FIS, OMNI-FIS

Погружные датчики протока

GHM MESSTECHNIK

Технические характеристики

Magnetic-Inductive Flow Probe FIS

- **Measurement of flow in conductive fluids**
- **A measurement probe for a wide range of piping diameters**
- **High quality materials**
- **No moving parts**
- **Change the sensor without loss of media**

Characteristics

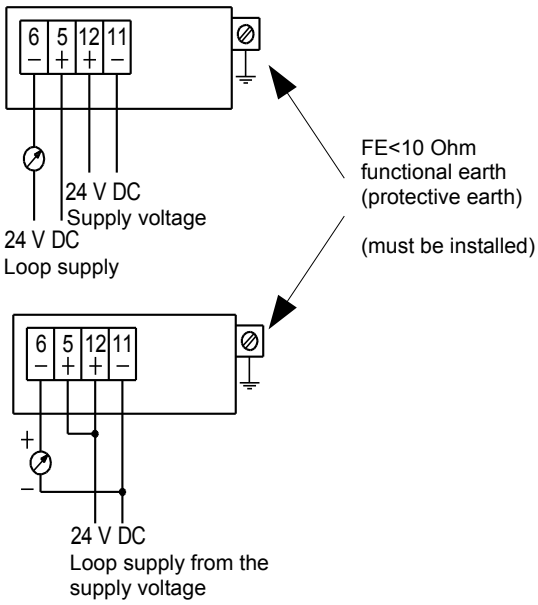
The FIS magnetic-inductive flow probes are built into the piping by means of the supplied welded-on sleeves (DN 50..DN 400) or by means of the plastic fixing clip (DN 50..DN 150) .
The complete measurement probe is removable without creating an opening to the medium, and so if a fault occurs, only the electronic part is replaced.
When an electric conductor moves at right angles to the magnetic field, the movement induces a voltage U in the conductor. With this measurement principle, the electrically conductive medium is the conductor. The magnetic field B is transverse to the direction of flow. The induced voltage U is directly proportional to the local flow speed v.

Technical data

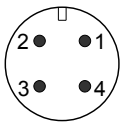
Sensor	magnetic-inductive
Nominal width	DN 50..300 welded-on nozzle DN 50..150 tapping sleeve
Process connection	welded-on nozzle, tapping sleeve
Metering ranges	full scales 1..8 m/s in steps of 1 m/s
Measurement accuracy	±5 % of the measured value, (when calibrated on the spot ±2 % of the measured value), from 3 cm/s
Repeatability	±2 % of the measured value
Time constant	5 seconds fixed
Media	conductive, largely homogeneous fluids, pastes, and slurries, also having solids components
Electrical conductivity	min. 20 mS/cm
Medium temperature	-25..+150 °C
Ambient temperature	-25..+60 °C
Operating pressure	max. 25 bar for welded-on nozzle max. 10 bar for tapping sleeve

Materials	Probe	stainless steel 1.4435
	Insulation	ceramic (zirconium oxide)
	Tapping sleeve	PP, 1.4305
	Electronics housing	stainless steel 1.4305 FKM and Klingerit
Supply voltage	24 V DC ±10 %	
Current consumption	50 mA (at 24 V DC and 20 °C)	
Output	4..20 mA (passive current output) load resistance max. 500 Ohm	
Ingress protection	IP 65 cable screw gland IP 67 round plug connector	
Weight	2,4 kg excluding tapping sleeve	
Conformity	CE	

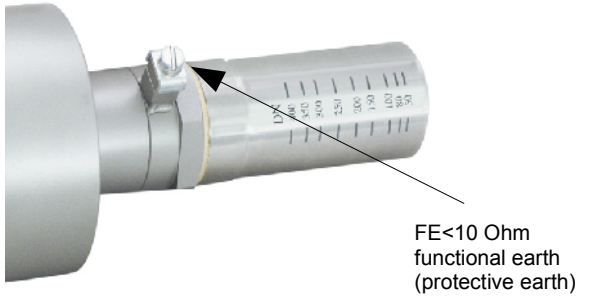
Wiring



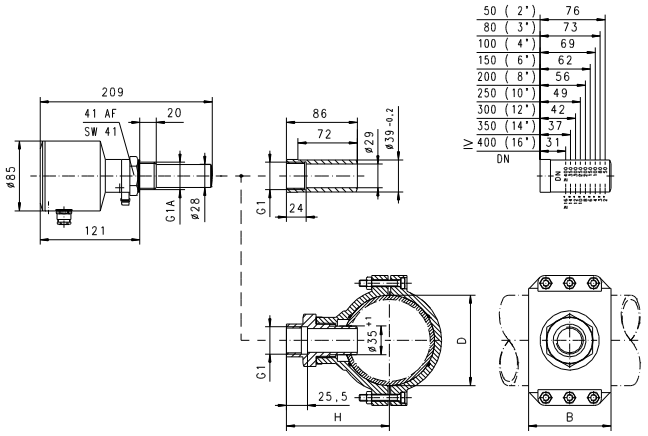
For model with round plug connector:



1 = supply voltage 24 V
2 = current loop +
3 = GND (0 V)
4 = current loop -



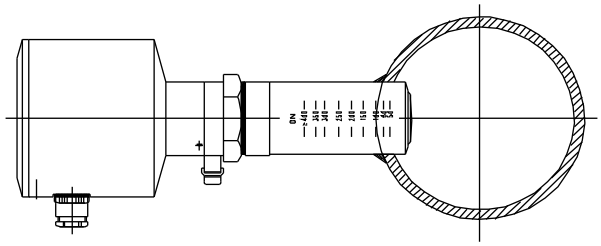
Dimensions



Handling and operation

Installation

The FIS magnetic-inductive probes are installed in the pipework by means of the supplied welded-on sleeves or by means of the plastic fixing clip (≥ DN 50 / ≥ G 2). See diagrams for installation position and depth.

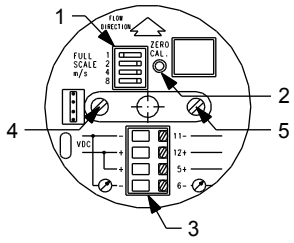


Weld on the nozzle at the marking
according to its nominal width, free of distortion.

Run-in and run-out sections must be greater than or equal to 10 x pipework diameter. Weld on the connection sleeve at right angles to pipework mid-line (see marking = external pipework diameter, for >DN 400 also at 400). Avoid distortions. The probe must screw in easily. After screwing in, the probe can be adjusted by rotating it.

The complete measurement probe is removable without creating an opening to the medium, and so if a fault occurs, only the electronic part is replaced.
The electrical connection is made after opening the cover (unlosable because of its earthing cable). For this, completely remove the three internal hex bolts from the lid. (Take care not to lose them)

The arrow on the electronics insert must be in the direction of flow (loosen bolts 4 and 5 by approx. 2 or 3 turns. Do not remove completely!) Turn the electronic component appropriately, and then tighten the bolts again. The alignment of the arrow has nothing to do with the alignment of the housing. This is possible at any time, without affecting the alignment of the internal component.
The metering range full scale value has already been set in the factory to the desired metering range, by means of the DIP switches (1, 2, 3, 4, 5, 6, 7, 8 m/s, see drawing). The figures next to the DIP switches are valid.



1 DIP switches
2 Button for zero point calibration
3 Connection clip

Example of the DIP switches

1 ■
2 ■
4 □ = 3 m/s
8 ■

Zero point setting:

- Fill the piping completely with medium
- Flow speed in the piping must be "zero"
- Press the "ZERO CAL" button
- After one minute, the device has automatically self-calibrated

During commissioning, an automatic self-test is carried out. The device status is signalled at the current output:

3 mA	The device is still conducting the self-test or has detected an error
4..20 mA	Device is in measurement mode and is displaying the speed measured currently

Ordering code

FIS [1.] [2.] [3.] [4.] [5.]

❍=Option

1.	**Nominal width**			
	025	DN 25 (welded-on nozzle)		
	050	DN 50 (tapping sleeve)		
	065	DN 65 (tapping sleeve)		
	080	DN 80 (tapping sleeve)		
	100	DN 100 (tapping sleeve)		
	125	DN 125 (tapping sleeve)		
	150	DN 150 (tapping sleeve)		
2.	**Process connection**			
	V	welded-on nozzle		●
	B	tapping sleeve	●	
3.	**Material for mechanical connection**			
	K	stainless steel (welded-on nozzle)		●
	B	PP (tapping sleeve)	●	
4.	**Full scale value of range**			
	001	1 m/s		
	002	2 m/s		
	003	3 m/s		
	004	4 m/s		
	005	5 m/s		
	006	6 m/s		
	007	7 m/s		
	008	8 m/s		
5.	**Electrical connection**			
	G	cable screw gland Pg 9 excluding cable		
	S ❍	for round plug connector M12x1, 4-pole		

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”

Flow Transmitter / Switch OMNI-FIS

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OMNI-FIS

- **Flow measurement in conductive fluids**
- **A measurement probe for a wide range of piping diameters**
- **High quality materials**
- **No moving parts**
- **Change the sensor without loss of media**
- **Analog output 4..20 mA or 0..10 V**
- **Two programmable switches**
- **Graphical LCD display, backlit, can be read in sunlight and in the dark**
- **Selectable units in the display**
- **Programmable parameters via rotatable, removable ring (programming protection)**
- **Electronics housing with non-scratch, chemically resistant glass**
- **Rotatable electronic housing for best reading position**
- **Designed for industrial use**
- **Small, compact construction**
- **Simple installation**

Characteristics

The FIS magnetic-inductive flow probes are built into the piping by means of the supplied welded-on sleeves (DN 50..DN 400) or by means of the plastic fixing clip (DN 50..DN 150) .

The complete measurement probe is removable without creating an opening to the medium, and so if a fault occurs, only the electronic part is replaced.

When an electric conductor moves at right angles to the magnetic field, the movement induces a voltage U in the conductor. With this measurement principle, the electrically conductive medium is the conductor. The magnetic field B is transverse to the direction of flow. The induced voltage U is directly proportional to the local flow speed v.

The OMNI transducer located on the sensor has a backlit graphics LCD display which is very easy to read, both in the dark and in bright sunlight. The graphics display allows the presentation of measured values and parameters in a clearly understandable form. The measured values are displayed to 4 places, together with their physical unit, which may also be modified by the user. The electronics have an analog output (4..20 mA or 0..10 V) and two switching outputs, which can be used as limit switches for monitoring minimal or maximal, or as two-point controllers. The switching outputs are designed as push-pull drivers, and can therefore be used both as PNP and NPN outputs. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a cleartext in the display.
The stainless steel case has a hardened non-scratch mineral glass pane. It is operated by a programming ring fitted with a magnet, so there is no need to open the operating controls housing, and its leakproofness is permanently ensured.

By turning the ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 ° and replaced, or completely removed, thus acting as a key.

Technical data

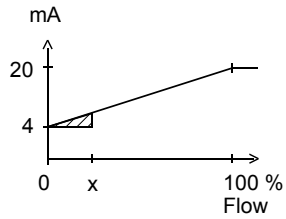
Sensor	magnetic-inductive	
Nominal width	DN 50..300 welded-on nozzle DN 50..150 tapping sleeve	
Process connection	welded-on nozzle, tapping sleeve	
Metering ranges	full scales 1..8 m/s in steps of 1 m/s	
Measurement accuracy	±5 % of the measured value, (when calibrated on the spot ±2 % of the measured value), from 3 cm/s	
Repeatability	±2 % of the measured value	
Time constant	5 seconds fixed	
Media	conductive, largely homogeneous fluids, pastes, and slurries, also having solids components	
Electrical conductivity	min. 20 mS/cm	
Medium temperature	-25..+150 °C	
Ambient temperature	-25..+60 °C	
Pressure resistance	max. 25 bar, welded-on nozzle max. 10 bar, tapping sleeve	
Materials	Probe	stainless steel 1.4435
	Insulation	ceramic (zirconium oxide)
	Tapping sleeve	PP, 1.4305
	Electronics housing	stainless steel 1.4305 FKM and Klingerit
Materials non-medium-contact	Electronics housing	stainless steel 1.4305
	Glass	mineral glass hardened
	Magnet	samarium-Cobalt
	Ring	POM
Supply voltage	18..30 V DC	
Power consumption	< 2 W	
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
Switching outputs	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum	
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with	

	simultaneous message on the display.
Electrical connection	for round plug connector M12x1, 5-pole
Ingress protection	IP 67
Weight	see table "Dimensions"
Conformity	CE

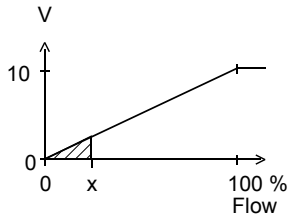
Signal output curves

Value x = Begin of the specified range
= not specified range

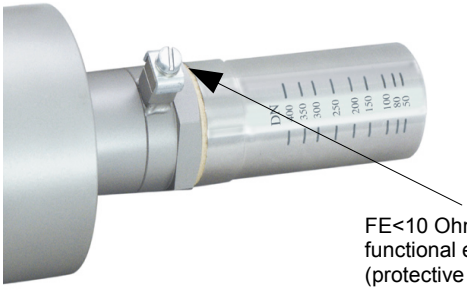
Current output



Voltage output



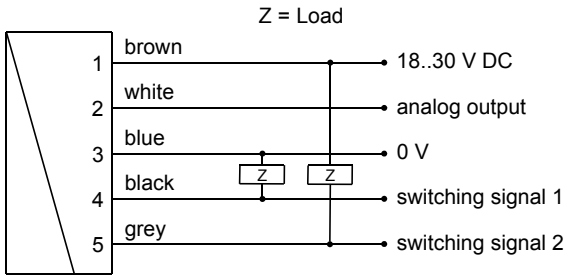
Other characters on request.



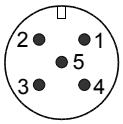
FE<10 Ohm
functional earth
(protective earth)

(must be installed)

Wiring

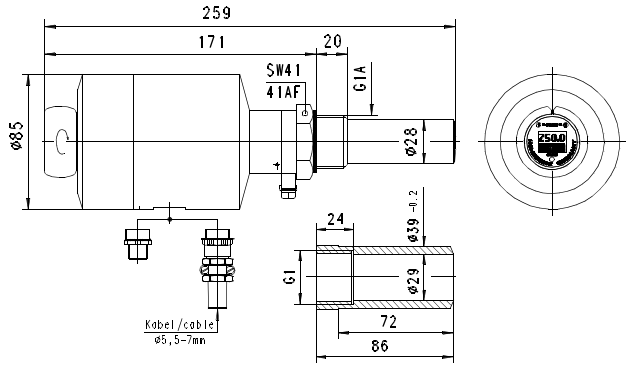


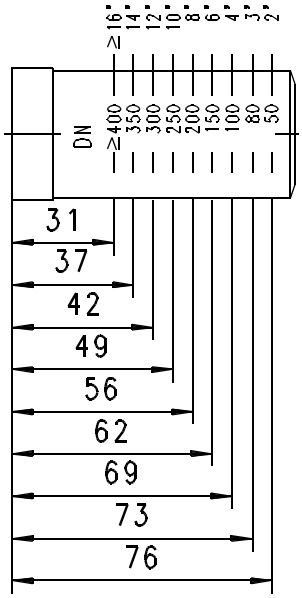
Connection example: PNP NPN



connector M12x1

Dimensions

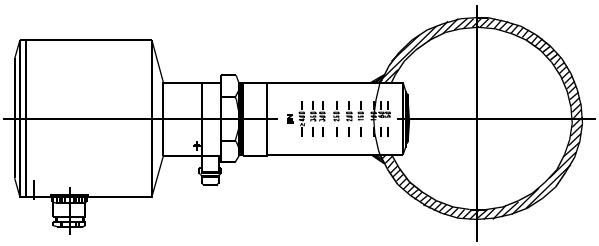




Handling and operation

Installation

The FIS magnetic-inductive probes are installed in the pipework by means of the supplied welded-on sleeves or by means of the plastic fixing clip (≥ DN 50 / ≥ G 2). See diagrams for installation position and depth.



Weld on the nozzle at the marking
according to its nominal width, free of distortion.

Run-in and run-out sections must be greater than or equal to 10 x pipework diameter. Weld on the connection sleeve at right angles to pipework mid-line (see marking = external pipework diameter, for >DN 400 also at 400). Avoid distortions. The probe must screw in easily. After screwing in, the probe can be adjusted by rotating it.

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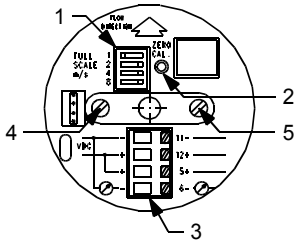
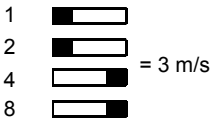
The electrical connection is made after opening the cover (unlosable because of its earthing cable). For this, completely remove the three internal hex bolts from the lid.

The arrow on the electronics insert must be in the direction of flow (loosen bolts 4 and 5 by approx. 2 or 3 turns. Do not remove completely) Turn the electronic component appropriately, and then tighten the bolts again. The alignment of the arrow has nothing to do with the alignment of the housing. This is possible at any time, without affecting the alignment of the internal component.
The metering range full scale value has already been set in the factory to the desired metering range, by means of the DIP switches (1, 2, 3, 4, 5, 6, 7, 8 m/s, see drawing). The figures next to the DIP switches are valid.



1 DIP switches
2 Button for zero point calibration
3 Connection clip

Example of the DIP switches:



Zero point setting:
- Fill the piping completely with medium
- Flow speed in the piping must be "zero"
- Press the "ZERO CAL" button
- After one minute, the device has automatically self-calibrated

Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:

Set to 1 = continue (STEP)
Set to 2 = modify (PROG)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.
Operation is by dialog with the display messages, which makes its use very simple.
Starting from the normal display (present value and unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
  MIN = Monitoring of minimum value
  MAX = Monitoring of maximum value
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code
  After entering the **code 111**, further parameters can be defined:
- Filter (settling time of the display and output)
- Physical unit (Units)
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (measured value corresponding to 0/4 mA)
- 20 mA (measured value corresponding to 20 mA)

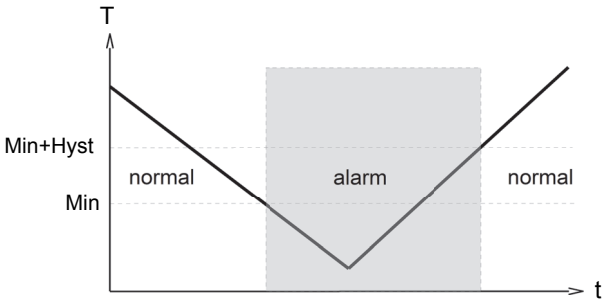
For models with a voltage output, replace 20 mA accordingly with 10 V.
Edit, using position 2

If the currently visible parameter is to be modified:

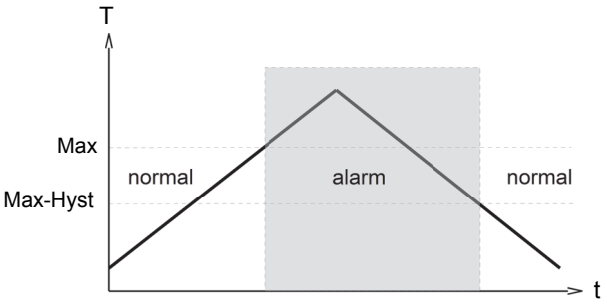
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.

Overload display
Overload of a switching output is detected and indicated on the display ("Check S1 / S2"), and the switching output is switched off.

Simulation mode
To simplify commissioning, the sensor provides a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning.
This mode is accessed by means of **Code 311**.

Factory settings
After modifying the configuration parameters, it is possible to reset them to the factory settings at any time using **Code 989**.

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OMNI-FIS

Ordering code

The basic device is ordered e.g. FIS xxx
with electronics e.g. OMNI-FIS xxxx

	1.	2.	3.	4.	5.
FIS					**E**

	6.	7.	8.
OMNI- FIS-			

❍=Option

1.	**Nominal width**								
	025	DN 25 (welded-on nozzle) for installation from DN50							
	050	DN 50 (tapping sleeve)							
	065	DN 65 (tapping sleeve)							
	080	DN 80 (tapping sleeve)							
	100	DN 100 (tapping sleeve)							
	125	DN 125 (tapping sleeve)							
	150	DN 150 (tapping sleeve)							
2.	**Mechanical connection**								
	V	welded-on nozzle							●
	B	tapping sleeve	●	●	●		●	●	
3.	**Material for mechanical connection**								
	K	stainless steel (welded-on nozzle)							●
	B	PP (tapping sleeve)	●	●	●		●	●	
4.	**Full scale value of range**								
	001	1 m/s							
	002	2 m/s							
	003	3 m/s							
	004	4 m/s							
	005	5 m/s							
	006	6 m/s							
	007	7 m/s							
	008	8 m/s							
5.	**Connection for**								
	E	electronics							
6.	**For nominal width**								
	025	DN 25 (welded-on nozzle)							●
	050	DN 50 (tapping sleeve)						●	
	065	DN 65 (tapping sleeve)					●		
	080	DN 80 (tapping sleeve)				●			
	100	DN 100 (tapping sleeve)			●				
	125	DN 125 (tapping sleeve)		●					
	150	DN 150 (tapping sleeve)	●						
7.	**Analog output**								
	I	current output 0/4..20 mA							
	U ❍	voltage output 0/2..10 V							
8.	**Electrical connection**								
	G	cable screw gland Pg 9 excluding cable							
	S ❍	for round plug connector M12x1, 5-pole							

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1

GHMGROUP

Specialists by C mpetence.

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Астана (7172)727-132
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
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Волгоград (844)278-03-48
Вологда (8172)26-41-59
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Киров (8332)68-02-04
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Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
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Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Ярославль (4852)69-52-93

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