



DMP 331Pi

Precision Pressure Transmitter

pressure ports and process connections with flush welded stainless steel diaphragm

accuracy according to IEC 60770: 0,1 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 40 bar

Output signals

2-wire: 4 ... 20 mA 3-wire: 0 ... 10 V others on request

Product characteristics

- excellent temperature response 0.04 % FSO / 10K
- Turn-Down 1:10
- processing of the sensor signal using ► digital electronics
- process connections suitable for hygienic application
- vacuum resistant

Optional versions

- **IS-version** ► Ex ia = intrinsically safe for gases and dusts
- communication interface for adjustment of offset, span and damping

The precision pressure transmitter DMP 331Pi demonstrates the further development of welltried industrial pressure transmitter DMP 331P.

signal from the specially designed The piezoresistive stainless steel sensor is processed by the newly developed digital electronic system, performing thus an active compensation of sensor-specific deviations such as hysteresis, thermal errors and non-linearity.

The temperature range of -40 ... 125 °C can be extended by the integration of a cooling element up to 300 °C.

Preferred areas of use are



Laboratory techniques



Food and beverage



Pharmaceutical industry





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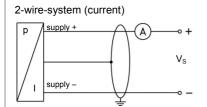
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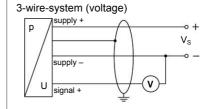
Pressure ranges ¹												
Nominal pressure		<u>.</u>		6		40						
gauge / absolute ²	[bar]	0.4	1	2 4		10	20	40				
Overpressure	[bar]	2	5	10	20	40	80	105				
Burst pressure ≥	[bar]	3	7,5	15	25	50	120	210				
Vacuum resistance	cuum resistance $P_N \ge 1$ bar: unlimited vacuum resistance											
¹ On customer request we ad	diust the	$P_N < 1$ bar:		sibility by softwa	are on the require	d pressure range						
² absolut pressure permissibl												
Vacuum ranges												
ominal pressure [bar]		-0.4 0.4	-1	. 1	-1 2	-1 4		-1 10				
Overpressure	[bar]	2	5	5 10		20		40				
Burst pressure ≥	[bar]	3	3 7.5		15	25		50				
Output signal / Supply												
Standard		2-wire: 4	20 mA / \	/ _s = 12 36 \	/ _{DC}							
Option IS-protection		2-wire: $4 \dots 20 \text{ mA}$ / $V_s = 12 \dots 36 V_{DC}$ 2-wire: $4 \dots 20 \text{ mA}$ / $V_s = 14 \dots 28 V_{DC}$										
Options				ommunication								
options		3-wire: 0	10 V / V	/ _s = 14 36 \	/ _{DC}							
³ only possible with el. conne	oction D			mmunication in	nenace							
	ection Bil	nuer series 723 (<i>i-pin)</i>									
Performance		150 00750										
Accuracy ⁴		IEC 60770: ≤	± 0.1 % FSO									
performance after turn-do	own		E									
- TD ≤ 1:5		no change of accuracy ⁵										
- TD > 1:5		for calculation use the following formula (for nominal pressure ranges \leq 0.40 bar see note 5):										
		≤ ± [0.1 + 0.015 x turn-down] % FSO										
		with turn-down = nominal pressure range / adjusted range										
		e.g. with a turn-down of 1:10 following accuracy is calculated: $\leq \pm (0.1 + 0.015 \times 10)$ % FSO i.e. accuracy is $\leq \pm 0.25$ % FSO										
Permissible load						e 3-wire: R _{min} =	10 kO					
							10 1(32					
Influence effectssupply: 0.05 % FSO / 10 Vload: 0.05 % FSO / kΩLong term stability $\leq \pm (0.1 \text{ x turn-down})$ % FSO / year at reference conditions												
Long term stability		$< \pm (0.1 \text{ v turn})$	down) % ES									
<i></i>			-down) % FS									
Response time		< 5 msec	·	O / year at refe	erence conditio	ns	ssanv ⁶).					
Response time		< 5 msec configuration of	of following pa	O / year at refe arameters pos	erence conditio		ssary ⁶):					
Response time		< 5 msec configuration of - electronic da	of following pa amping: 0	O / year at refe arameters pos	erence conditio	ns	ssary ⁶):					
Long term stability Response time Adjustability		< 5 msec configuration of	of following pa amping: 0 7 00 % FSO	O / year at refe arameters pos 100 sec	erence conditio	ns	ssary ⁶):					
Response time Adjustability		< 5 msec configuration of - electronic da - offset: 0 9 - turn down of <i>limit point adjust</i>	of following pa amping: 0 7 00 % FSO f span: max. ment (non-linea	O / year at refe arameters pos 100 sec 1:10 arity, hysteresis,	erence conditio sible (interface <i>repeatability</i>)	ns	ssary ⁶):					
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Response time Adjustability $\frac{4}{3}$ accuracy according to IEC of $\frac{5}{5}$ except nominal pressure raises to a construction of the second secon	nge <u>s</u> ≤ () % FSC	< 5 msec configuration of - electronic da - offset: 0 9 - turn down of <i>limit point adjust</i> 0.40 bar; for thes 0 e.a. turn-down of	of following paramping: 0 $300 \text{M} = 100 \text{M}$ FSO f span: max. ment (non-lineate calculation of f 1:3: $\leq \pm 0.1$	O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as + 0.02 x 3) % F3	erence conditio sible (interface repeatability) follows: SO i.e. accuracy i	ns / software nece s ≤ ± 0.16 % FSC		istor and YD)				
Response time Adjustability ⁴ accuracy according to IEC 6 ⁵ except nominal pressure raises ± (0.1 + 0.02 x turn-down) ⁶ software, interface, and cab	nges ≤ () % FSC ble have	< 5 msec configuration of - electronic da - offset: 0 9 - turn down of <i>limit point adjust</i> 0.40 bar; for thes e.g. turn-down of to be ordered se	of following paramping: 0 f 0% FSO f span: max. ment (non-lineating of the span of the spa	O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as f accuracy is as f - 0.02 x 3) % Ft are appropriate if	erence conditio sible (interface repeatability) follows: SO i.e. accuracy i	ns / software nece s ≤ ± 0.16 % FSC		igher, and XP)				
Response time Adjustability ⁴ accuracy according to IEC 6 ⁵ except nominal pressure raises ± (0.1 + 0.02 x turn-down) ⁶ software, interface, and cabe Thermal effects ⁷ (Offset	nges ≤ () % FSC ble have t and S	< 5 msec configuration of - electronic da - offset: 0 9 - turn down of limit point adjust 0.40 bar; for thes 0 e.g. turn-down of to be ordered se span) / Permis	of following paramping: 0 70% FSO f span: max. ment (non-lineate calculation of 1:3: $\leq \pm (0.1 - 5)$ parately (softw. sible temper	O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as + 0.02 x 3) % F3 are appropriate to atures	erence conditio sible (interface repeatability) follows: SO i.e. accuracy i for Windows [®] 95,	ns / software nece s ≤ ± 0.16 % FSC 98, 2000, NT Ver		igher, and XP)				
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Response time Adjustability ⁴ accuracy according to IEC 0 ⁵ except nominal pressure raises accept nominal press nominal pressure raises accept nominal press nominal press accept nominal press nomi	nges ≤ 0) % FSC ble have t and S FSO] 10 K] 3 ⁸ t can infl edium for bility	< 5 msec configuration (- electronic da - offset: 0 9 - turn down of limit point adjust 0.40 bar; for thes 9 e.g. turn-down of to be ordered se span) / Permis ≤ ± (0.35 x tur ≤ ± (0.35 x tur ≤ ± (0.035 x tur medium: electronics / e storage: filling fluid silic filling fluid silic filling fluid foo uence thermal eff r nominal pressu permanent no damage, b emission and silicone oil food compatib (Mobil SHC C	of following paramping: 0 7 0% FSO f span: max. 7 ment (non-linee the calculation on f 1.3: $\leq \pm (0.1 - 1)$ parately (softw. sible temper n-down) urn-down) nvironment: cone oil over d compatible fects for offset re gauge > 0 bac ut also no fur immunity acc ble oil with FD ibus 32; Cate uest	O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as f accuracy is as in compens. in compens. -40 125 -25 85 -40 100 erpressure: -40 oiloverpressure and span depen ar: 150 °C for 60 nction pording to EN 6	erence conditio sible (interface repeatability) follows: SO i.e. accuracy if for Windows® 95, ated range 0 ated range 0 ated range 0 ated range 0 of °C for filling flu of °C for fill flu of °C for filling flu of °C for fill flu of °C for fill	ns / software nece s ≤ ± 0.16 % FSC 98, 2000, NT Ver 80 °C 80 °C	sion 4.0 or h ible oil n: -40 15 150 °C ^s ng condition. I temperature 00)	0 °C ⁹ s. e of 50 °C				

{									
Materials									
Pressure port	stainless steel 1.4435 (316 L) others on request								
Housing	stainless steel 1.4404 (316 L)								
Option compact field housing	stainless steel 1.4305 (303), cable gland brass, nickel plated others on request								
Seals (O-ring)	standard: FKM (recommended for medium temperatures ≤ 200 °C)								
	option: FFKM (recommended for medium temperatures > 200 °C)								
	others on request								
	clamp, dairy pipe, Varivent [®] : without								
Diaphragm	standard: stainless steel 1.4435 (316L) option: Hastelloy® C-276 (2.4819) and Tantalum on request								
Media wetted parts	pressure port, diaphragm								
Explosion protection (only for	4 20 mA / 2-wire)								
Approvals	IBEXU 10 ATEX 1068 X / IECEX IBE 12.0027X								
DX 19-DMP 331Pi	zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da								
Safety technical maximum val-	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H},$								
ues	the supply connections have an inner capacity of max. 27 nF to the housing								
Ambient temperature range	in zone 0: -20 60 °C with p _{atm} 0.8 bar up to 1.1 bar								
	in zone 1 or higher: -20 70 °C								
Connecting cables	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m								
(by factory)	cable inductance:signal line/shield also signal line/signal line: 1 µH/m								
Miscellaneous									
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA								
Weight									
Installation position	approx. 200 g any ¹⁰								
Operational life	> 100 x 10 ⁶ pressure cycles								
CE-conformity	EMC Directive: 2014/30/EU								
ATEX Directive	2014/34/EU								
18 8									

¹⁰ Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges $P_N \leq 1$ bar.

Wiring diagrams

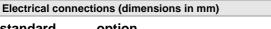


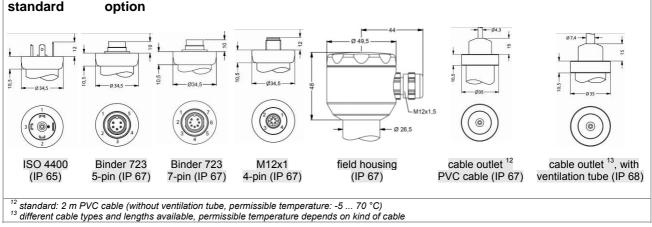


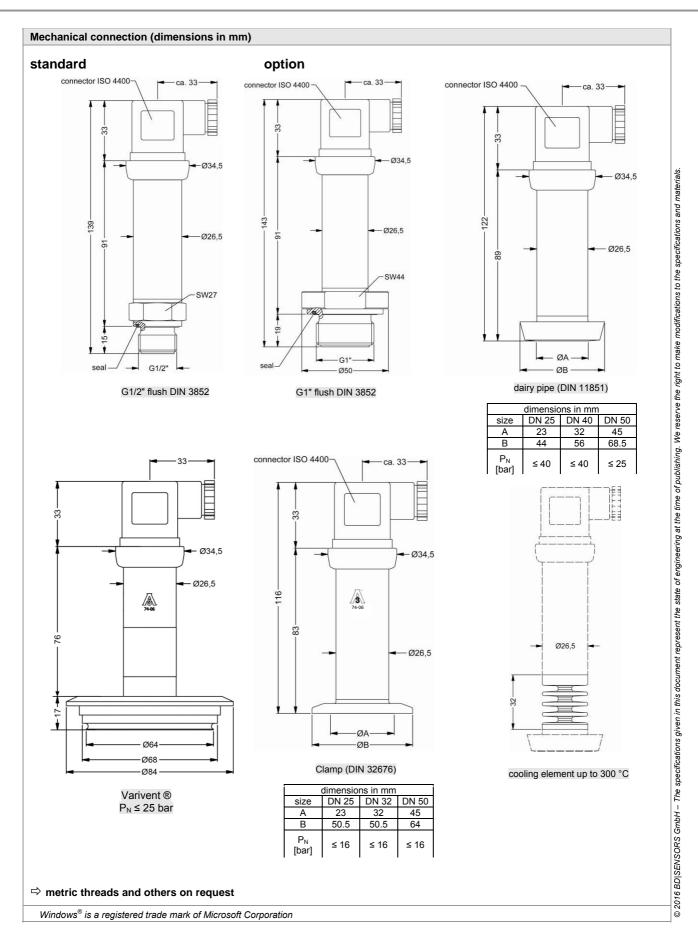
Pin configuration

Electrical connections		ISO 4400	Binder 723 (5-pin)	Binder 723 (7-pin)	M12x1/ metal (4-pin)	field housing	cable colour (IEC 60757)
	Supply +	1	3	3	1	IN +	wh (white)
	Supply –		4	1	2	IN –	bn (brown)
Signal + (only	Signal + (only for 3-wire)		1	6	3	OUT +	gn (green)
	shield	ground pin	5	2	4	Ŧ	gnye (green- yellow)
Communication	RxD	-	-	4	-	-	-
interface 11	TxD	-	-	5	-	-	-
	GND		-	7	-	-	-
11	1	. DO (1)					

¹¹ may not be connected directly with the PC (the suitable adapter is available as accessory)









pressure measurement

JRS

ΝS

BD SE

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DMP 331Pi

5 0 0 5 0 1

 $\begin{array}{c|ccccc} 4 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 2 & 0 & 0 & 1 \\ 4 & 0 & 0 & 1 \\ 1 & 0 & 0 & 2 \\ 2 & 0 & 0 & 2 \\ 2 & 0 & 0 & 2 \\ 3 & 4 & 0 & 0 \\ S & 1 & 0 & 2 \\ S & 4 & 0 & 0 \\ S & 1 & 0 & 2 \\ V & 2 & 0 & 2 \\ V & 4 & 0 & 2 \\ V & 4 & 0 & 2 \\ V & 1 & 0 & 3 \\ 9 & 9 & 9 & 9 \\ \end{array}$

1 E

3

gauge absolute 1

[bar] 0.40

1.0 2.0 4.0 10 20 40 -0.40 ... 0.40 -1 ... 1 -1 ... 2 -1 ... 4

-1 ... 10 customer

0 ... 10 V / 3-wire

4 ... 20 mA / 2-wire Intrinsic safety 4 ... 20 mA / 2-wire

Pressure

Input

Output

BD|SENSORS GmbH BD-Sensors-Straße 1 D - 95199 Thierstein



consult

customer Accuracy		3									
Accuracy		9									consult
- 194											
0.1%		1									
customer		9									consult
Electrical connection											
Male and female plug ISO 4400				D							
Male plug Binder series 723 (5-pin)				2							
Male plug Binder series 723 (7-pin)				C							
Cable outlet with PVC-cable				0							
Cable outlet	4		TR	D							
Male plug M12x1 (4-pin) / metal			M 1	D							
Compact field housing			8 5	_							
stainless steel 1.4305			8 5	J							
customer			99	9							consult
Mechanical connection			- 1 - 1	-							
G1/2" with flush				7		0					
welded diaphragm (DIN 3852)	6			Z	0	0					
G1" with flush				-							
welded diaphragm (DIN 3852)				Z	3	1					
Clamp DN 25 / 1" (DIN 32676) / 3A				С	6	1					
Clamp DN 32 / 1 1/2" (DIN 32676) / 3A				C		2					
Clamp DN 50 / 2" (DIN 32676) / 3A				C							
Clamp 3/4" (DIN 32676) / 3A				С	6	9		_			
Dairy pipe DN 25 (DIN 11851)	5			M							
Dairy pipe DN 40 (DIN 11851)	5			Μ	7	5					
Dairy pipe DN 50 (DIN 11851)	5			М							
Varivent [®] DN 40/50 / 3A				Р		1					
customer				9	9	9					consult
Diaphragm											
Stainless steel 1.4435 (316L)						1					
Hastelloy [®] C-276 (2.4819)						F	1				
Tantalum						Т					consult
customer						9					consult
Seals							·				Consult
for clamp or dairy pipe: without					-		0				
for inch thread - standard: FKM							1				
for inch thread - option: FFKM							7				
							9				
customer							9				consult
Filling Fluids								4			
silicone oil								1			
food compatible oil								2			
customer					_			9			consult
									1 1		
standard	1								1 2		
standard RS-232 interface										1	
standard RS-232 interface with cooling element up to 300 °C									2 1	1	
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and											
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C									2 2	1	
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and									2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C										1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer									2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar									2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery	7	thers on reques	it						2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (perm	7 missible temperature: -5 70 °C), o								2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (perm cable with ventilation tube (code TR0 = PVC cable), dif	7 missible temperature: -5 70 °C), o ifferent cable types and lengths avail	lable, price with	out cable	achanico		Inaction	dainy ning		2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (perr cable with ventilation tube (code TR0 = PVC cable), di The cup nut has to be mounted by production of pressu	7 missible temperature: -5 70 °C), o ifferent cable types and lengths avail	lable, price with	out cable	echanica	Il con	nection	dairy pipe	9.	2 2	1	consult
standard RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (perm cable with ventilation tube (code TR0 = PVC cable), dif The cup nut has to be mounted by production of pressu The cup nut has to be ordered as separate position.	7 missible temperature: -5 70 °C), o ifferent cable types and lengths avail	lable, price with	out cable	echanica	Il con	nection	dairy pipe	9.	2 2	1	consult
$\label{eq:standard} standard \\ RS-232 interface \\ with cooling element up to 300 °C \\ RS-232 interface and \\ cooling element up to 300 °C \\ customer \\ absolut pressure possible from 1 bar \\ cable socket is included in delivery \\ standard: 2 m PVC cable without ventilation tube (perm cable with ventilation tube (code TR0 = PVC cable), dif The cup nut has to be ordered as separate position. \\ possible only for P_N \geq 1 bar \\ \end{tabular}$	7 missible temperature: -5 70 °C), o ifferent cable types and lengths avail sure transmitter with electrical connect	lable, price with	out cable	echanica	Il con	nection	dairy pipe	9.	2 2	1	consult
RS-232 interface with cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (perm cable with ventilation tube (code TR0 = PVC cable), dif The cup nut has to be mounted by production of press The cup nut has to be ordered as separate position. possible only for P _N ≥ 1 bar RS-232 interface only possible with el. connection Bind	7 missible temperature: -5 70 °C), o Ifferent cable types and lengths avail ure transmitter with electrical connec der series 723 (7-pin)	lable, price with ction field housi	out cable	echanica	ıl con	nection	dairy pipe	э.	2 2	1	consult
$\label{eq:standard} standard RS-232 interface and cooling element up to 300 °C RS-232 interface and cooling element up to 300 °C customer absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (code TR0 = PVC cable), dif The cup nut has to be mounted by production of pressure possible only for P_N ≥ 1 bar RS-232 interface and cable for DMP 331 Pi with optic Software, Interface and cable for DMP 331 Pi with optic$	7 missible temperature: -5 70 °C), o ffferent cable types and lengths avail ure transmitter with electrical connect der series 723 (7-pin) ion RS-232 have to be order separat	lable, price with ction field housi tely	out cable ng and me	echanica	Il con	nection	dairy pipe	э.	2 2	1	consult
$\label{eq:standard} $$ tandard $$ RS-232 interface $$ with cooling element up to 300 °C $$ RS-232 interface and $$ cooling element up to 300 °C $$ customer $$ table socket is included in delivery $$ tandard: 2 m PVC cable without ventilation tube (perficience) $$ table with ventilation tube (code TR0 = PVC cable), differe up nut has to be ordered as separate position. $$ possible only for $$ P_N$ as the area to be a separate position. $$ possible only for $$ P_N$ and $$ table as the area to be a separate possible only for $$ table as the area to be a separate possible only for $$ table as the area table as table as$	7 missible temperature: -5 70 °C), o ffferent cable types and lengths avail ure transmitter with electrical connect der series 723 (7-pin) ion RS-232 have to be order separat	lable, price with ction field housi tely	out cable ng and me	echanica	Il con	nection	dairy pipe	э.	2 2	1	consult
$\label{eq:standard} \\ RS-232 interface \\ with cooling element up to 300 °C \\ RS-232 interface and \\ cooling element up to 300 °C \\ customer \\ absolut pressure possible from 1 bar \\ cable socket is included in delivery \\ standard: 2 m PVC cable without ventilation tube (perm cable with ventilation tube (code TR0 = PVC cable), dif \\ The cup nut has to be mounted by production of pressu \\ The cup nut has to be ordered as separate position. \\ possible only for P_N \ge 1 bar \\ RS-232 interface only possible with el. connection Binc \\ Software, Interface and cable for DMP 331 Pi with optic (Ordering code: CIS-G; Software appropriate for Window) \\ \end{tabular}$	7 missible temperature: -5 70 °C), o ffferent cable types and lengths avail sure transmitter with electrical connect der series 723 (7-pin) ion RS-232 have to be order separat ows [©] 95, 98, 2000, NT Version 4.0 o	lable, price with ction field housi tely	out cable ng and me	echanica	Il con	nection	dairy pipe	э.	2 2	1	consult
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