - 7)							



TCE 6000 TRANSMITTER – TECHNICAL DATA

General	
Supply Voltage	24 V DC
Interface	RS485 Attention: May only be used outside the ESTA area.
Power Consumption	max. 4 W
Housing Material	aluminum diecast
Programming	via TRD 8001 or via RS485 interface
Temperature	ambient: : -40 °C ... +70 °C [-40 °F ... +158 °F] storage and transport: -40 °C ... +80 °C [-40 °F ... +176 °F]
Protection Class	IP65
Electrical connections	M12 socket plug (5-pin, female), for RS485 M12 plug-in connector (5-pin, male) for Pneumatic Power Generation Unit
Dimensions	see dimensional drawing (page 8)
Frequenzausgang	
Output Signal	isolated, optical frequency output
Status In- and Output (on request)	

SET-UP OF A TCM/TCE 6000 WITH OPTICAL I/O



¹⁾ The interface can be used to parameterize the flow meter (not allowed in active ESTA mode).

²⁾ On request.



OPTV – TECHNICAL DATA

OPTV-02/X0 Light Receiver	
Ambient Temperature	-20 °C up to +60 °C [-4 °F up to +140 °F]
Supply Voltage	U_B : 7 up to 30 V
Quiescent Current	$I_R < 1.1$ mA
Output	Frequency output, constant pulsetime 500 µsec
Electrical Data, Alternatively	Voltage outputs (3-wire connection) a. Active output High level: $U_{high} > U_B - 0.6 \text{ V} - [2.5 \text{ k}\Omega \times I_{out} \text{ (mA)}]$ Low level: $U_{low} < 0.6 \text{ V} + [1.3 \text{ k}\Omega \times I_{out} \text{ (mA)}]$ b. Passive output High level: $U_{high} > U - [I_{out} \text{ (mA)} \times 1.3 \text{ k}\Omega]$ Low level: $U_{low} < 0.6 \text{ V} + [1.3 \text{ k}\Omega \times I_{out} \text{ (mA)}]$ U is the voltage applied at the output, max. 30 V Current output (2-wire connection) a. For $U_B < 9 \text{ V}$ (NAMUR supply units) High level: $I_{high} > 2.2 \text{ mA}$ Low level: $I_{low} < 1.1 \text{ mA}$ b. For U_B 7 up to 30 V High level: $I_{high} = [(U_B - 0.6 \text{ V})/1.3 \text{ k}\Omega] + I_{low}$ Low level: $I_{low} = (U_B - 4 \text{ V})/7.5 \text{ k}\Omega$
Max. Frequency	1.500 Hz
Electrical Connection	Two off 4-pin screw terminals for supply and output signals (see wiring schemes)
Housing	Grey-colored polycarbonate for DIN hat top rail mounting
Dimensions	see dimensional drawing (page 9)

FIBER OPTIC CABLE – TECHNICAL DATA

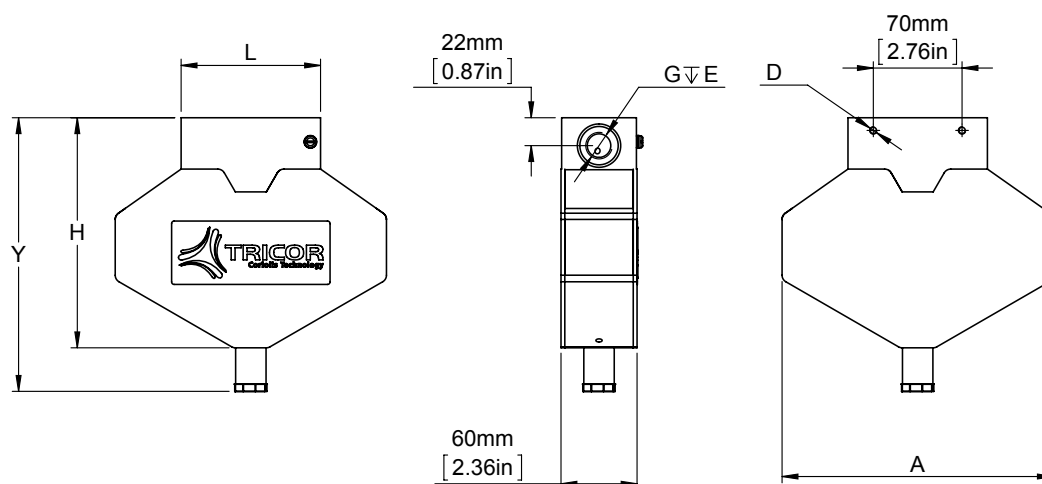
LW cable LABS-free, incl. pre-assembled plugs	
Type	HITRONIC POF
Cable Ø	5.5 mm
Plug Ø	< 8.5 mm
Bending Radius	Permanently installed: 55 mm, temporarily: 30 mm
Tensile Strength	Permanently installed: 100 N, temporarily: 600 N
Ambient Temperature	-20 °C ... +70 °C [-68 °F ... +158 °F]
Protection Class	IP65
Cable Length	Max. 10 m
Wire Tip Material	1.4305 [AISI 303]



PNEUMATIC POWER GENERATION UNIT – TECHNICAL DATA

Pressure min/max.	3/7 bar [45/100 psi]
Max. output at 7 bar	7.5 W
Compressed air consumption at 7 bar	50 NI/min
Process connection	G $\frac{1}{8}$ "
Temperature range	0 °C ... 50 °C [32 °F ... +122 °F]
Housing	ALU
Included	compressor connection G $\frac{1}{8}$ " connection cable, 2.5 meters with M8 plug-in connector (3-pin, female) for Pneumatic Power Generation Unit with M12 plug-in connector (5-pin, male) for TCE 6000
Dimensions	see dimensional drawing (page 8)

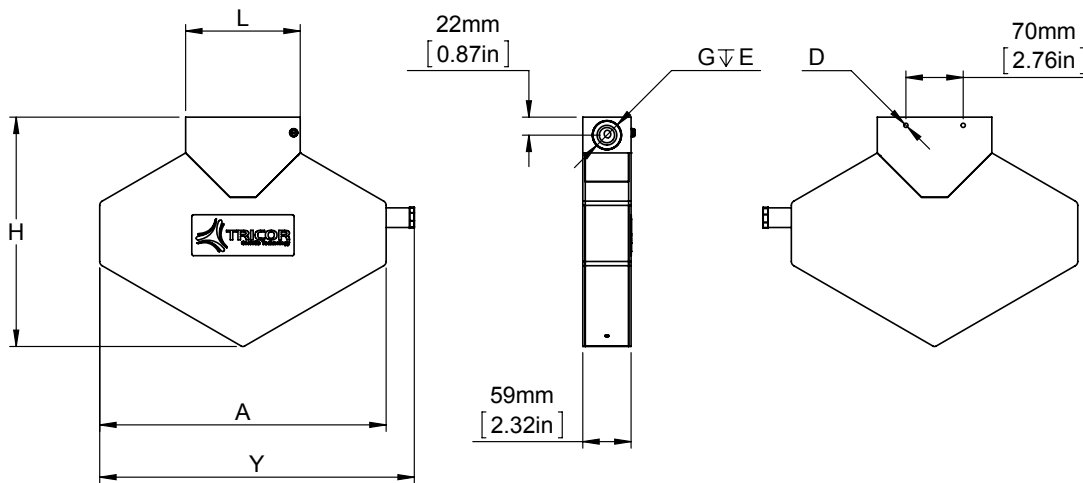
TCM 0325 TO TCM 0650 – DIMENSIONAL DRAWING



Sensor Typ	A	D	E	G	H	L	Y
TCM 0325	214 mm [8.43 in]	M6 ∇ 10	15 mm [0.59 in]	G $\frac{1}{2}$ "	182 mm [7.17 in]	110 mm [4.33 in]	216 mm [8.50 in]
TCM 0650	214 mm [8.43 in]	M6 ∇ 10	15 mm [0.59 in]	G $\frac{1}{2}$ "	182 mm [7.17 in]	110 mm [4.33 in]	216 mm [8.50 in]

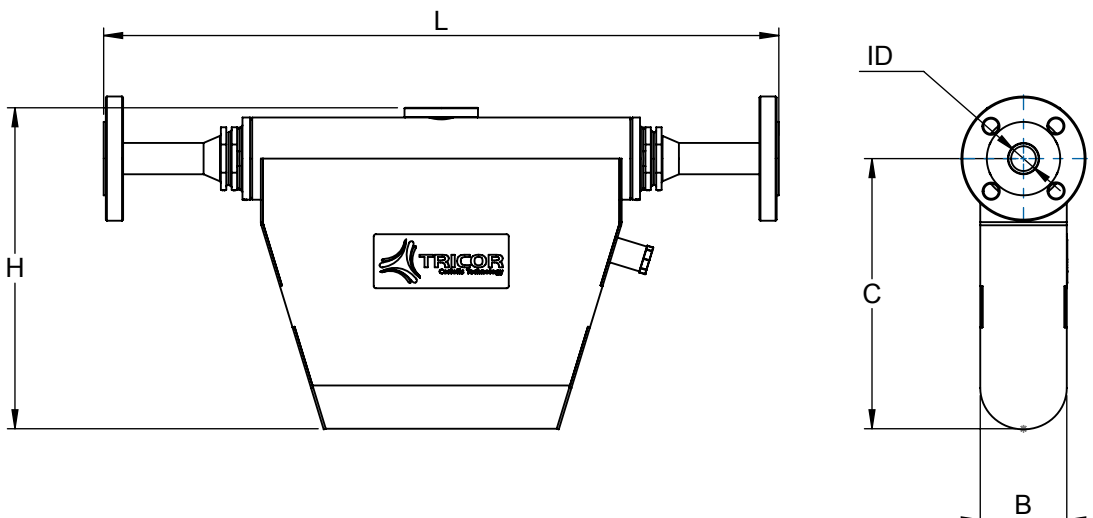


TCM 0325 TO TCM 0650 – DIMENSIONAL DRAWING



Sensor Type	A	D	E	G	H	L	Y
TCM 1550	350 mm [13.78 in]	M6 ∇ 10	18 mm [0.71 in]	G $\frac{1}{2}$ "	280 mm [11.02 in]	140 mm [5.51 in]	384 mm [15.12 in]
TCM 3100	350 mm [13.78 in]	M6 ∇ 10	18 mm [0.71 in]	G $\frac{1}{2}$ "	280 mm [11.02 in]	140 mm [5.51 in]	384 mm [15.12 in]

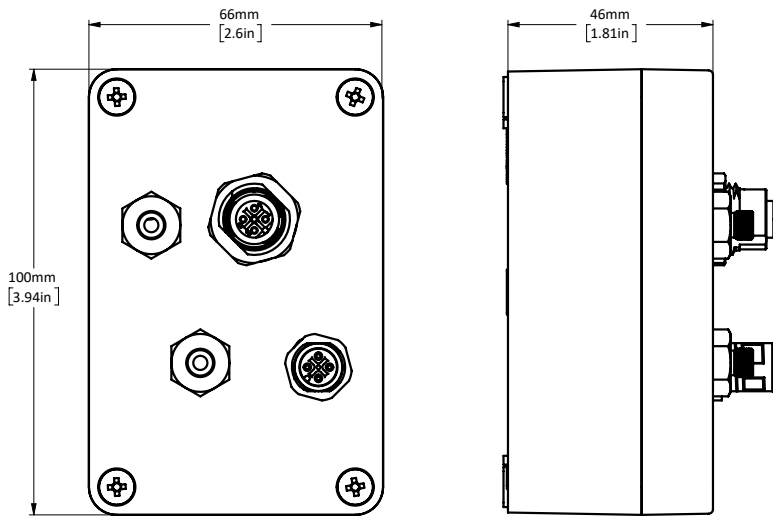
TCM 5500 TO TCM 065K – DIMENSIONAL DRAWING



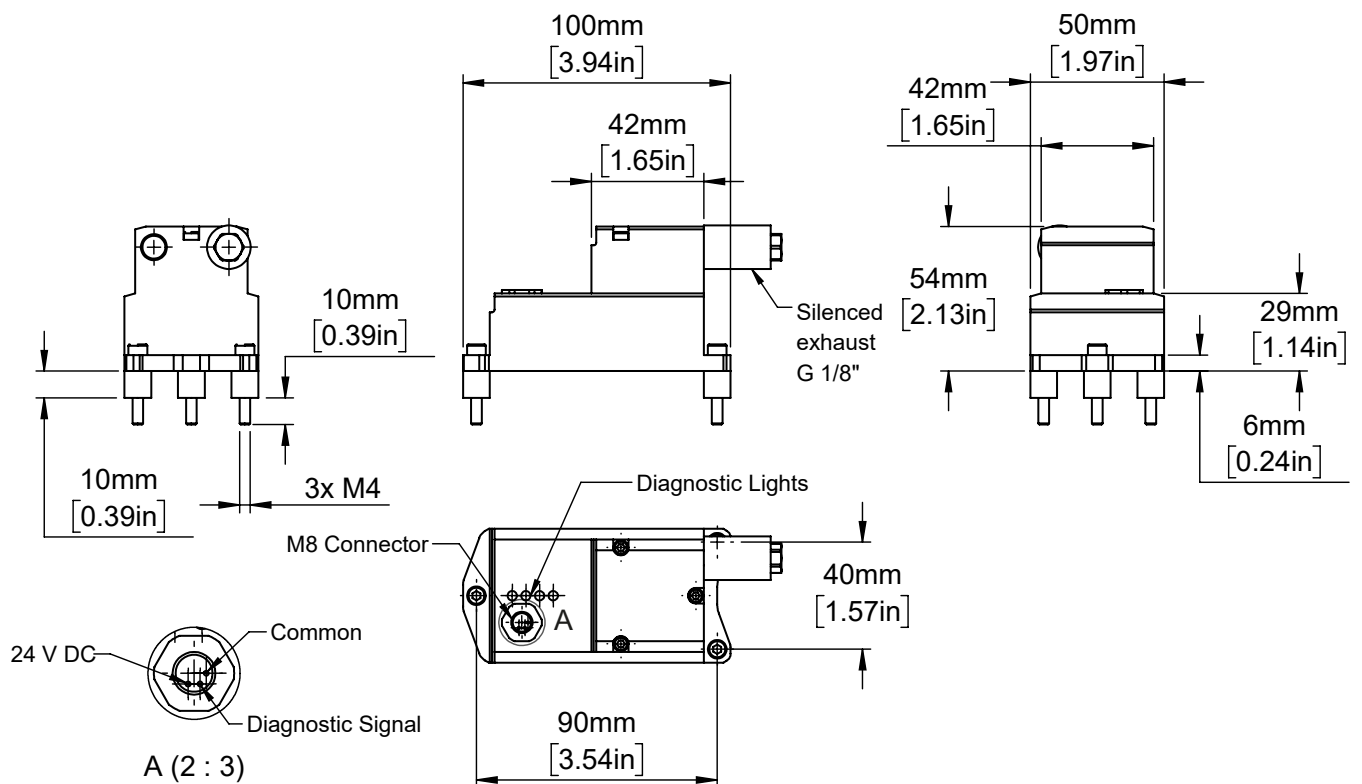
Sensor Type	B	C	H	L	I.D.	Anschluss
TCM 5500. 7900	61 mm [2.40 in]	204 mm [8.03 in]	260 mm [10.24 in]	460 mm [18.11 in]	Ø 13 mm [Ø 0.51 in]	on request
TCM 028K	80 mm [3.15 in]	253 mm [9.96 in]	315 mm [12.40 in]	625 mm [24.61 in]	Ø 23 mm [Ø 0.91 in]	on request
TCM 065K	151 mm [5.94 in]	387 mm [15.24 in]	480 mm [18.90 in]	830 mm [32.68 in]	Ø 40 mm [Ø 1.57 in]	on request



TCE 6000 TRANSMITTER – DIMENSIONAL DRAWING

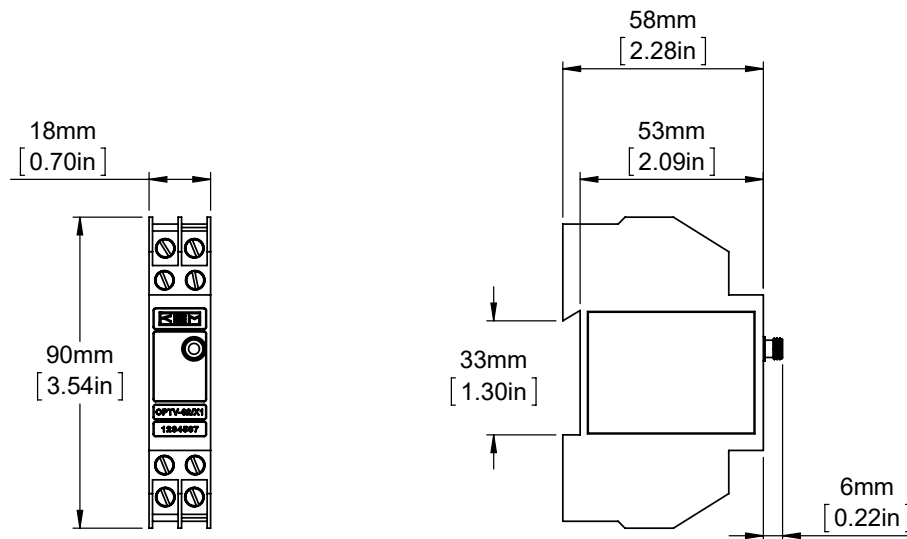


PNEUMATIC POWER GENERATION UNIT – DIMENSIONAL DRAWING



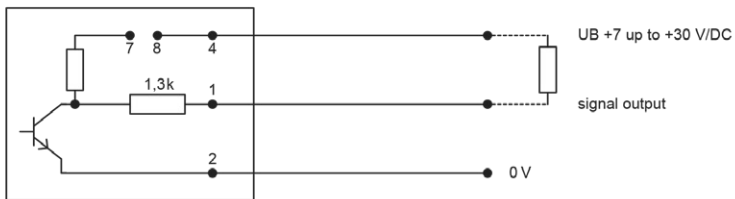


OPTV – DIMENSIONAL DRAWING

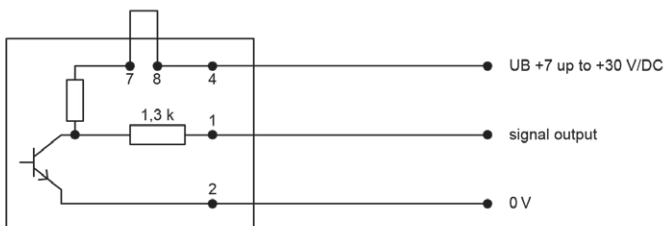


OPTV – ELECTRICAL CONNECTION

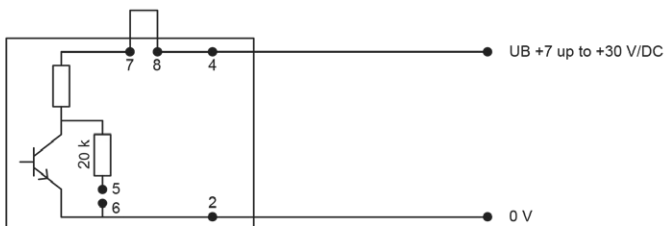
3-wire passive



3-wire active



2-wire





TCM METER (TRICOR CLASSIC SERIES) – ORDERING CODE

	TCM	XXXX	-	XX	-	X	X	X	X	-	X	X	X	X	-	Ex
Process Connections																
see datasheet TCM CLASSIC series				XX												
Mechanical Options																
Medium Temperature Range																
-40 °C ... +100 °C [-40 °F ... +212 °F]						S										
Pressure Range																
With rupture disc max. 4 bar [58 psi]							G									
Mechanical Design																
Standard (version dependent)								S								
Face to Face Length																
Standard (version dependent)									S							
Electronics Options																
Electronics Type																
Meter mount electronics TCE 6000										F						
Interface																
RS485 (Modbus RTU) ³⁾											S					
Supply Voltage																
24 V DC												D				
Options																
Optical I/O (TCE 6000 only)													C			
EX-Protection																
ATEX Zone 2: II 3G Ex nA IIC T4 Gc																Exn

OPTV – ORDERING CODE

OPTV-02:	Single channel light receiver
OPTV-03:	Dual channel light receiver/-sender (on request)

FIBER OPTIC CABLE – ORDERING CODE

	LW	-	LA	-	X
Plastic fibre optic cable, single fibre cable, pre-assembled					
Cable length					
2 meter [≈ 6.5 ft.]					02
3 meter [≈ 10 ft.]					03
5 meter [≈ 16.5 ft.]					05
9 meter [≈ 30 ft.]					09
10 meter [≈ 33 ft.]					10

PNEUMATIC POWER GENERATION UNIT – ORDERING CODE

Pneumatic Power Generation Unit: TCE 6000-FSDC-SET-PPG



SAFETY INSTRUCTIONS

The following has to be adhered to:

- a. Installation instructions for electrical devices.
- b. The devices have to be installed in a way that the max. ambient temperature does under no circumstances exceed the mentioned maxima (consider self heating).
- c. Exceeding or falling below the regular measuring range will cause invalid frequency output signals.
- d. Generally, supplied units have to be connected by an expert according to EMC stipulations.



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