

MAGNETOSTRICTIVE TRANSDUCER



MSB Series

Key-Features:

- Available measurement ranges from 50 - 4000 mm
- Very small overall dimensions
- Standard flange or threaded flange
- Excellent resistance to shock and vibration
- Displacement speed up to 10 m/s
- Linearity up to $\pm 0.02\%$
- Working temperature $-30...+75\text{ }^{\circ}\text{C}$
- Working pressure up to 350 bar
- Protection class IP67
- Output signals: Analog, Digital Start/Stop

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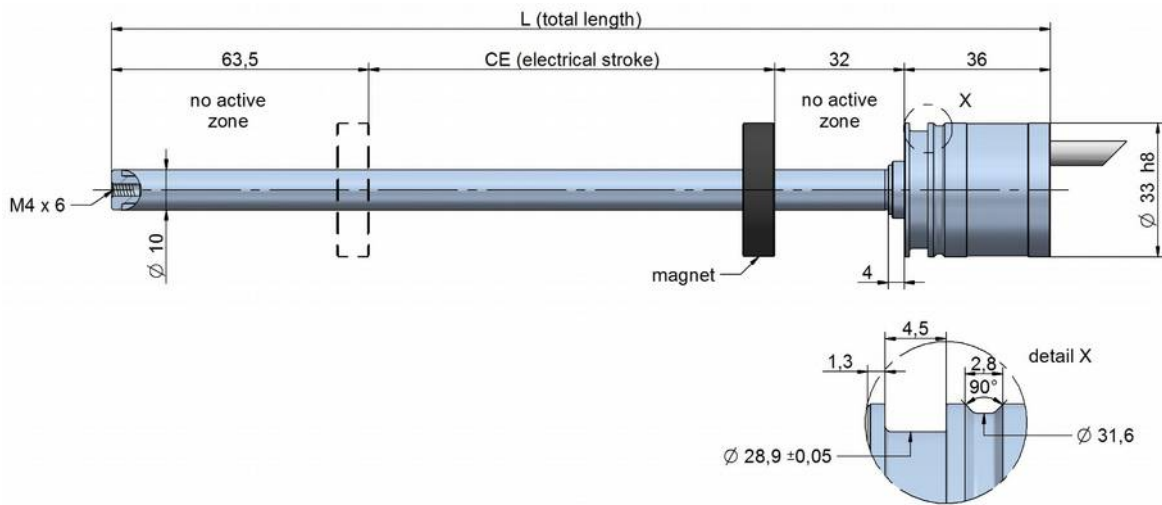
TECHNICAL DATA

Measurement range *	[mm]	50/ 100/ 130/ 150/ 200/ 225/ 300/ 400/ 450/ 500/ 600/ 700/ 750/ 800/ 900 1000/ 1250/ 1500/ 1750/ 2000/ 2250/ 2500/ 2750/ 3000/ 3250/ 3500/ 3750/ 4000
Measured dimension		position
Protection class		IP67
Displacement speed	[m/s]	≤10
Maximum acceleration	[m/s ²]	≤100
Working pressure	[bar]	350 (peak max. 500)
Linearity	[%]	±0.02 (min. ±0.06 mm)
Resolution	[μm]	10 (limited through noise of the signal)
Repeatability	[mm]	<0.01
Hysteresis		<±0.005 % MR
Shock test DIN IEC68T2-27		100 g, 11 ms
Vibrations DIN IEC68T2-6		20 g, 10...2000 Hz
Position read sampling time	[ms]	1 for range 50 to 1000 mm / 1.5 for range 1250 to 2000 mm / 2 for range ≥ 2000 mm
Max. current consumption	[mA]	40 (load on Start/Stop output: 300 Ohm)
Coefficient of temperature		<±0.005 % MR
Max. output load	[kOhm]	5
Protection against polarity inversion		yes
Max. power ripple	[Vpp]	1
Electric isolation	[VDC]	100
Working temperature	[°C]	-30...+90 (for range ≤2500 mm and supply ≤24 VDC)
	[°C]	-30...+75 (for strokes > 2500mm)
Storage temperature	[°C]	-40...+100
Power supply	[V]	18...30 / 12 with output signal 0.1...5.1 V
Output signals		0.1...10.1 V / 0.1...5.1 V / 4...20 mA / digital output RS422 Start/Stop
Mounting		MSB...F1: standard flange with cable output / MSB...F2: threaded flange M18x1.5 with connector output M12
Case material		high grade steel AISI 316
Dimensions	[mm]	MSB...F1 (cable output): measurement range +131.5 / MSB...F2 (connector output): measurement range +140.3

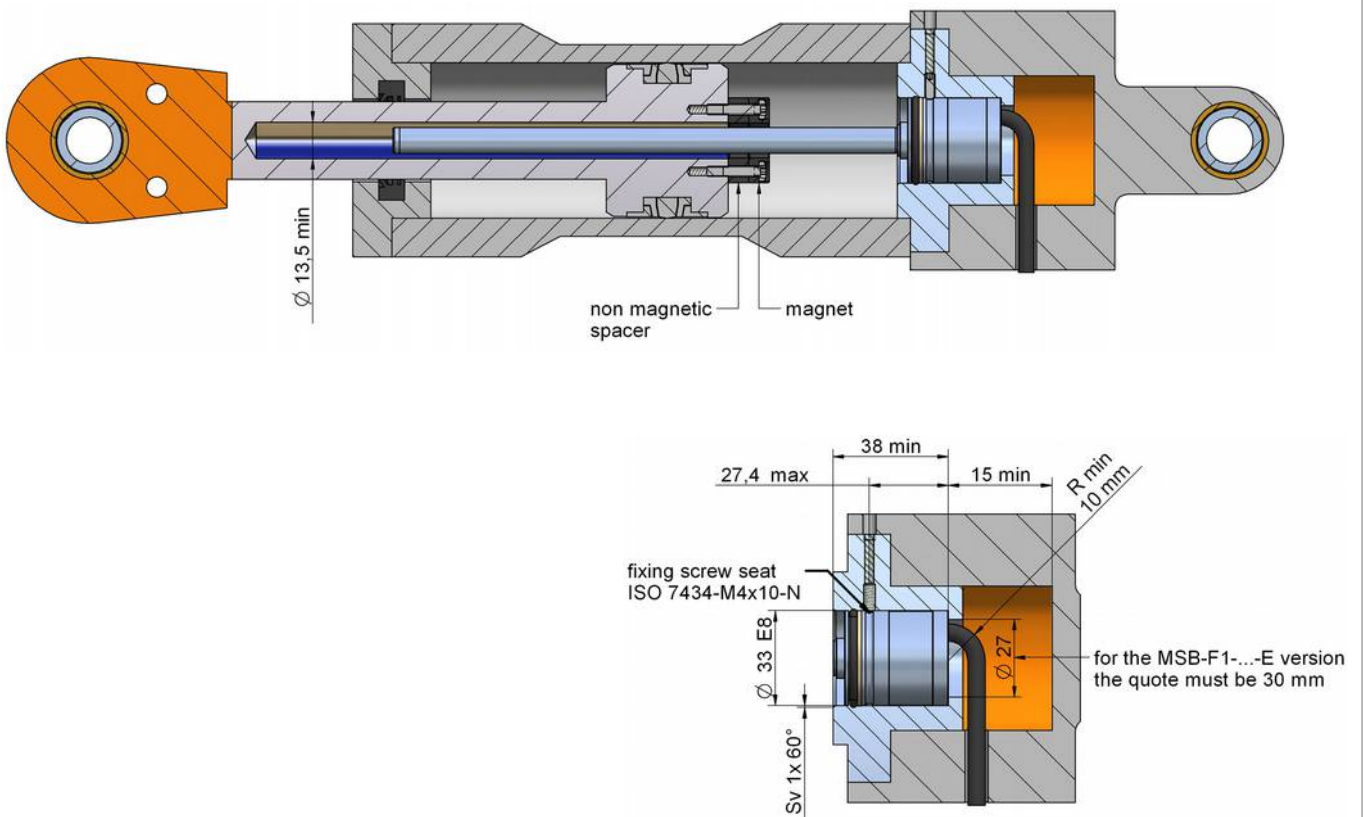
* output signal 0.1...5.1 V: the maximum measurement range is 1250 mm

TECHNICAL DRAWING MSB...F1

Dimensions MSB...F1

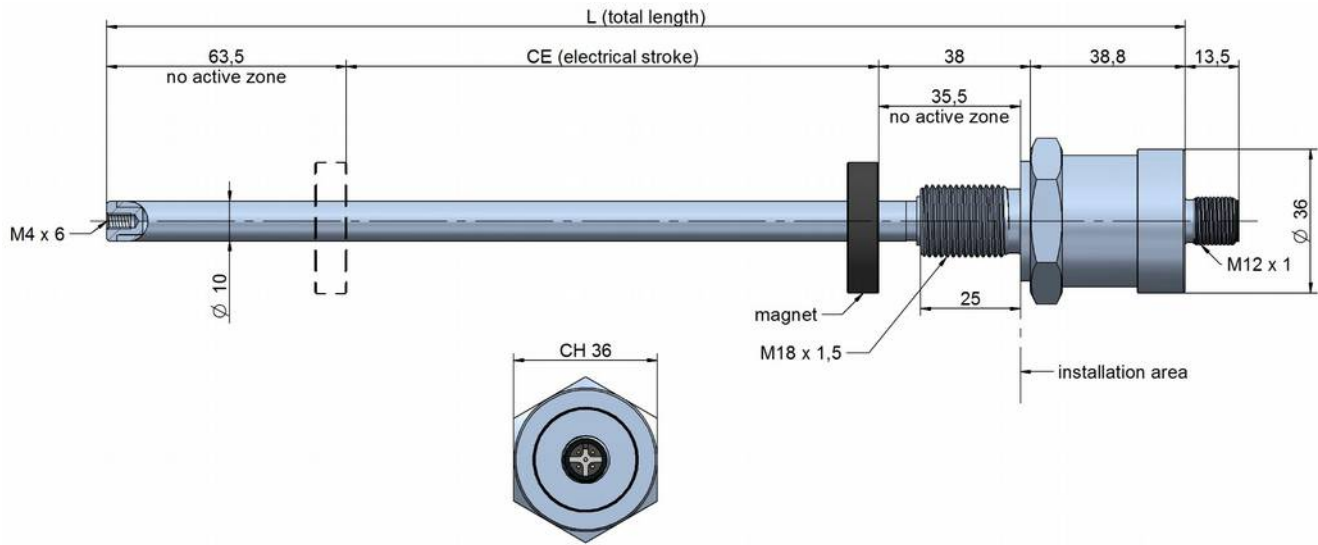


MSB...F1: mounting in a cylinder

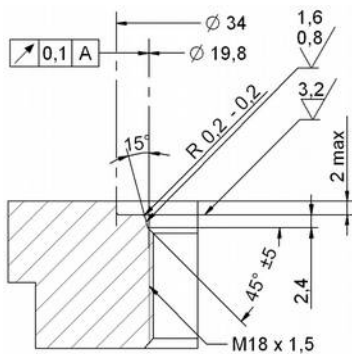
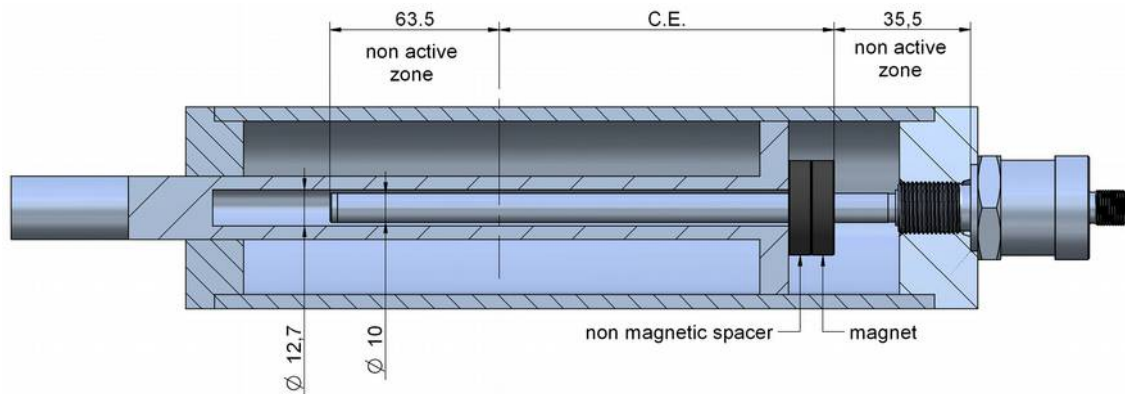


TECHNICAL DRAWING MSB...F2

Dimensions MSB...F2



MSB...F2: mounting in a cylinder



Thread M18x1,5

The seal surface must be free from winding or longitudinal scratches.

CONNECTION ANALOG OUTPUT MSB...N/K/E-F1

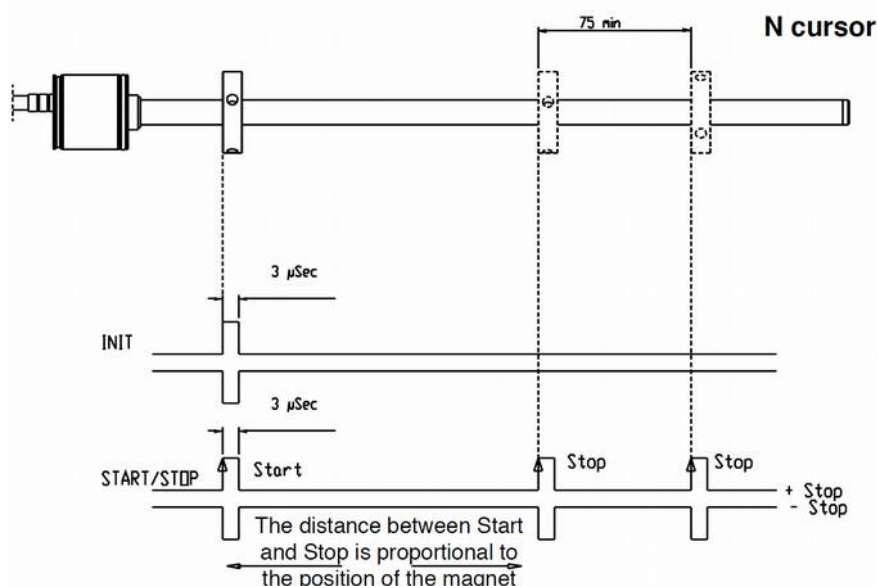
MSB...N-F1	MSB...K-F1	MSB...E-F1	Cable
0.1...10.1 V	0.1...5.1 V	4...20 mA	yellow
GND output	GND output	GND output	pink
Power supply +	Power supply +	Power supply +	brown
power supply -	power supply -	power supply -	blue



cable output
MSB...F1, length 1 m

Note: in case of cable length shortening, after cutting the cable take care of soldering and insulating to green and grey wires together.

CONNECTION DIGITAL OUTPUT START/STOP MSB...S-F1



cable output
MSB...F1, length 1 m

Series MSB...S magnetostrictive transducers supply digital outputs in START/STOP format with RS422 differential serial transmission.

The transducer requests an Initialisation pulse that launches sampling. The following pulses are transmitted on the outputs:

Start: the Initialisation pulse retransmitted

Stop: the pulse corresponding to the position of each magnet.

The time between the Start pulse and the subsequent Stop pulses is proportional to the position of each magnet according to the "Magnetostrictive wave propagation speed" constant, equal to about 2900 m/s.

$$P = \text{Time} \cdot 2900 \text{ m/s}$$

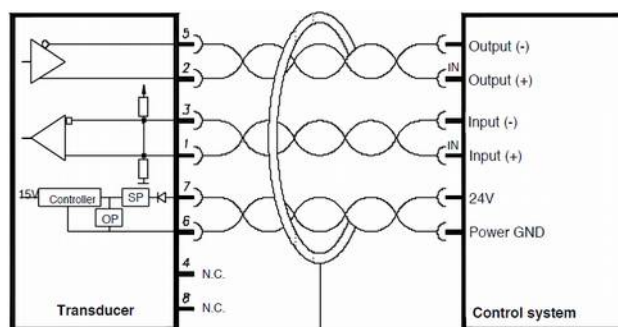
The correct propagation speed for each product is shown on the product label. Resolution in terms of meters is linked to the resolution used to measure time.

- 1 µs (1 MHz) ==> 2.9 mm
- 10 ns (100 MHz) ==> 0.029 mm
- 1 ns (1 GHz) ==> 2.9 µm

The measurement reference is the leading edge of the pulse.

Optimum width of the interrogation pulse is 3 µs, but the transducer works correctly for times from 1.5 to 5 µs.

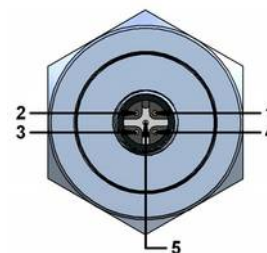
MSB...S-F1	Cable
Output +	grey
Output -	green
Input +	yellow
Input -	pink
Power supply +	brown
Power supply -	blue



CONNECTION MSB...F2

Electrical connection MSB...N/K/E-F2

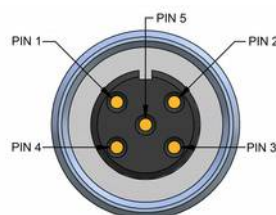
MSB...N-F2	MSB...K-F2	MSB...E-F2	PIN
0.1...10.1 V	0.1...5.1 V	4...20 mA	1
GND output	GND output	GND output	2
DO NOT CONNECT	DO NOT CONNECT	DO NOT CONNECT	3
Power supply GND	Power supply GND	Power supply GND	4
Power supply +	Power supply +	Power supply +	5



Connector output, M12
MSB...F2

Cable for analog output, connector M12, 5 pole

K5P2M-S-M12	2 m, connector, straight, IP67, shielded
K5P5M-S-M12	5 m, connector, straight, IP67, shielded
K5P10M-S-M12	10 m, connector, straight, IP67, shielded
K5P2M-SW-M12	2 m, connector, angular, IP67, shielded
K5P5M-SW-M12	5 m, connector, angular, IP67, shielded
K5P10M-SW-M12	10 m, connector, angular, IP67, shielded



PIN	Cable colour K5P..
1	brown
2	white
3	blue
4	black
5	grey

MAGNETIC CURSORS

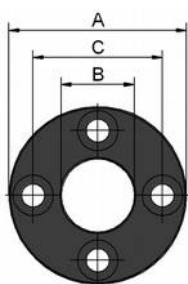
Magnetic cursor	A	B	C	D
PCUR022	32.8	13.5	23.9	-
PCUR023	32.8	13.5	23.9	11.0
PCUR024	25.4	13.5	-	-
PCUR026 (for liquids)	52.4	12.0	44.0	-
PCUR027 (for liquids)	52.4	15.0	44.0	-

Note:

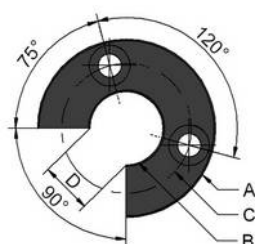
PCUR026 and PCUR027 is supplied with kit PKIT036 for floating cursor for liquids.

Material PCUR026, PCUR027: high grade steel AISI 316

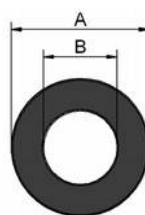
Magnetic cursors for liquids need a higher measurement range.



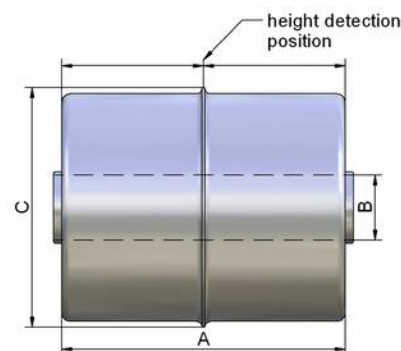
PCUR022



PCUR023

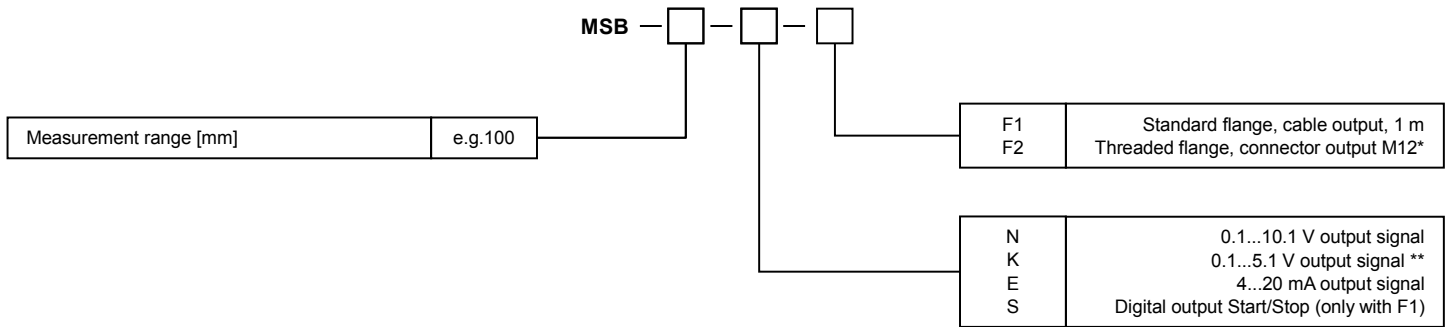


PCUR024



PCUR026/027

ORDER CODE MSB



Note: Please order magnetic cursor separately (see page 6).

* Magnetic cursors for liquids need a higher measurement range.
 ** Output signal 0.1...5.1 V: maximum measurement range is 1250 mm

OVERVIEW

Base model: 0.1...10.1 V analog output, standard flange F1, cable output with 1 m cable

MSB-50-N-F1	50 mm	MSB-900-N-F1	900 mm
MSB-100-N-F1	100 mm	MSB-1000-N-F1	1000 mm
MSB-130-N-F1	130 mm	MSB-1250-N-F1	1250 mm
MSB-150-N-F1	150 mm	MSB-1500-N-F1	1500 mm
MSB-200-N-F1	200 mm	MSB-1750-N-F1	1750 mm
MSB-225-N-F1	225 mm	MSB-2000-N-F1	2000 mm
MSB-300-N-F1	300 mm	MSB-2250-N-F1	2250 mm
MSB-400-N-F1	400 mm	MSB-2500-N-F1	2500 mm
MSB-450-N-F1	450 mm	MSB-2750-N-F1	2750 mm
MSB-500-N-F1	500 mm	MSB-3000-N-F1	3000 mm
MSB-600-N-F1	600 mm	MSB-3250-N-F1	3250 mm
MSB-700-N-F1	700 mm	MSB-3500-N-F1	3500 mm
MSB-750-N-F1	750 mm	MSB-3750-N-F1	3750 mm
MSB-800-N-F1	800 mm	MSB-4000-N-F1	4000 mm

Options with additional charge on base model

F2	Threaded flange M18 x 1,5
E	Analog output 4...20 mA

MSB...N/K/E-F2: Mating Connector

D5-G-M12-S	Connector M12, 5-pole, straight, IP67
D5-W-M12-S	Connector M12, 5-pole, angular, IP67

Magnetic cursor (please order in addition to the sensor)

PCUR022	Magnetic cursor, \varnothing 32.8
PCUR023	Magnetic cursor, \varnothing 32.8 with 90 degree slit
PCUR024	Magnetic cursor, \varnothing 25.4
PCUR026	floating cursor for liquids with hole \varnothing 12
PCUR027	floating cursor for liquids with hole \varnothing 15
CUR022	non-magnetic spacer for mounting PCUR022 cursor

MSB...N/K/E-F2: Connection cable

K5P2M-S-M12	2 m, M12 connector straight, 5-pole, shielded
K5P5M-S-M12	5 m, M12 connector straight, 5-pole, shielded
K5P10M-S-M12	10 m, M12 connector straight, 5-pole, shielded
K5P2M-SW-M12	2 m, M12 connector angular, 5-pole, shielded
K5P5M-SW-M12	5 m, M12 connector angular, 5-pole, shielded
K5P10M-SW-M12	10 m, M12 connector angular, 5-pole, shielded

MSB...N/K/E-F1: Mating Connector

D4-G-M12-S	Connector M12, 4-pole, straight, IP67
D4-W-M12-S	Connector M12, 4-pole, angular, IP67

Subject to change without prior notice.

WayCon Positionsmesstechnik GmbH

email: info@waycon.de
 internet: www.waycon.de

Head Office

Mehlbeerenstr. 4
 82024 Taufkirchen
 Tel. +49 (0)89 67 97 13-0
 Fax +49 (0)89 67 97 13-250

Office Köln

Auf der Pehle 1
 50321 Brühl
 Tel. +49 (0)2232 56 79 44
 Fax +49 (0)2232 56 79 45