

## A909 WIRE BREAK DETECTION SYSTEM FOR STRANDING, CABLING, SCREENING AND ARMOURING MACHINES

### Principle of operation

Wire breaks are detected by checking the rotation of the reel. A series of magnets is placed on the brake disc, integral with the reel; a magnetic sensor constantly monitors the transit of the magnets and reacts if this transit does not occur within a specified time period. A coded alarm signal is transmitted to a master control unit.

It is strongly recommended to **read all the instructions** contained in this manual **before carrying out any operation.**



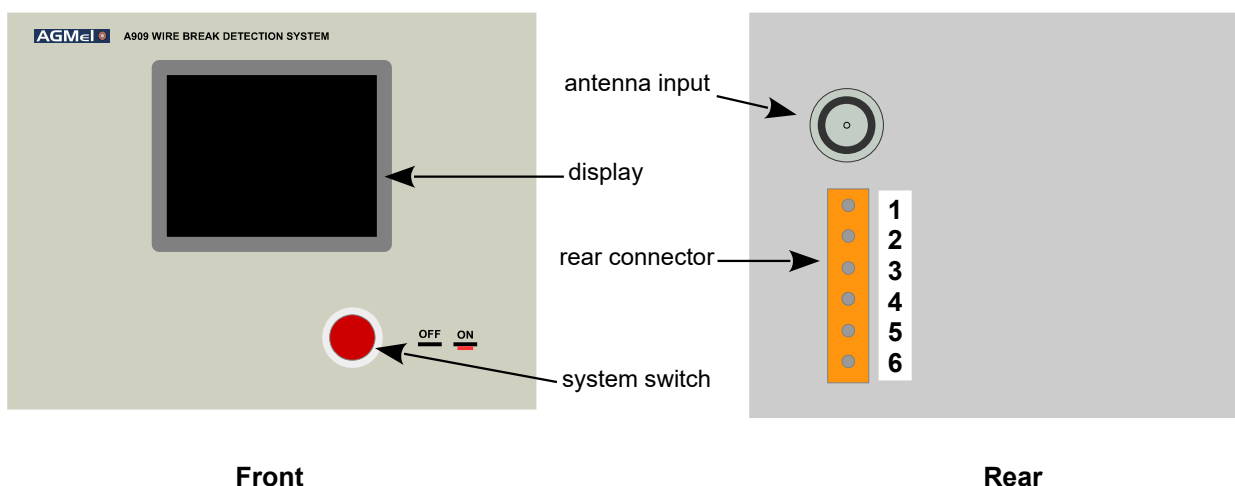
### Preliminary controls

The preliminary phase of the installation is to verify the correct receipt of an alarm signal.

Place the receiver preferably near the control desk of the cabling machine, connect the power supply and the antenna, activate the system by putting the system switch in position "ON".

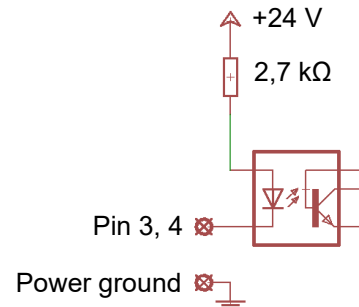
Place a transmitter near the farthest reel from the receiver, short for a brief moment the two wires coming out of the transmitter, wait a few seconds and check the led on the transmitter; while the led is alight, the display on the receiver should indicate "Wire break Bobbin XX", XX being the number of the transmitter. If everything works well, the preliminary phase has been completed.

### Receiver installation



**Rear terminal panel connections**

Pin No	Signal	Function
1	+ 12 ÷ 30 Vdc	Power supply
2	- Pwr GND	Power ground
3	Reset / on-off	Remote system reset / on-off
4	SSM enable	Signal strength monitor enable
5	C	Relay output
6	N. O.	

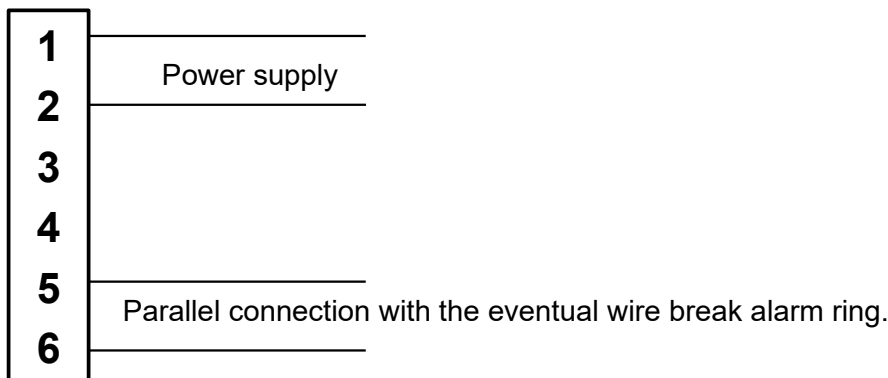


Don't short or connect the power ground to the antenna ground.

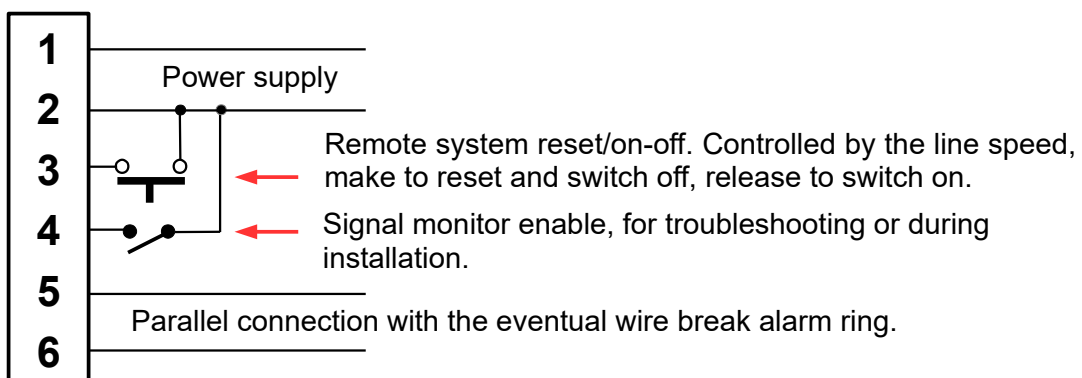
Power ground and antenna ground are galvanic isolated to reduce ground loops that are a major cause of noise and interference.

**System switch on the front panel must be in the “ON” position if the system is to be remotely controlled.**

**Simplified wiring diagram**



**Complete wiring diagram**



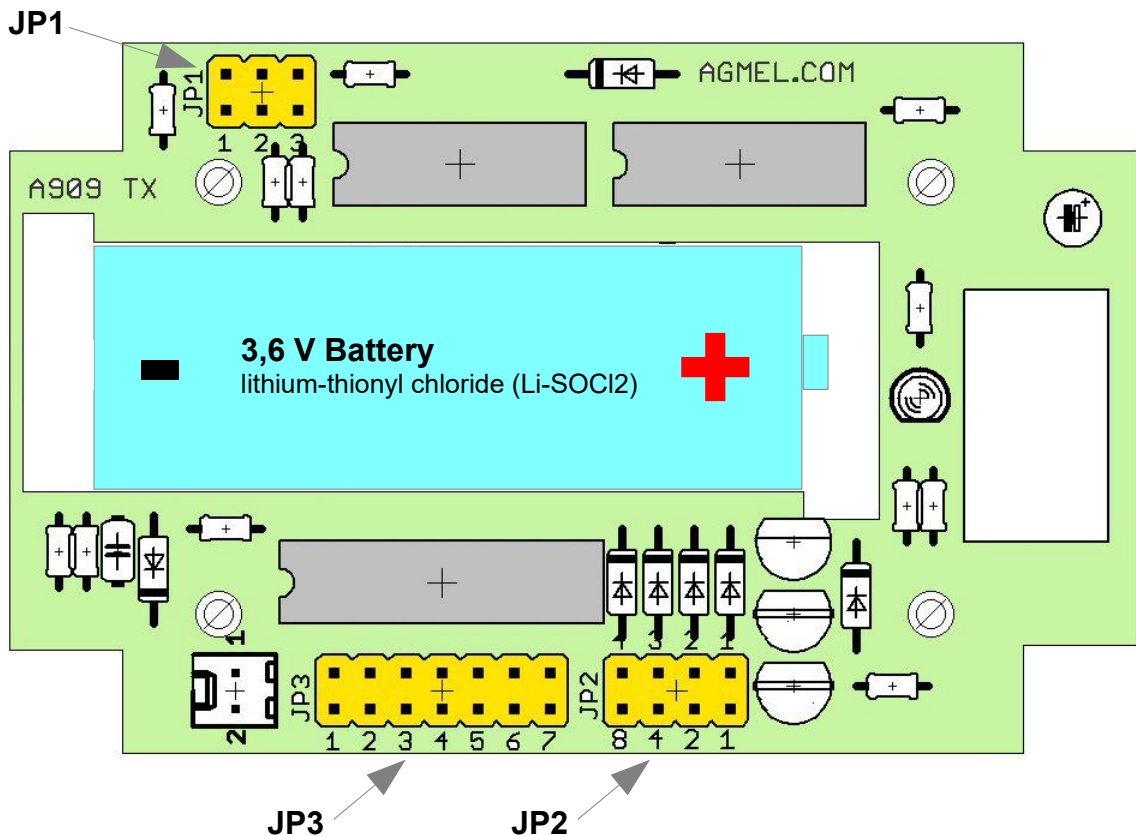


### Transmitter configuration



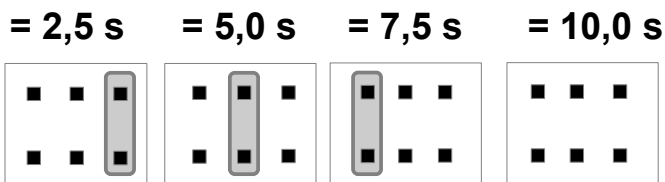
To program the transmitter, remove the four screws on the bottom.

Warning, incorrect programming could affect the proper operation.



### Jumpers settings

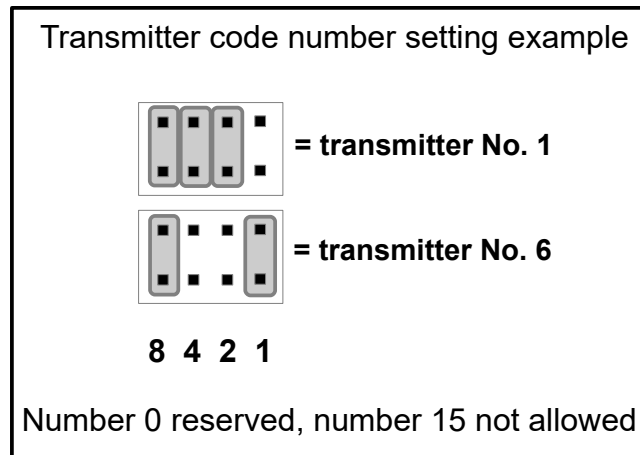
- Setting the maximum time delay before sending the alarm  
Set the jumpers **JP1**:



indicates a shorted position

To overcome the ramp-up speed, the first time interval has a duration of 30% higher than the others, so for example, if jumper 1 position 2 is shorted, after the first pulse, the transmitter waits 6.5 seconds before sending an alarm, then it waits 5.0 seconds.

- 2) Transmitter code number setting  
Set the binary coded jumpers **JP2** :



- 3) Serial address setting  
Set the jumpers **JP3** so that they match the serial address setting of the receiver.

### Sample calculation of maximum time delay before sending the alarm

Reel diameter  $d = 560$  mm      Minimum line speed  $v = 300$  m/h

Maximum time for one turn of the reel =  $3,6 \pi d / v = 3,6 * 3,14 * 560 / 300 = 21,1$  s

Time for the calculation must be at least 25 % higher:  $21,1 + 25\% * 21,1 = 26,4$  s

Time interval =  $26,4 / \text{No. of magnets}$

No. of magnets	time interval [s]	J1 position [s]
3	8,8	10,0
4	6,6	7,5
5	5,3	7,5
6	4,4	5,0
7	3,8	5,0
8	3,3	5,0
9	2,9	5,0

### Transmitter installation

Mount the transmitter in a protected place and so that the internal antenna (shown in the figure) is preferably away from metal parts.

You can check the signal strength by connecting pin 2 and 4 of the receiver, the higher is the value measured during the transmission and the better the quality of received signal.

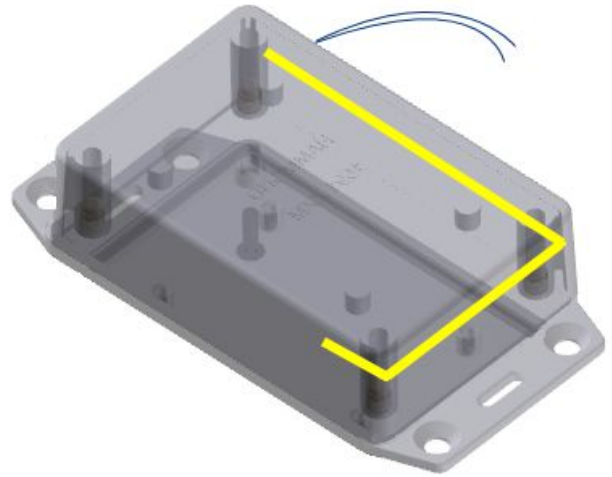
The transmitter enables a link at distance up to 75 meters in building.

Connect the pair of wires of the transmitter with the wires of the sensor, polarity doesn't matter.

You can install extension wiring so long as it needs.

If conditions permit, the assembly can be simplified by mounting the sensor inside the transmitter.

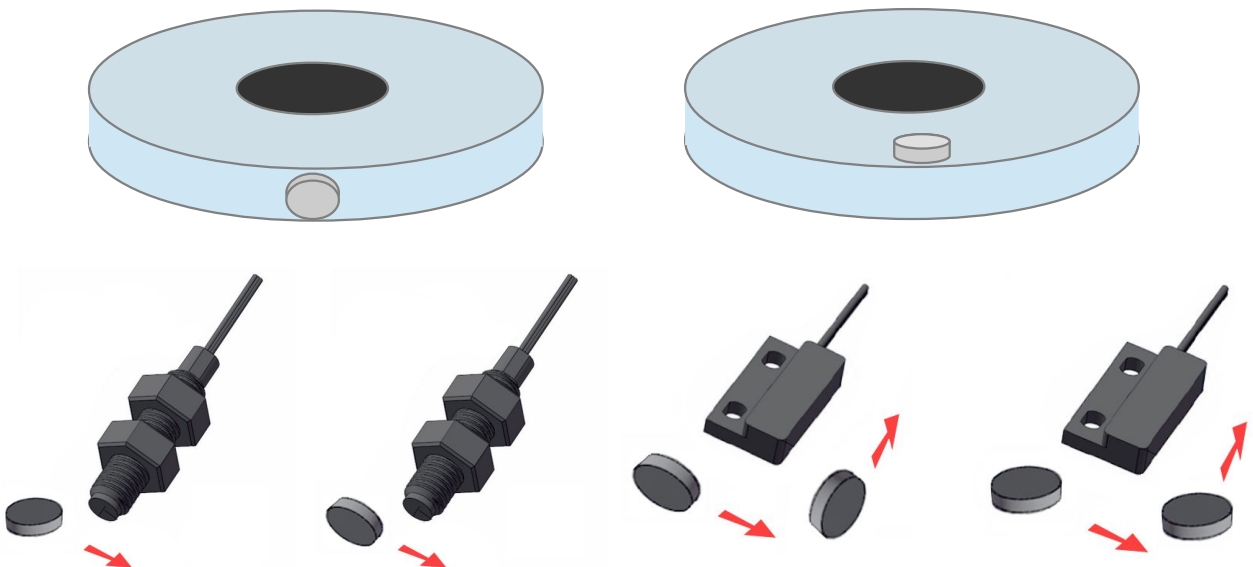
Mark the desired position and we will send another transmitter amended.



### Magnets and sensor installation

The disc magnets supplied are NdFeB, N42 grade, 10 mm diameter x 3 mm thick. Clean carefully the disc where the magnets will be mounted, install the magnets equally spaced and fix them using epoxy glue.

**Do not use hot glue!**  
The magnets lose their magnetization after 80 °C

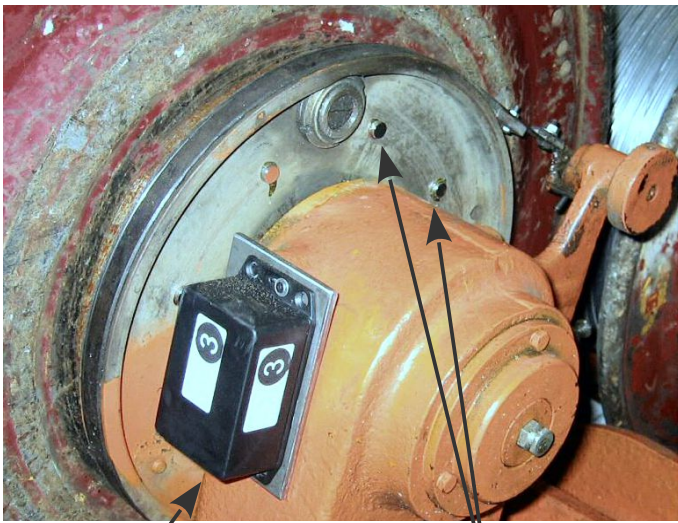


The typical life of the sensors supplied is more than 20 years of continuous operation. Securely mount the sensor and prevent accidental shock.

The positioning of the sensors and the distance between them and the magnets depend on the particular application, there is no general rule.

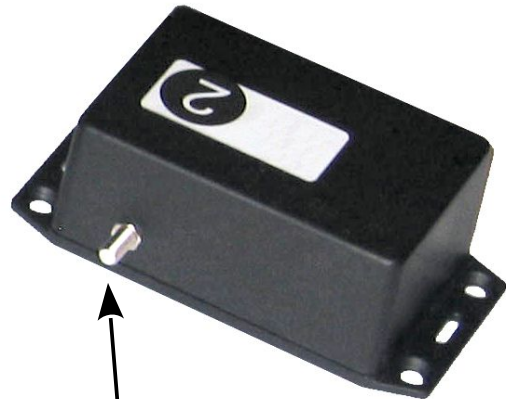
Adjust the distance of the sensor from the magnets and their mutual position using an ohmmeter connected to the two wires of the sensor: by spinning the disk where the magnets are mounted, the ohmmeter should indicate the effective closure of the sensor to the passage of all the magnets.

### Installation example



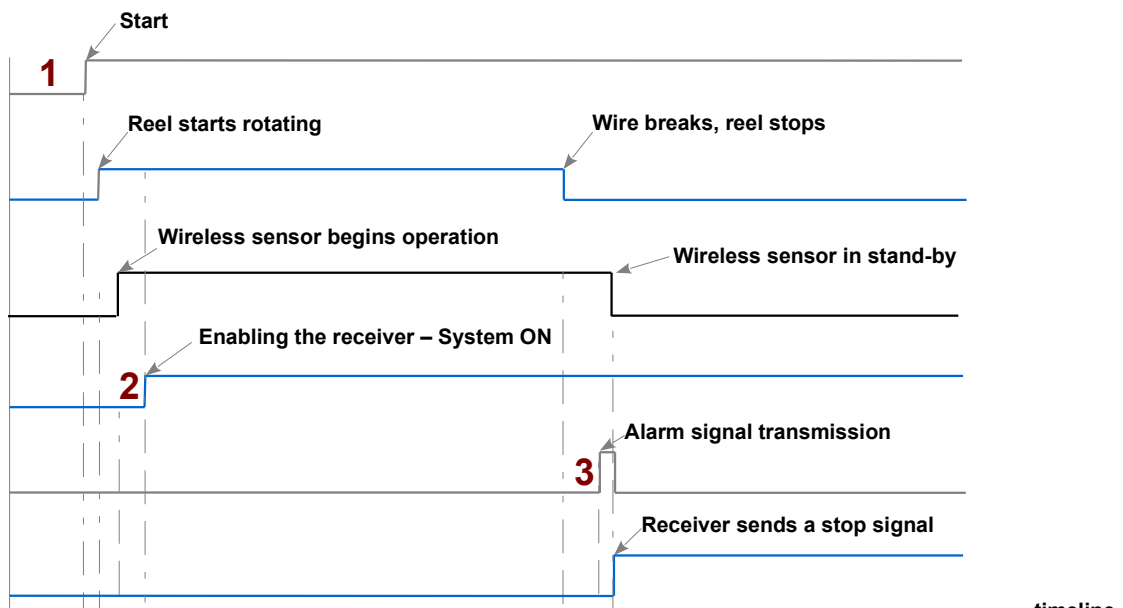
Transmitter with sensor inside

Magnets



Sensor

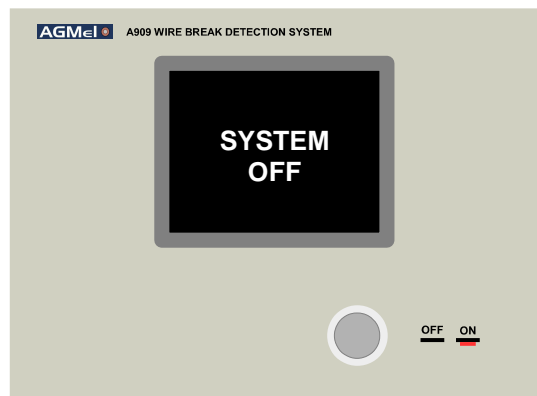
### System operation



System state diagram

#### 1 The machine starts working.

To reduce operator intervention and setting errors, each transmitter will function automatically after detecting the rotation of the reel, therefore the operator must ensure, during starting of the machine, that the empty reels are properly braked and that the full reels rotate.

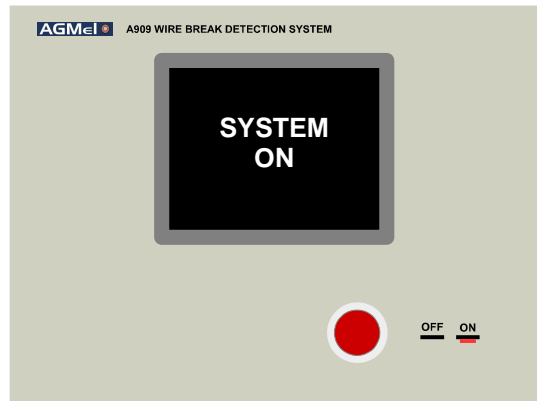




## 2 System ON

The machine has reached the line speed, alarm system is switched on.

The wireless sensors are switched on automatically.



## 3 Alarm signal transmission

The wire breaks, reel stops rotating.

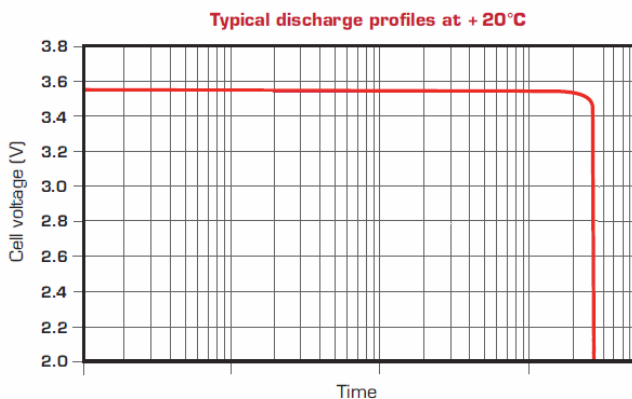
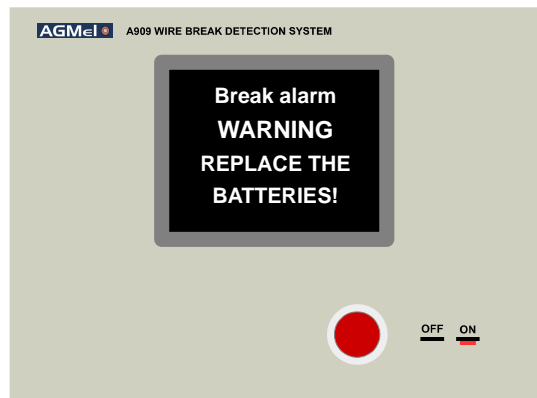
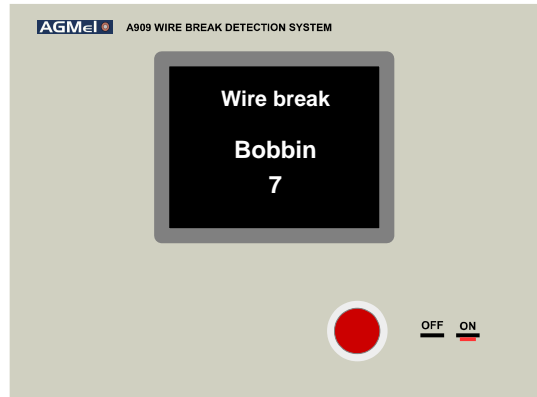
Wireless sensor transmits a coded alarm signal.

Malfunctions of the circuit could result from an insufficient supply voltage.

To prevent this possibility, the battery voltage is monitored and the system transmits a battery low alarm if the battery voltage drops below 3.1 volts.

**Under these conditions a warning signal is transmitted instead of the reel number code, because there may not be a second chance to transmit.**

**Change all the batteries in the transmitters at the same time.**



## Specifications

### Transmitter model A909TX

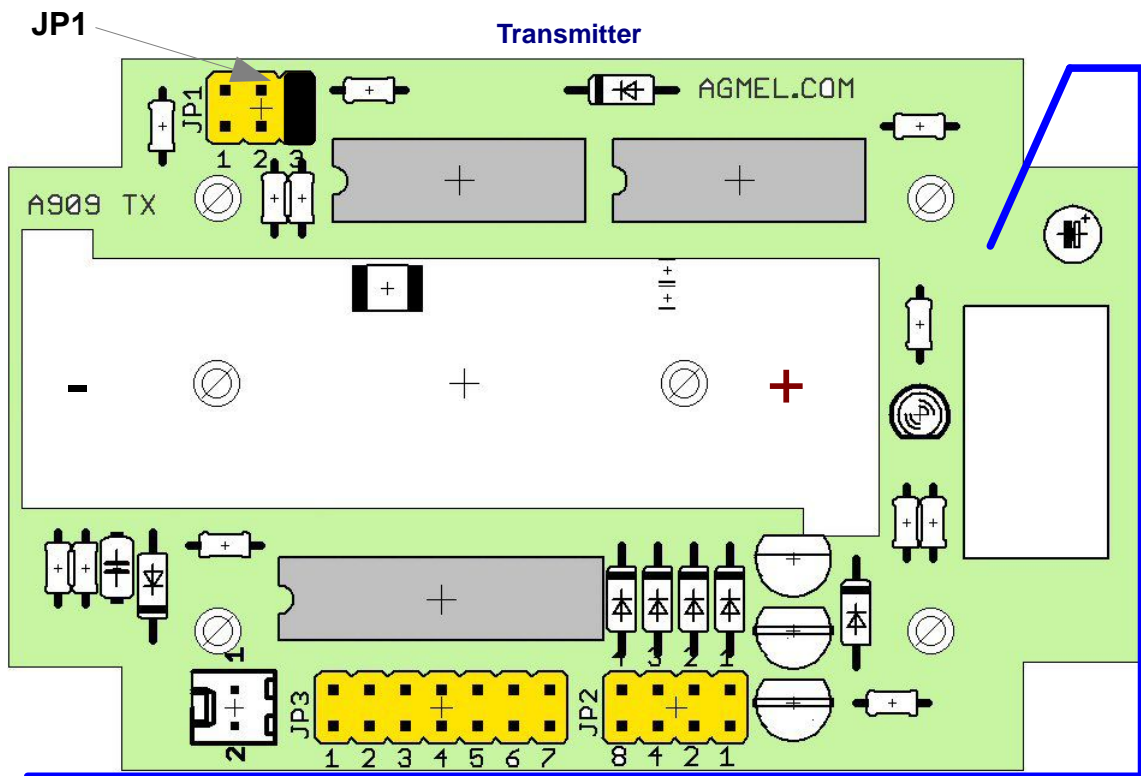
Frequency: 433,92 Mhz  
 Power supply: 3,6 V lithium battery  
 Battery life: 4 years approximately  
 Alarm delay: Programmable 2,5 ÷ 10 s  
 Duration of transmission: 0,5 s  
 Range: 70 m approx.  
 Dimensions: 87x58x39 mm

### Receiver model A909RX- 42

Power supply: 12 ÷ 30 Vdc  
 Display: 320 X 240 TFT LCD  
 Output: Relay 1A, momentary ON action  
 Inputs: Reset, SSM enable, external antenna  
 Dimensions: 150x130x55 mm



### Typical Configuration (42 reels)



JP1 = 7,5 s

#### Jumpers settings

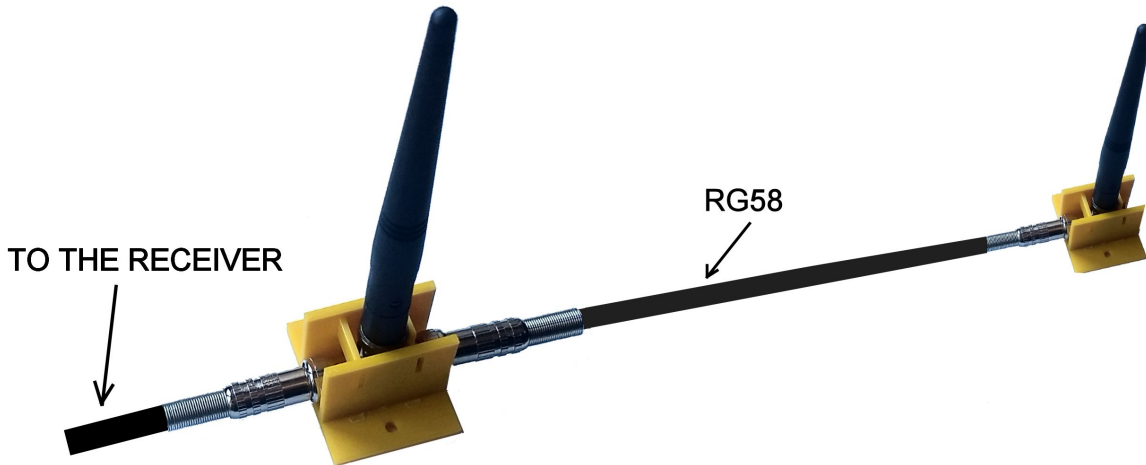
Reel	JP3	JP2	Reel	JP3	JP2	Reel	JP3	JP2
1	1+2	8+4+2	15	1+3	8+4+2	29	1+4	8+4+2
2	1+2	8+4+1	16	1+3	8+4+1	30	1+4	8+4+1
3	1+2	8+4	17	1+3	8+4	31	1+4	8+4
4	1+2	8+2+1	18	1+3	8+2+1	32	1+4	8+2+1
5	1+2	8+2	19	1+3	8+2	33	1+4	8+2
6	1+2	8+1	20	1+3	8+1	34	1+4	8+1
7	1+2	8	21	1+3	8	35	1+4	8
8	1+2	4+2+1	22	1+3	4+2+1	36	1+4	4+2+1
9	1+2	4+2	23	1+3	4+2	37	1+4	4+2
10	1+2	4+1	24	1+3	4+1	38	1+4	4+1
11	1+2	4	25	1+3	4	39	1+4	4
12	1+2	2+1	26	1+3	2+1	40	1+4	2+1
13	1+2	2	27	1+3	2	41	1+4	2
14	1+2	1	28	1+3	1	42	1+4	1

#### Receiver

Jumpers	JP1	JP2	JP3
Shorted positions	1+2	1+3	1+4

## Troubleshooting

If placing the antenna on the back of the receiver results in a weak signal, install two antennas alongside the machine as illustrated in the image below.



## External reset

If the receiver is controlled by line speed, the reset may occur before the operator can read on the display which wire is broken. This problem can be solved with the circuit below.

