

# Transmitter Trb 8300 & InPro 8000 Sensor Series

Full range turbidity measurements

## Technical Data



Trb 8300



InPro® 8050 InPro® 8200

### Short description

This fiber optic measuring system is based on the backscattered light principle and consequently provides the highest possible performance from low/medium turbidities to high suspended particle concentrations. The system consists of a transmitter Trb 8300 and a sensor of the InPro® 8000 Series. The system is designed for reliable and accurate measurements in biotechnological, chemical and industrial wastewater applications.

### Transmitter features

- Three retrievable, independently configurable parameter sets with remote access
- Manual, process and multipoint calibration procedures
- Four 0/4...20 mA galvanically isolated outputs according to NAMUR NE 43 guideline
- Two programmable limit setpoints, 1 alarm relay
- Wash contact and HOLD input
- Online help functions and full text menu guide in three languages
- RS232 interface for software updates and printing of configurations
- In compliance with EN 55011, EN50082-2, IEC 61010-1, US UL 3111-1, CAN/CSA 22.2, No. 1010.1
- Suitable for all sensors of InPro® 8000 Series

### Sensor features

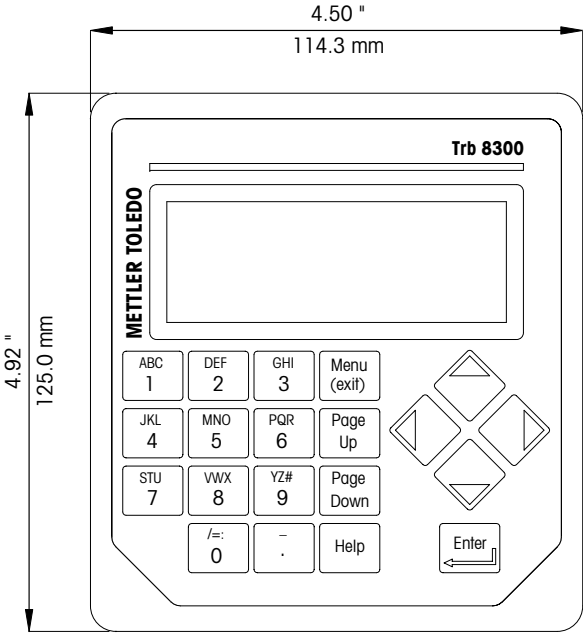
- Compact 12 mm design, single / dual optical fiber sensors made of either PSU, DIN 1.4435 stainless steel (316L) or Hastalloy (HA-C276)
- Wide measuring range from 5 FTU up to 250 g/l suspended solids
- Suitable for installation in classified areas (Ex-proof)
- Sterilizable and available in various lengths
- Fixed fiber optic cable with SMA connectors

## Contents

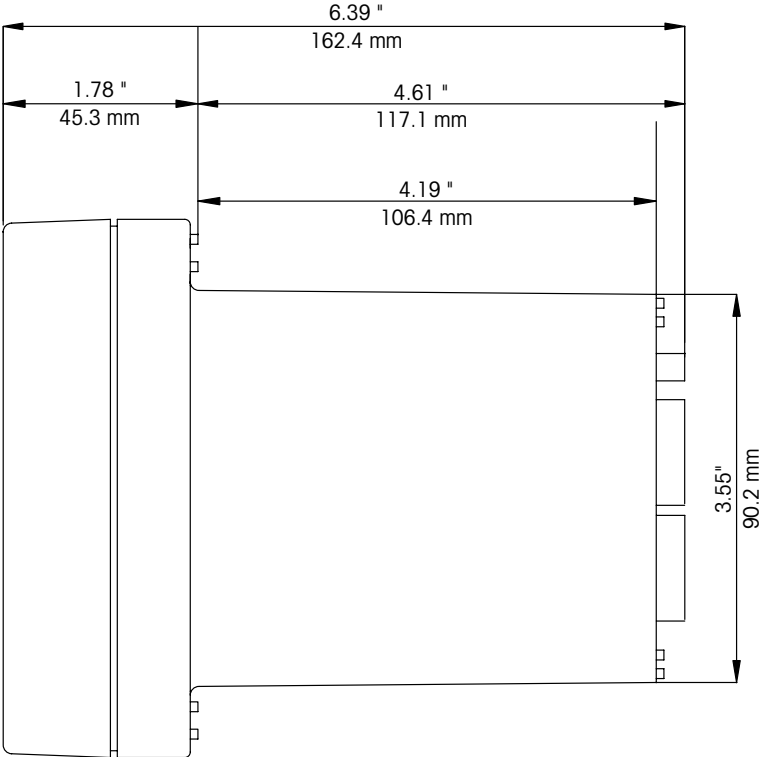
Dimensions and installation drawings: Trb 8300 transmitter	2
Technical specifications: Trb 8300 transmitter	4
Ordering information	6
Terminal assignment	7
Drawings: InPro® 8000 sensors	8
Specifications: InPro® 8000 sensors	9
Specifications: Fiber optic cable	10
Ordering information	10

**METTLER TOLEDO**

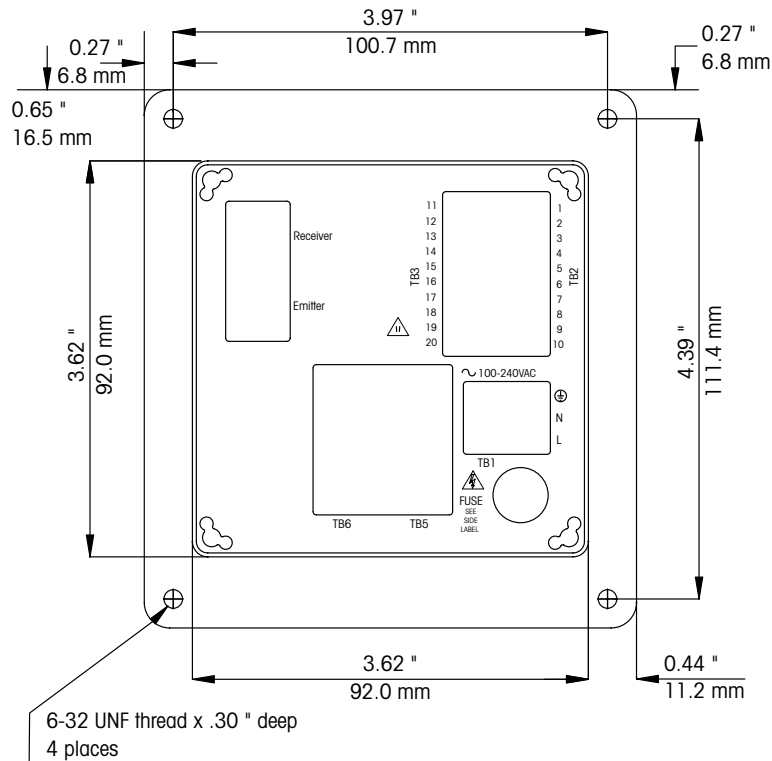
Front dimensions



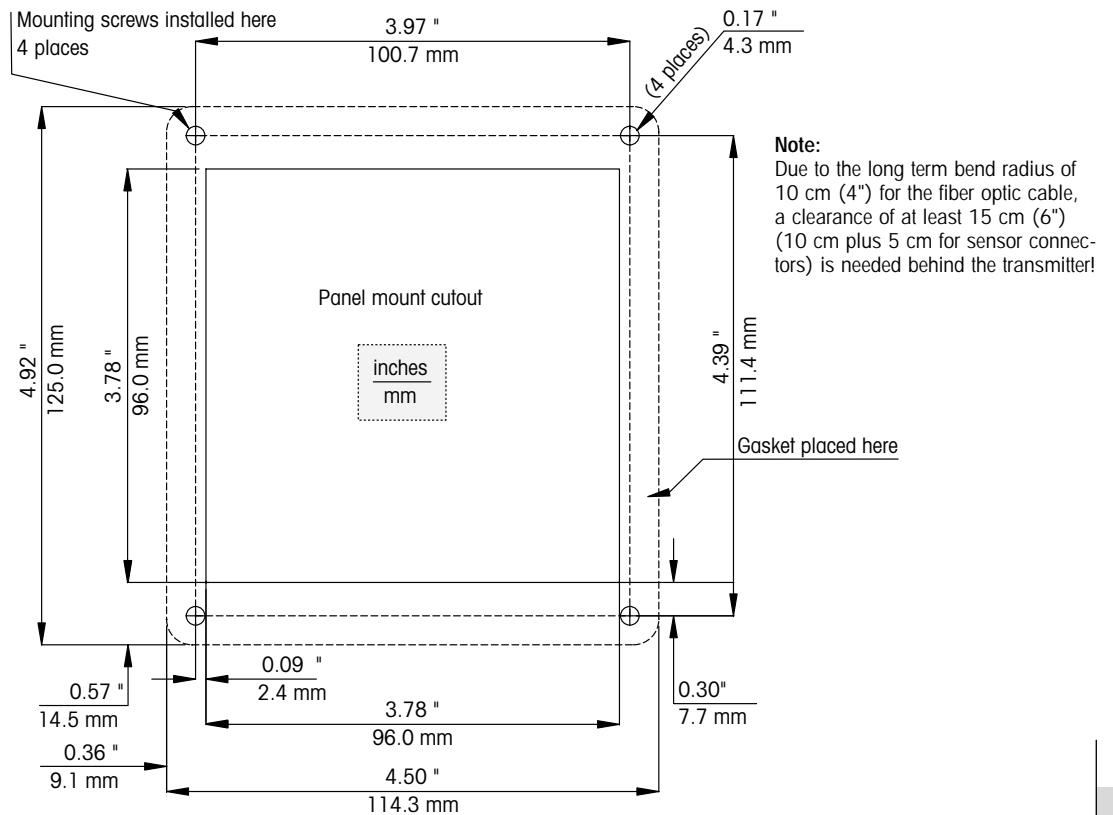
Side dimensions



Rear dimensions



Panel mount cutout



Transmitter Trb 8300

<b>Power supply</b>	100...240 V AC 25 Watts maximum, 47...63 Hz. On power loss, all stored values are retained in non-volatile memory without batteries. Clock does not run when power is off.
<b>Light source</b>	Light-emitting diode (LED), emitting frequency 880 nm, installed in transmitter
<b>Measurement</b>	Input/output for InPro® 8000 fiber optic sensor, backscattered light principle
<b>Measurement range</b>	5 FTU...4000 FTU (Formazin Turbidity Units) and 0...30 g/l suspended solids with InPro® 8200  10 FTU...4000 FTU and 0...250 g/l suspended solids with InPro® 8050 and InPro® 8100
<b>Selectable measuring units</b>	FTU NTU EBC g/l % ppm
<b>Digital input</b>	4 buffered digital inputs (0...5 V) – 1 digital input to HOLD the output (i.e. the 4...20 mA outputs are held or set to predefined values until the HOLD signal is removed). – 3 digital inputs to select one of three parameter sets A through C (stored).
<b>Parameter sets</b>	Three different parameter sets (A through C) can be stored in memory and recalled by software menu or remote access via digital inputs.
<b>System Calibration (operating modes)</b>	
Manual calibration (user input):	offset and gain values for the sensor can be entered directly.
Process calibration:	single-point grab-sample calibration (offset or slope: user selectable).
Multipoint calibration:	2, 3, 4 or 5 point automatic calibration (offset and gain) for linearization of measurement curves.
Default calibration:	on reset default calibration factors are loaded into the transmitter.
<b>Security</b>	Password-protected menu access for different user levels (master, user 1 and 2).
<b>System diagnostics</b>	Light source (internal reference signal = 0).

Transmitter Trb 8300

<b>Output 1 – 4</b>	Four standard powered 0/4...20 mA outputs, 500 Ω load maximum, isolated from the measurement circuit; accuracy ± 0.05 mA, typical. Outputs are assignable to any parameter set with free scaling in linear, bi-linear, logarithmic or auto range format.
<b>Alarm contact</b> Contact ratings	Relay contact, mechanical SPDT, floating AC < 250 V / < 5 A DC < 30 V / < 5A
Contact response Alarm delay	N/C (fail-safe type) 000...600 s
<b>Wash contact</b> Contact ratings	Relay contact, mechanical SPDT, floating AC < 250 V / < 5 A DC < 30 V / < 5A
Contact response Rinsing interval	N/O or N/C 0.0...999.9 h (0.0 h = cleaning function switched off)
Cleaning time	000...600 s
<b>Limit values (2)</b> Contact ratings	2 relay contacts, mechanical SPDT, floating AC < 250 V / < 5 A DC < 30 V / < 5A
Contact response Delay	N/O or N/C 000...600 s
Switching points Hysteresis	hi-hi / hi-lo / lo-lo 0.0...50.0%
<b>Digital Communications</b> RS232 standard Baud rate Parity	For main program software updates and print outs of configurations. max. distance 15 m (45 ft) 1200, 2400, 4800, 9600, 19.2k and 38.4k odd, even or none
<b>Display</b>	LC display, 20 character x 4 line, backlit
<b>Keypad</b>	20 tactile feedback keys
<b>Language</b>	Software selectable: English, German, or French for menu and help texts
<b>Diagnostic functions</b>	Sensor mA outputs Inputs Display Keypad Meter Serial Port Relays Self-test

Transmitter Trb 8300

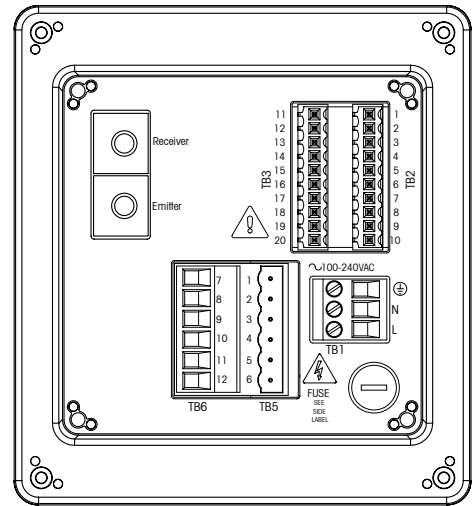
<b>Data retention</b>	Parameters and calibration data in non-volatile memory without batteries
<b>CE</b> Emissions: Immunity: Safety:	EN 55011 / Group I / Class A ISM emissions. EN 50082-2 / EMC heavy industrial generic immunity standard. IEC 61010-1 / safety requirements for electrical equipment for measurement, control and laboratory use
<b>UL</b> <b>CSA</b>	3111-1 Electrical Measuring and Test Equipment C22.2, No. 1010.1
<b>Nominal operating conditions</b> Ambient temperature: Transport/storage temp: Relative humidity: Altitude:	-10...+50 °C (14...104 °F) -20...+80 °C (-4...176 °F) 0...80 % up to 31 °C (88 °F), decreasing linearly to 50 % at 40 °C (104 °F) 2000 m (6500 ft.)
<b>Enclosure</b> Alloy Assembly Dimensions Rating Weight	ABS-PC, UV and chemically resistant Panel mounting, cutout 96 x 96 mm (3.78" x 3.78") 1/4 DIN H: 125 mm, W: 114 mm, L: 162 mm (H: 4.92", W: 4.50", L: 6.39") front panel seal, rating pending approx. 0.9 kg (2 lbs.)

Ordering information

Item	Order no.
Transmitter Trb 8300	52 800 204
10-terminal plug-in connector (TB2 and TB3)	52 800 251
6-terminal plug-in connector (TBS and TB6)	52 800 252
Fuse, 0.5 A slow blow, 5 x 20 mm (Littlefuse 215.500 or equivalent)	52 800 253
Panel mounting screws (6 – 32 x 7/16", 4 required)	52 800 254
Screws for front panel (2 required)	52 800 255
Retaining washers for front panel (2 required)	52 800 256
Liquid crystal display module (order mounting standoffs separately)	52 800 257
Display standoffs (4 required for display above)	52 800 258

Terminal assignment

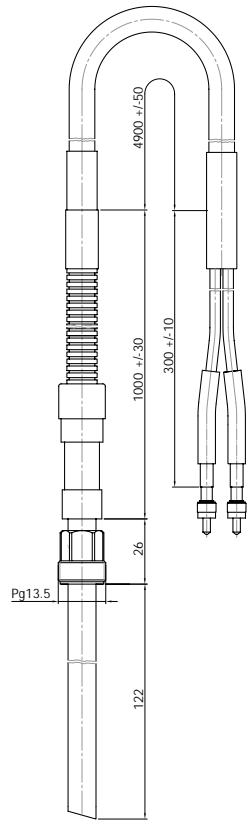
Board	Terminal	Connection
TB2	1	Do not use !
	2	Return Parameter Set A, B and HOLD
	3	Do not use !
	4	Parameter Set B
	5	Do not use !
	6	HOLD
	7	Parameter Set A
	8	RS232 ground
	9	RS232 receive
	10	RS232 transmit
TB3	11	Do not use !
	12	Return Parameter Set C
	13	Parameter set C
	14	Do not use !
	15	Analog output 4 +
	16	Analog output 3 +
	17	Analog output -
	18	Analog output -
	19	Analog output 2 +
	20	Analog output 1 +
Board	Terminal	Connection
TB5	1	Alarm, normally closed
	2	Alarm common
	3	Alarm, normally open
	4	Wash, normally closed
	5	Wash, common
	6	Wash, normally open
TB6	7	Limit 1, normally closed
	8	Limit 1, common
	9	Limit 1, normally open
	10	Limit 2, normally closed
	11	Limit 2, common
	12	Limit 2, normally open



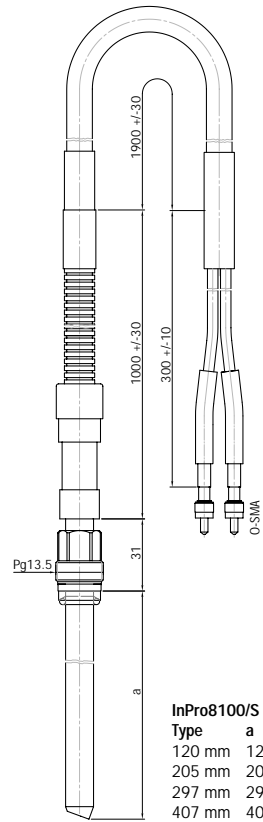
Trb 8300 rear panel view

Drawings

InPro® 8050

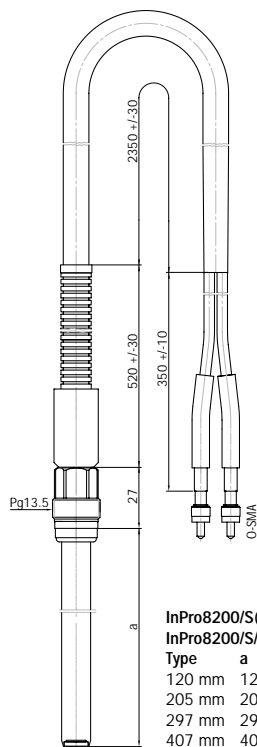


InPro® 8100



InPro8100/S	
Type	a
120 mm	122 mm
205 mm	207 mm
297 mm	299 mm
407 mm	409 mm

InPro® 8200



InPro8200/S(H)/Epoxy InPro8200/S/Kalrez®-FDA	
Type	a
120 mm	120 mm
205 mm	205 mm
297 mm	297 mm
407 mm	406.5 mm

All dimensions in mm

## Specifications InPro® 8000 Sensors

	InPro® 8050	InPro® 8100	InPro® 8200
Measuring principle	backscatter, 1-fiber	backscatter, 1-fiber	backscatter, 2-fiber
Sensor material	PSU (Polysulfone)	DIN 1.4435 (316 L)	Din 1.4435 (316L) or HA-C276
Sensor diameter	12 mm	12 mm	12 mm
Insertion length	120 mm	120, 205, 297 or 407 mm	120, 205, 297 or 407 mm
Process connection	Pg 13.5	Pg 13.5	Pg 13.5
<b>Measuring range:</b>			
Formazin Turbidity Units	10...4000 FTU	10...4000 FTU	5...4000 FTU
Suspended Solids (Diatomaceous earth as reference)	0...250 g/l	0...250 g/l	0...30 g/l
<b>Design:</b>			
Cable connectors	SMA	SMA	SMA
Cable lengths	6 m (20 ft) optical	3 m (10 ft) optical	3 m (10 ft) optical
Cable type	duplex HCS fiber, fixed	duplex HCS fiber, fixed	duplex HCS fiber, fixed
<b>Wetted parts:</b>			
Metals	none	DIN 1.4435	DIN 1.4435 (316L) or HA-C276
Plastic	PSU	none	none
O-ring	Viton®-FDA	Viton®-FDA	Viton®-FDA
Sapphire spigot for fiber protection	yes	none	none
Sapphire window for fiber protection	none	none	Kalrez® -type: Kalrez®-FDA 6230 sealed Epoxy-type: Epoxy bonded
<b>Working conditions:</b>			
Pressure range	0...2 bar (0...29 psi)	0...6 bar (0...87 psi)	Epoxy-type: 0...16 bar (0...232 psi) With Swagelok® adapter: 0...60 bar (0...870 psi) Kalrez® -type: 0...6 bar (0...87 psi)
Measuring temperature range	0...60 °C (32...140 °F)	-30...130 °C (-22...266 °F)	Epoxy-type: -30...130 °C (-22...266 °F) Kalrez® -type: -10...130 °C (14...266 °F)
Temperature range (sterilization)	n/a	0...130 °C (32...266 °F)	Kalrez® -type: 0...130 °C (32...266 °F) Epoxy type: n/a

## Specifications duplex fiber optic cable

Cladding material	HCS (Hard Clad Silica)
Core diameter	600 ± 10 µm
Attenuation @ 850 nm	≤ 8 dB/km
Long-term bend radius	≥ 94 mm
Outer jacket	PVC

## Ordering information

Designation code	InPro® 8100/S/xxx	S = shaft material DIN 1.4435 (316L)
	InPro® 8200/S(H)/...../xxx	H = Hastalloy C276
		..... = sealing for sapphire window
		xxx = insertion length in mm

Designation	Insertion lengths	Body material	Order no.
InPro 8050	120 mm (4.7")	PSU	52 800 209
InPro 8100/S/120	120 mm (4.7")	DIN 1.4435 (316L)	52 800 205
InPro 8100/S/205	205 mm (8.1")	DIN 1.4435 (316L)	52 800 206
InPro 8100/S/297	297 mm (11.7")	DIN 1.4435 (316L)	52 800 207
InPro 8100/S/407	407 mm (16.0")	DIN 1.4435 (316L)	52 800 208
InPro 8100/120/Autoclave	120 mm (4.7")	DIN 1.4435 (316L)	52 800 065
InPro 8100/297/Autoclave	297 mm (11.7")	DIN 1.4435 (316L)	00 824 580
InPro 8200/S/Epoxy/120	120 mm (4.7")	DIN 1.4435 (316L)	52 800 216
InPro 8200/S/Epoxy/205	205 mm (8.1")	DIN 1.4435 (316L)	52 800 217
InPro 8200/S/Epoxy/297	297 mm (11.7")	DIN 1.4435 (316L)	52 800 218
InPro 8200/S/Epoxy/407	407 mm (16.0")	DIN 1.4435 (316L)	52 800 219
InPro 8200/H/Epoxy/120	120 mm (4.7")	HA-C276	52 800 220
InPro 8200/H/Epoxy/205	205 mm (8.1")	HA-C276	52 800 221
InPro 8200/H/Epoxy/297	297 mm (11.7")	HA-C276	52 800 222
InPro 8200/H/Epoxy/407	407 mm (16.0")	HA-C276	52 800 223
InPro 8200/S/Kalrez-FDA/120	120 mm (4.7")	DIN 1.4435 (316L)	52 800 224
InPro 8200/S/Kalrez-FDA/205	205 mm (8.1")	DIN 1.4435 (316L)	52 800 225
InPro 8200/S/Kalrez-FDA/297	297 mm (11.7")	DIN 1.4435 (316L)	52 800 226
InPro 8200/S/Kalrez-FDA/407	407 mm (16.0")	DIN 1.4435 (316L)	52 800 227

## Accessories

Designation	Lengths	Order no.
Fiber-Kit 3 m	3 m (10 ft)	52 800 228
Fiber-Kit 5 m	5 m (15 ft)	52 800 229
Fiber-Kit 6 m	6 m (18 ft)	52 800 230
Fiber-Kit 10 m	10 m (30 ft)	52 800 231
Fiber-Kit 15 m	15 m (45 ft)	52 800 232
Fiber-Kit 20 m	20 m (60 ft)	52 800 233
Fiber-Kit 25 m	25 m (75 ft)	52 800 234
Fiber-Kit 30 m	30 m (100 ft)	52 800 235
Fiber-Kit 40 m	40 m (130 ft)	52 800 236
Fiber-Kit 45 m	45 m (150 ft)	52 800 172
Fiber-Kit 50 m	50 m (165 ft)	52 800 237
Fiber-Kit 65 m	65 m (200 ft)	52 800 238
Fiber-Kit 75 m	75 m (230 ft)	52 800 177
Fiber-Kit 90 m	90 m (275 ft)	52 800 239
Fiber-Kit 100 m	100 m (330 ft)	52 800 154
Fiber-Kit 125 m	125 m (380 ft)	52 800 158
Fiber-Kit 170 m	170 m (520 ft)	52 800 196

## Accessories (cont.)

Couplings (2 included in each Fiber-Kit)	52 800 240
Coupling Box IP 65/NEMA 4X	52 800 241
Swagelok Adapter NPT 1/2"	52 800 242
«CaliCap» (calibration tool)	52 800 210

## Complementary O-rings

Designation	Size	Order no.
Viton®-FDA	10.77 x 2.62 mm	20 302 1000
Silicon-FDA	10.77 x 2.62 mm	20 301 1136
Kalrez®	10.78 x 2.62 mm	20 304 1000
Kalrez®-FDA	10.78 x 2.62 mm	20 304 1034
EPDM-FDA	10.77 x 2.62 mm	20 303 1206

## Housings for InPro® 8050 (H = immersion length)

Designation	Material	H	a	O-ring	Order no.
InFit 761-25 B PVC	PVC	70	120	Viton®-FDA	52 400 310
InFit 761-25 B PVDF	PVDF	70	120	Viton®-FDA	52 400 311
InFit 761-25 B PP	PP	70	120	Viton®-FDA	52 400 316
InDip 508/CPVC/NPT	CPVC	Variable	120	Selectable	41 508 3001
InDip 508/PVDF/NPT	PVDF	Variable	120	Selectable	41 508 3002
InDip 510/S/NPT	316L <sup>s</sup>	Variable	120	Viton®-FDA	41 510 3001

## Housings for InPro® 8100 and InPro® 8200 (H = immersion length)

Designation	Material	H	a	O-ring	Order no.
InFit 761-25 CP/70/4435/Vi	DIN 1.4435	70	120	Viton®	00 761 3042
InFit 761-25 CP/70/C22/Vi	Hastalloy C22	70	120	Viton®	00 761 3105
InFit 761-25 BTB/70	DIN 1.4435	70	120	Silicon-FDA	00 761 3093
InFit 761-25 CIP/70 3.1B	DIN 1.4435	70	120	Silicon-FDA	52 400 491
InFit 761-25 CIP/T 3.1B	DIN 1.4435	–	120	Silicon-FDA	52 400 493
InFit 761-25 CIP/TS 3.1B	DIN 1.4435	–	120	Silicon-FDA	52 400 502
InFit 761-25 CIP/70 TC 1.5"	DIN 1.4435	70	120	Silicon-FDA	52 400 494
InFit 761-25 CIP/70 TC 2"	DIN 1.4435	70	120	Silicon-FDA	52 400 495
InTrac 777-SL	DIN 1.4435	70	205	Kalrez®	52 401 570
InTrac 797-M	DIN 1.4435	75	297	Viton®-FDA	00 797 3012

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