



T3F - EtherCAT

T-Series III Data Sheet

Ethernet header	Ethernet Data				FCS
	EtherCAT header				
14Byte	11bit	1bit	4bit	44*-1498Byte	4bit
Ethernet header	Length	Res.	Type	1...n Datagrams	FCS

- + Updated new generation: stronger performance
- + Stroke length up to 20 m
- + EtherCAT output: position and velocity



THE NEW III GENERATION



High precision



Double anti-interference



High performance chip



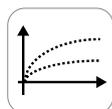
Wide operating voltage



Reverse polarity protection



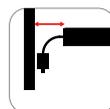
Shock/vibration resistant



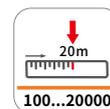
Linear/Curve measurement



Compact for transport and storage



Confined space installation



Wider stroke length range

Input	Measured data	Position/Velocity
	Position measurement range	100mm...20000mm
Output	Interface	EtherCAT
	Data protocol	EtherCAT 100 Base-Tx, high speed Ethernet
	Data transmission rate	Max. 100Mbit/s
Resolution	Position resolution	0.5...1000µm optional
	None-Linearity	< ±0.02%F.S. (min. ±100µm)
	Repeatability	< ±0.001%F.S. (min. ±2.5µm)
	Update time	Depends on stroke length
	Temperature coefficient	< 15ppm/°C
Mounting	Mounting position	Any
	Pressure resistance outer tube	Thread metric M18×1.5, 3/4"-16UNF-3A etc.
Design/ Material	Electronics housing	Aluminum alloy/Zinc alloy
	Magnet	Stainless soft pipe (Teflon skin), min. bending semidiameter 280mm, shipping semidiameter 500mm
Electrical connection	Wiring connection	6 pin M16 connector, two 5 pin M12 connectors and one 4 pin M12 connector, two 5 pin M12 connectors and one 4 pin M8 connector, straight out cable
	Operating voltage	9VDC...36VDC
	Polarity protection	Up to -36VDC
	Overvoltage protection	Up to +36VDC
	Power consumption	< 120mA (varies with range size)
	Dielectric strength	500 VDC (DC ground to machine ground)
Operating conditions	Loop velocity	Any
	Operating temperature	-40...85°C
	Humidity	90 % relative humidity, no condensation
	Ingress protection	IP67 installed into pressure pipe (top IP68)
	Shock	100 g/11 ms, IEC standard 60068-2-27
	Vibration	5 g/10...2000 Hz, IEC standard 60068-2-6 (resonant frequencies exclusive)
	EMC	Flexible sensor installed into pressure pipe Electromagnetic emission according to EN 61000-6-3 Electromagnetic immunity according to EN 61000-6-2

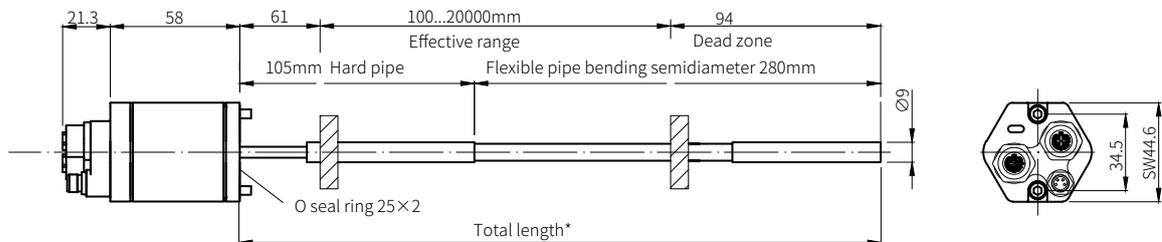
ITEM CATEGORY PARAMETER

Aviation plug : Two 5 pin M12 (female) + One 4 pin M12 (male)

Aviation plug : Two 5 pin M12 (female) + One 4 pin M8 (male)

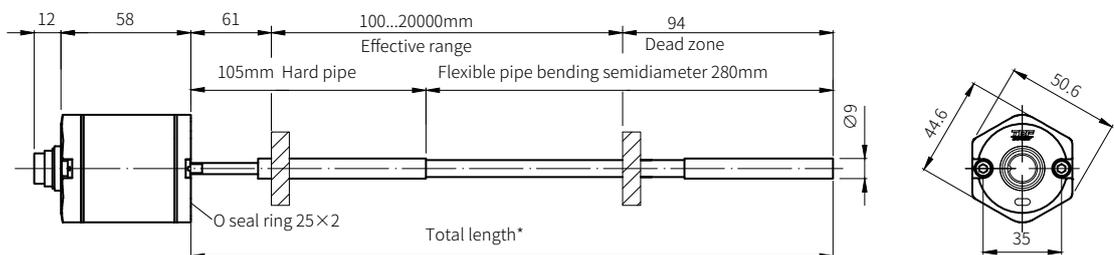
T3F- _____ - **D5D42** - _____

T3F- _____ - **D5D48** - _____



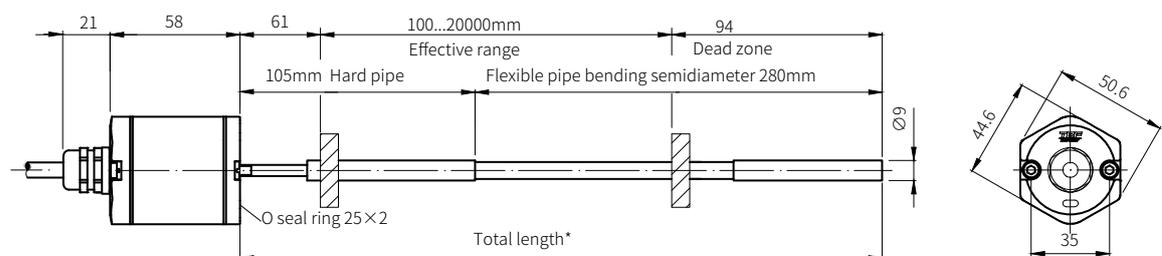
Aviation plug : 6 pin M16 (male)

T3F- _____ - **D616** - _____



Straight out cable

T3F- _____ - **RP** - _____



*Total length < 7600mm, error +8mm; > 7600mm, error +15mm /-5mm;

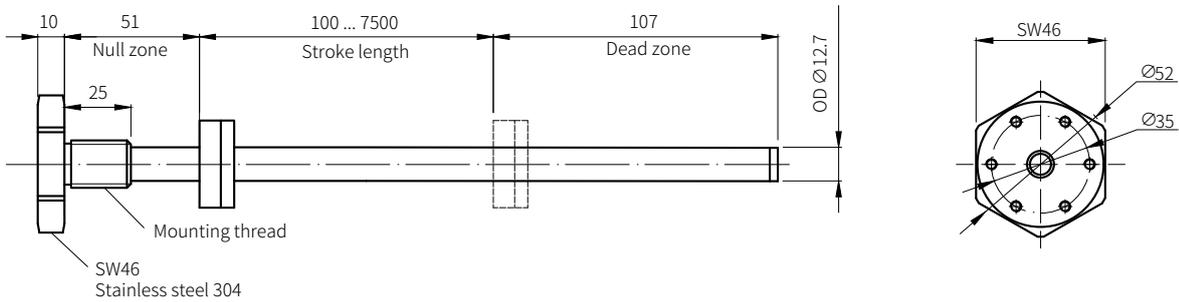
Total length error has no impact on effective range.

DRAWING OF PRESSURE PIPE

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Continuous pressure tolerance of the pressure pipe is 35MPa (70MPa peak).

T3F flexible sensor is installed into pressure pipe, straight out cable IP68, aviation plug IP67.



ORDER CODE

HD -	---	M -	---
	Stroke length		Thread
	0100...7500mm (5mm increments)	M	Metric M18x1.5
		V	Metric M20x1.5
		S	3/4"-16UNF-3A
		W	Metric M24x1
			If not selected, thread M18x1.5 by default.

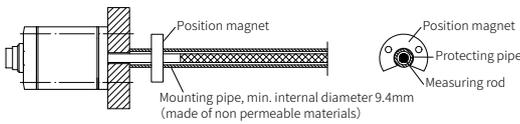
MOUNTING DRAWING

Electronics housing for T3F flexible sensor employs two M4x60 non permeable screws for installation.

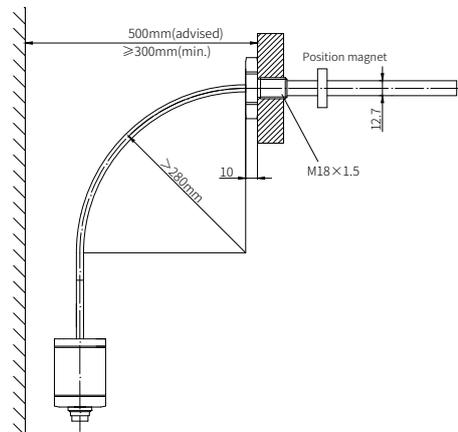
When arc measurement is adopted, the flexible pipe can be bended into required shape with min. bending semidiameter 280mm.

With long range sensor, pipes made of non permeable materials can be used as support. In addition, pressure pipe with flange can also be ordered to support and protect the sensor.

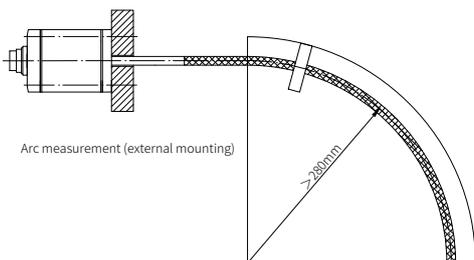
Linear measurement



Pressure pipe

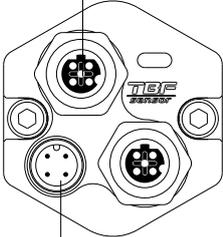
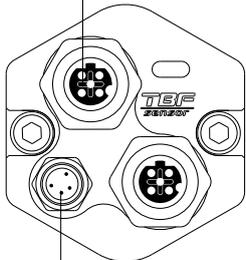
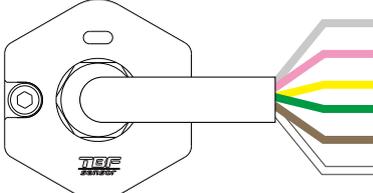


Arc measurement



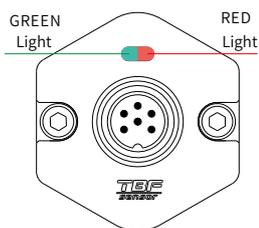
FUNCTION

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6 pin M16 male connector	D616	PIN	Function
	 View on sensor	1	TX+
		2	RX+
<hr/>			
Two 5 pin M12 female connectors (D-coded), One 4 pin M12 male connector	D5D42	PIN	Function
5 pin M12 female connector(D-coded)  4 pin M12 male connector	 D512 (female) View on sensor	1	TX+
		2	RX+
<hr/>			
	D412(male)	PIN	Function
	 View on sensor	1	9VDC...36VDC
		2	NC
		3	0 VDC(GND)
		4	NC
<hr/>			
Two 5 pin M12 female connectors (D-coded), One 4 pin M8 male connector	D5D48	PIN	Function
5 pin M12 female connector(D-coded)  4 pin M8 male connector	 D512 (female) View on sensor	1	TX+
		2	RX+
<hr/>			
	D408(male)	PIN	Function
	 View on sensor	1	9VDC...36VDC
		2	NC
		3	0 VDC(GND)
		4	NC
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Straight out cable	Color	Function	
	Gray	TX-	
	Pink	TX+	
	Yellow	RX+	
	Green	RX-	
	Brown	9VDC...36VDC	
	White	0 VDC(GND)	

Enhanced monitoring and diagnostic functions

TECHNOLOGY PERCEIVES THE FUTURE



Green light	Red light	Function
ON	OFF	View on sensor
ON	ON	Magnet cannot be measured, nor magnet number is correct.
OFF	OFF	Communication exception

ORDER CODE

T3F - - - M - - - 1 - E - - -

Pipe mounting

- C Basic structure
- M Thread M18×1.5 with pressure pipe
- S 3/4"-16UNF-3A with pressure pipe

Stroke length

00100...20000mm
 (< 1000: 50mm increments)
 > 1000: 250mm increments)
 Max. range 7500mm (pressure pipe installed)

Connection type

- RP__ Straight out __m high performance cable (Fill in zero if less than 2 places)
- D616 M16 male connector (6 pin)
- D5D42 Two sets of M12 female connectors (D-coded), One set of M12 male connector
- D5D48 Two sets of M12 female connectors (D-coded), One set of M8 male connector

Output

(Output Code)

EtherCAT Output Code [1]-E[2][3][4]-[5][6]

[1] System	[2][3][4] Output	[5][6] Magnet number
1 Standard	101 Position, update in high speed, 1-5 magnet	01 one magnet
	102 Position, 1-20 magnet	02 two magnets
	103 Position and velocity, update in high speed, 1-5 magnet, linear correction optional
	105 Position and velocity, 1-20 magnet, linear correction optional	20 twenty magnets

Model selection | Model: T3F-M-00600M-D616-1-E101-01

Explanation: T series III generation, T3F flexible sensor, installed inside pressure pipe, mounting thread metric M18x1.5, stroke length 600mm, 6pin M16 aviation plug, standard, EtherCAT output, position measurement, update in high speed, single magnet.

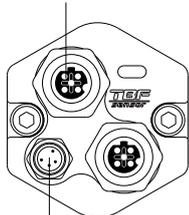
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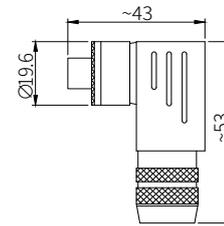
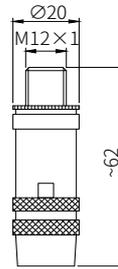
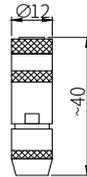
PARTS SELECTION

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5 pin M12(D-coded) female connector

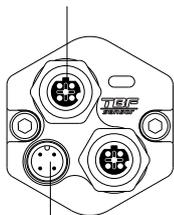


4 pin M8 male connector



Name	4 pin M8 female connector	4 pin M12(D-coded) male connector	4 pin M12(D-coded) male connector (90 degree angle)
End view drawing			
Material	Galvanized nickel		
Fitting diameter	3.5...5mm	6...8mm	
Connection	Welding	Threaded	
Adaptive	4 pin M12 (Power connector)	5 pin M12(D-coded)	
Order code	18-1001	18-1011	18-1012

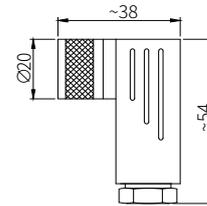
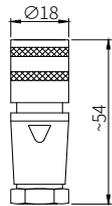
5 pin M12(D-coded) female connector



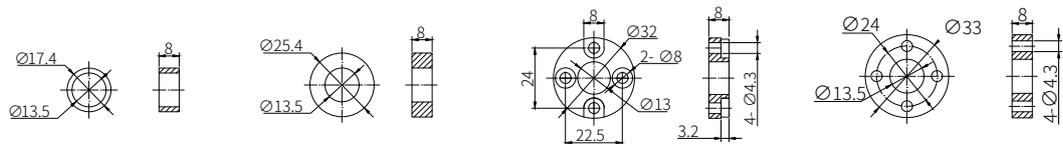
4 pin M12 male connector



Connector	5 pin M12 female connector	5 pin female connector (90 degree angle)	4pin M12(D-coded) male connector
Name	Integral cable	Integral cable	Integral cable
Cable	5 wire 0.25mm ² shielded cable	5 wire 0.25mm ² shielded cable	4 wire 0.25mm ² shielded cable
Color/Diameter	Orange/ Ø 6	Orange/ Ø 6	Green/ Ø 6
Plug surface	 1-Brown 2-Green 3-White 4-Gray 5-Yellow	 1-Brown 2-Green 3-White 4-Gray 5-Yellow	 1-Yellow 2-White 3-Orange 4-Blue
Length	5...30M	5/10/15/20/30M	5...30MM
Adaptive	4 pin M12 (Power connector)	4 pin M12 (Power connector)	5 pin M12(D-coded)
Order code	16-1035	16-1040	16-1045



Name	6 pin M16 female connector	6 pin M16 female connector (90 degree angle)
End view drawing		
Material	Galvanized nickel	Galvanized nickel
Fitting diameter	6...8mm	6...8mm
Connection	Welding	Welding
Order code	18-3001	18-3003



Name	Ring magnet	Ring magnet	Ring magnet	Ring magnet
Operating temperature	-40...125°C			
Order code	12-1032	12-1019	12-1024	12-1001
Fitting non-permeable gasket				
Name	Non-permeable gasket	Non-permeable gasket	Non-permeable gasket	Non-permeable gasket
Operating temperature	-40...125°C			
Order code	12-1037	12-1021	12-1025	12-1008

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