IDT129
Position Transmitter

Installation Manual

STT Condigi

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1 Introduction

K2421 (Position indicator) is a low frequency transmitter. K2421 transmits its position to transceivers of the types MIP75 and PS75, when they are passing within the coverage area of the K2421.

When the transceiver is activated, it will transmit the ID code and the position received from the last K2421 passed.

PS75 is in some positions automatically activated when entering the covered area of the K2421.

K2421 can transmit one out of 1023 different positions.

The position signal is either distributed through FC120 ferrite antennas (K2912) or by setting up wired loops – under the pavement, over the ceiling, around a door etc.

K2421 features a “status output” for remote monitoring of the function. The output can be connected to a supervision system.

K2421 also features a "mute input".

K2421 replaces the older IDT100 / IDT120 / IDT126/IDT128.

1.1 Abbreviations

K2421: Product designator for Tunstall position transmitter.
K2912: Product designator for Tunstall ferrite coil antenna.
MIP75: Product designator for Tunstall mini ID and position transmitter.
PS75: Product designator for Tunstall ID badges.

1.2 Purpose

This installation manual provides technicians with information required to do a safely and correctly installation.

In cases, where other released documents cover a subject, a reference to this document is made.

1.3 Manual Scope

This document covers K2421 build on PCB revision 2421PCB01AC. This code is found on the PCB.

1.4 References

Ref. 2: FC120 documentation.

2 Installation and Setup

2.1 Installation Considerations

2.1.1 Position Zones

IDT's are installed on locations, where personal has to pass by, when they enter or leave a room or a zone. The IDT emits a position field of a certain size around its antenna. A transmitter pick up the position when the transmitter is carried through the field.

The transmitter has no possibility to detect the direction of the movement. Consider a position field covering a door between a door and a hallway. If an alarm is send with that position, the transmitter may be found in the room or in the hallway, but not in other rooms that are covered by other positions.

The position field has to cover a certain area, depending of the speed at which a transmitter is carried through the field. Indoors running speed of 10 km/hour is considered typical.

At this speed, a position transmitter needs to be covered by the field over a distance of only 1.6 meters.
At higher speed, the field must cover a larger area. However if an IDT is placed near a door a person have to slow down to open the door and the coverage area can be reduced.

Another matter to consider before installing IDT's is possible spill over e.g. from one floor to the other or through walls from one room to another.

2.1.2 Loop Antenna

Loop antennas can be installed indoor or outdoor. Loop antennas offer the largest areas of coverage.

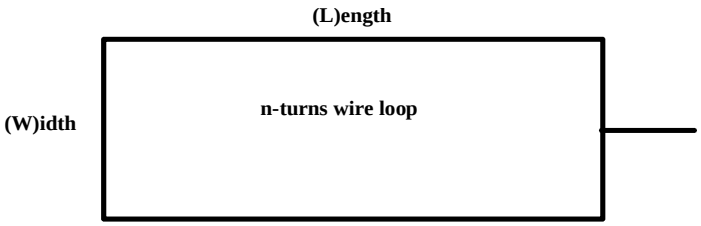
For indoor installation loop can be placed on a wall, in the floor or on the ceiling, depending on the specific circumstances. Spill over from floor to floor or from room to room must be considered: A loop placed in the horizontal division between two floors will emit its field equally on the two floors.

For outside installation spill over is often no problem, and large loops may be used.

Loops can be placed under the pavement, in the soil or so.

Note!

- Wires diameters of 1 mm (0.75 mm^2) has been tested ok, but this does not mean other diameters not will work. They have just not been tested.
- The optimal loop width is by practical testing found to 1.2 meter.
- Two or more loop antennas placed near each other can cause problems. Keep a distance of more than two meters between the antennas.



The following table is intended as a loop dimension guide, which describes the number of loop turns as function of the loop length.

Loop Length [meter]	Minimum Turns of Wire [n]	Status	Test Conditions
Less than 2 meters	3	NOT ALLOWED Small loops with low impedance will cause an IDT heat problem.	Temp = 25 ºC Wire = 0.75 mm^2 Vout = 8.5 Vpp. Loop width = 1.2 m
2 to 6 meters	3	ALLOWED	
6 to13 meters	2	ALLOWED	
More than 13 meters	1	ALLOWED	

See section 2.3.2 for electrical connection of loop antennas.

2.1.3 Ferrite Antenna

In systems with a large number of positions, e.g. with positions in each room, or with possible spill over problems, it may be a good idea to use ferrite coils instead of loops. These can be placed at the exact spot where a position is defined. It covers an area of approximately 1 to1.5 meter, and one K2421 can be installed either with one or even two FC120 coils. See examples on how to install FC120 in figure 1 and 2.

However, using two FC120 per K2421, one must be aware, that the fields from more FC120's interact if they can “see” each other. For more information, see Section Adjustment.

If two FC120´s (connected to the same K2421) were installed opposite each other e.g. in a hallway, the field would be amplified if they are installed exactly opposite and phased in the same direction.
If they were phased in opposite direction the field would then be weakened as the two phases would neutralize each other.

When installing two FC120 on one K2421 it is especially important to test the field. When they are not placed exactly opposite to each other, the interacting may be hard to predict. In order to obtain the maximal level of field-coverage or the field-coverage needed for the specific area, the FC120 must be tested in various positions and directions.

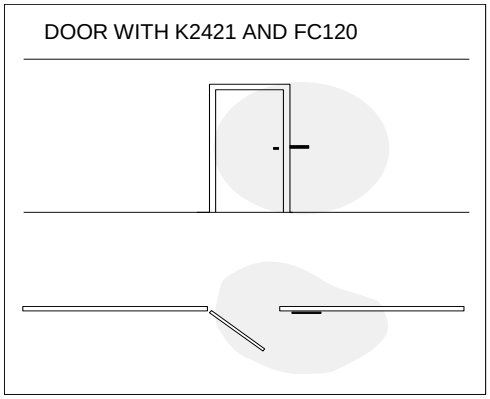


Figure 1

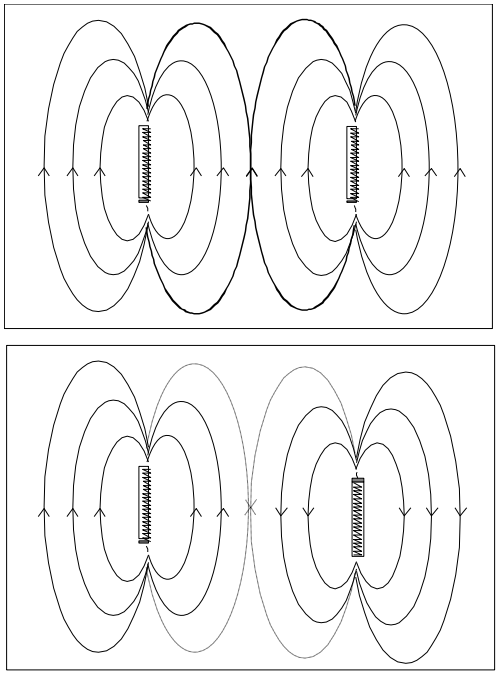


Figure 2

2.2 Mechanical Installation

2.2.1 Wall Mounting

The K2421 is fastened to the wall with two screws through the two keyholes in the IDT back cover. Use screws with screw head lower than 3.5 mm. Keyhole spacing is 66 mm.

If it is necessary to secure the IDT from being lifted off the keyhole screws, then it is possible to secure the mounting with extra screws:
Remove the circuit board from the back cover.
Secure the back cover with screws through the circular holes in the upper right- and in the lower left corner of the back cover.
Reassemble the circuit board on the back cover.

2.2.2 Cable Stain Relief

The K2421 is fitted with a fixture for cable ties near the screw terminals. More cable ties can be fitted at a time. If needed, use this fixture to secure cables to the IDT.

2.3 Electrical Installation

2.3.1 Power Supply

The K2421 accepts DC supplies with a voltage between +12V to +30V.

The K2421 is designed for the power supply K2955.

The power supply is connected to the VIN+ and VIN- screw terminals on the circuit board.

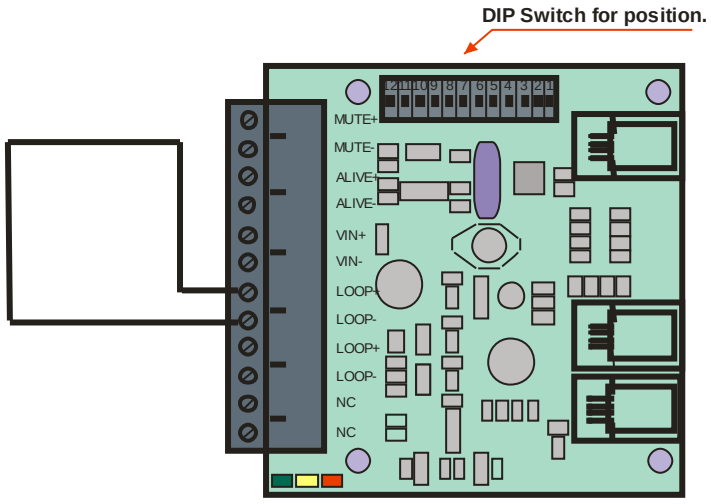
The maximum current consumption is up to 700 mA for a 12VDC supply, and up to 350 mA for a 24VDC supply.

When the DC power is connected the POWER_ON LED will lit green.

2.3.2 Loop Antenna

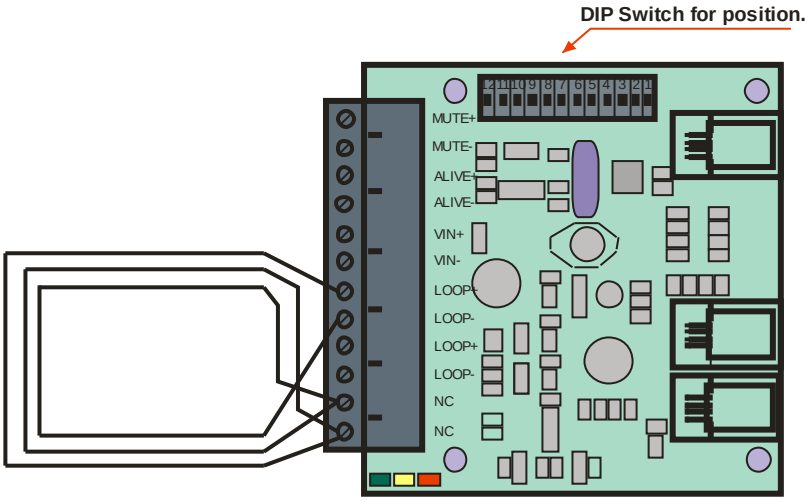
A. Connect a “one wire loop” to Loop + and Loop – according to the illustration below.

Note!
Use only this loop antenna when area is greater than 30 m^2.



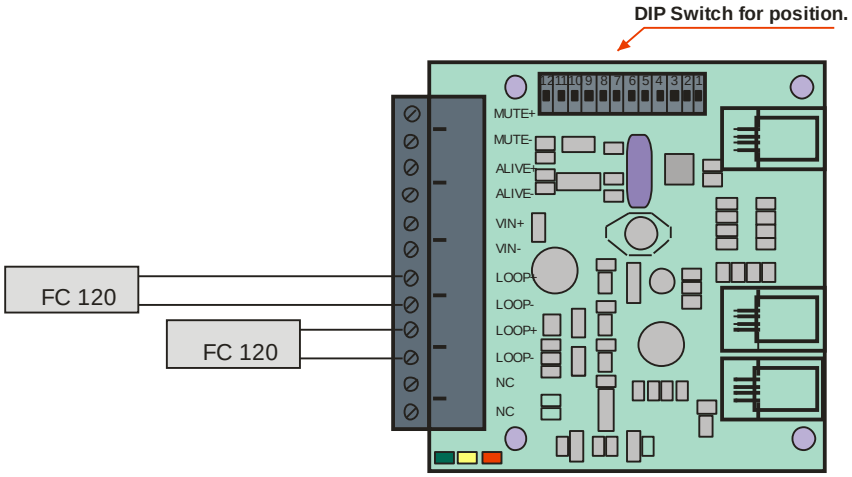
B. Connect a “three wire loop” according to the illustration below.

Note!
It is important that the polarity is correct. The current must flow in the same direction in the wires. A “three wire loop” is easily obtained by using a “3 wire” cable (e.g. 3 x 0.75 mm^2 cable).



2.3.3 Ferrite Antenna

Connect one or two FC120´s according to the illustration below.



2.3.4 Alive Output and NOT_ALIVE LED

The K2421 ALIVE output is a passive optically isolated open collector.

The signaling voltage/current must come from the receiver of the signal, just as if the output was the contact of a relay.

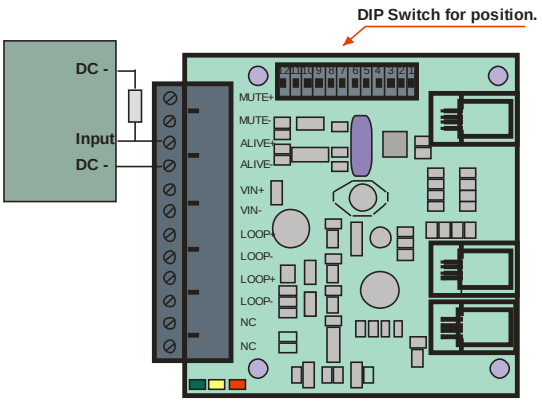
Maximum allowed voltage is 28 VDC.
Maximum allowed current is 20 mA.

Polarity (Alive+ and Alive-) is marked on the circuit board.

The ALIVE output is short circuited during normal operation.

The ALIVE output is open if the power supply fails, or if output current rises above, or drops below the allowed range.

Further will the red NOT_ALIVE LED on the K2421 emits if the output current rises above, or drops below the allowed range.



2.3.5 Mute Input

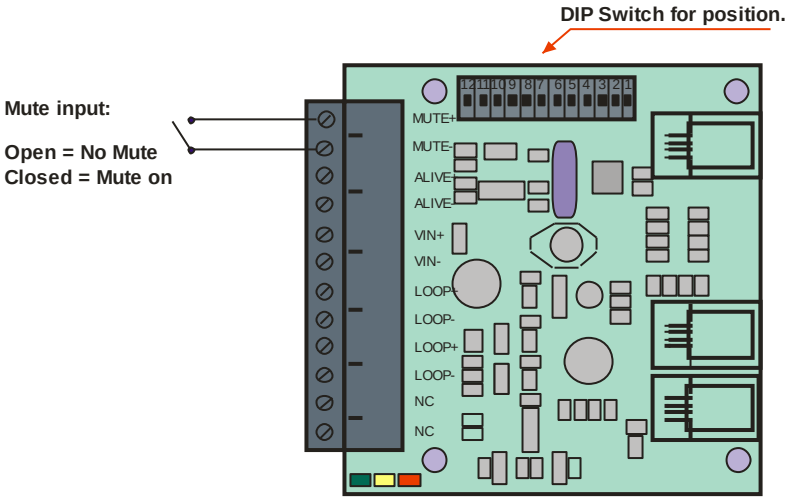
K2421 has a mute input.

When the input is short-circuit, e.g. by a door-switch, the IDT antenna output is muted, and thus no position field is emitted.

Position emitting is resumed, when the mute input is left open again. A green MUTE_ON LED on the PCB will be lit during mute (no position emitted).

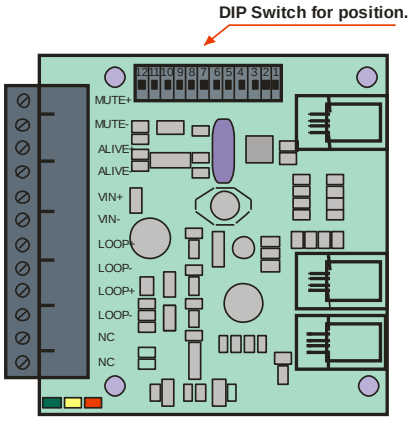
Indication on the ALIVE output is not affected by mute.

Maximum voltage/current on mute input is 5 V / 3 mA.



2.4 Electrical and Logical Setup

2.4.1 DIP Switch



The following table describes the meaning of DIP switch settings.

Switch	ON	OFF	Description
1	1	0	Sw1-10 used to set the Position ID (coded binary) The position ID may be coded in the range 1-1022. e.g. if an IDT code 100 is to be coded: All switches must be OFF except the following: SW7:ON - 64 SW6:ON - 32 SW3:ON - 4 --------- 100 ---------
2	2	0	
3	4	0	
4	8	0	
5	16	0	
6	32	0	
7	64	0	
8	128	0	
9	256	0	
10	512	0	

Dip VOL Bit12|Bit11	Output	Load Type	Range	Power at 12V
OFF|OFF	4Vpp	Loop1Mx1M	260cm	50mA
OFF|OFF	4Vpp	Loop1Mx1M iron in floor	200cm	
OFF|OFF	4Vpp	1xFC120	90cm	40mA
OFF|ON (DEF)	8Vpp	Loop1Mx1M	340cm	120mA
OFF|ON (DEF)	8Vpp	1xFC120	135cm	100mA
ON|OFF	12Vpp	Loop1Mx1M	380cm	150mA
ON|OFF	12Vpp	1xFC120	140cm	80-150mA
ON|ON	16Vpp	Loop1Mx1M	410cm	220mA
ON|ON (Max 1xFC120)	16Vpp	1xFC120	165cm	100-260mA
ON|ON (Max 1xFC120)	16Vpp	1xFC120 adjusted coil	180cm	130-170mA

2.4.2 Adjustment

The K2421 is factory adjusted for medium output power. By changing the dipswitches 11 and 12 you can adjust the output power (see section 2.4.1).

There should be no viewable clipping of the output voltage, when measuring with an oscilloscope.

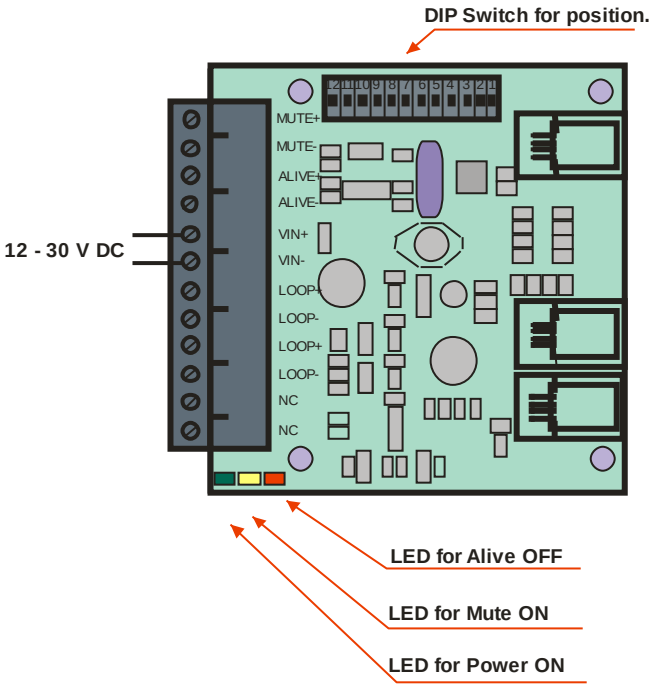
Note! If the NOT_ALIVE LED is lit the internal current is too low or too high.

If a high current is detected, this must be caused of a too small loop area, see Section LOOP antenna.

If the current is too low try to increase the output power by changing the dipswitches 11 and 12 (see section 2.4.1).

2.4.3 Power Supply

The K2421 is typically used in systems where either 10 to 24V is needed.



NB: No power during configuration.

3 User Guide

3.1 Daily Use

No action has to take place in daily use.

3.2 Maintenance

No maintenance is needed.

If a user should want to verify the operation of an IDT, the following procedure can be used:

1. Place a MIP75 transmitter near the loop- or ferrite antenna of an IDT in another position area.
2. Make an alarm call.
3. Verify that the transmitted position complies with the position of the IDT.
4. Move the MIP75 to a position near the loop- of ferrite antenna of the IDT under test.
5. Make an alarm call.
6. Verify that the transmitted position complies with the position of the IDT.

In critical installations, use the K2421's "Alive output" to monitor the function.

4 Technical Data

4.1 Product Data

Order no.	K2421
Size	122x82x27 mm
Color	White
Material	The top is impact strengthened plastic. The back is aluminum.
Weight	185 g
IP-rating	IP-20
Supply voltage	12 to 30VDC
Current consumption	Depend on type of antenna.
Allowed load impedance	Down to 2 ohm. This is obtained with the antenna suggestions stated in this document.
Output voltage	Up to max.16 Vpp (depending on loop size and turns)
Output frequency	16 to18 KHz
Coverage	165 cm from antenna with FC120 antenna. 260 cm from wire with loop antenna. (Depending of loop size).
Position protocol	10-bit
Status output	Max. voltage: 28 V Max. current: 20 mA
Mute input	Max. voltage: 5 VDC (open circuit) Max. current: 3 mADC (closed circuit) Max. allowed voltage for mute: < 1V
Environment temperature	-10 to +50 deg. C.
Environment humidity	10 to 90 % non-condensing.
Approvals:	

4.2 Requirements

If installed in an out-door environment or in environments with temperatures below the stated minimum or where the unit can be exposed to water, suitable additional enclosure is required.

4.3 Product Revisions

The following K2421 revisions are found:

K2421 is based on PCB version 2421PCB01AC
K2421 replaces K2420

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