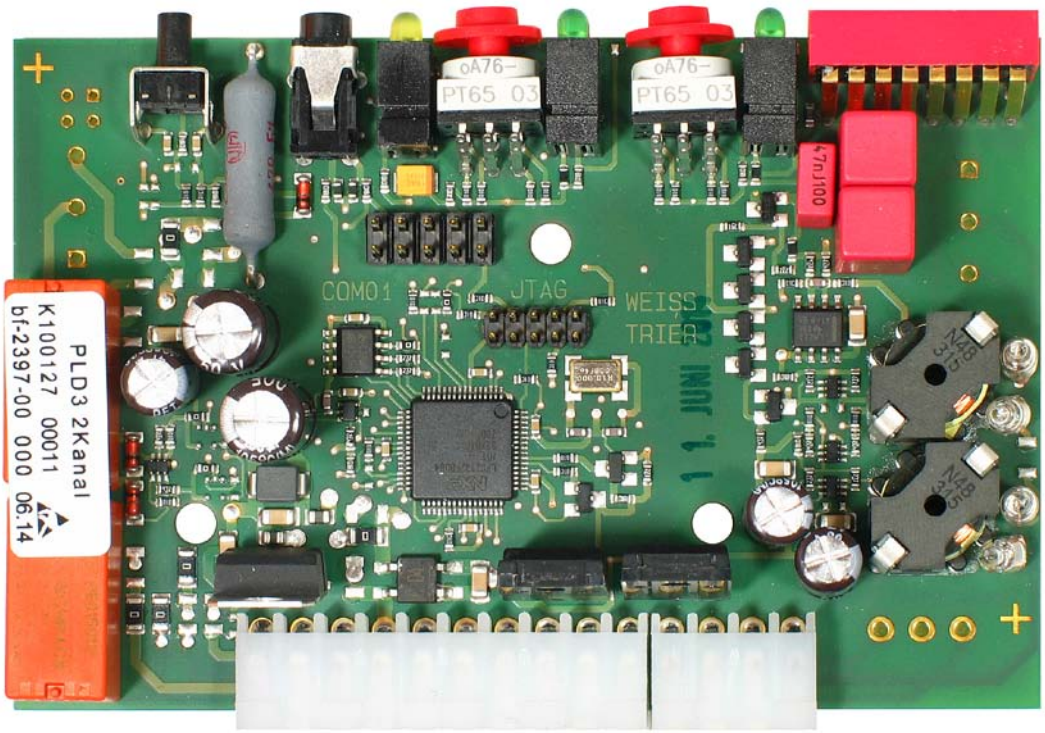
Connection and installation manual

Induction loop detector
ISD 6 (2-channel)



tousek®
GATE AUTOMATION

Important warning and safety notes

- These installation and operating instructions form an integral part of the product.They have been specifically written for professional installers trained and skilled in the trade and should be carefully read in their full length before carrying out the installation. It concerns the control only, not of the overall device “automatic gate”. After the installation this manual has to be handed over to the user.
- **Installation, connection, adjustments, putting into operation, and servicing may only be carried out by trained professionals in full accordance with these installation and operating instructions.**
- **Before carrying out works on the gate system, the power supply has to be turned off.**
- **Before taking off the housing cover, always turn off the mains switch!**
- The EU Machine Directive, laws and rules concerning the prevention of accidents, and laws and standards which are in force in the EU and in the individual countries have to be strictly followed.
- The TOUSEK Ges.m.b.H. can not be held liable for any claims resulting from disregards of the laws and standards in force during the installation and operation.
- The packaging materials (cardboard, plastic, EPS foam parts and filling material etc.) have to be properly disposed of in accordance with the applying recycling and environmental protection laws. They may be hazardous to children and therefore have to be stored out of children´s reach.
- The product is not suitable for installation in explosion-hazardous areas.
- The product may only be used in accordance with its original purpose, for which it has been exclusively designed, and which is described in these installation and operating instructions. The TOUSEK Ges.m.b.H. rejects any liability if the product is used in any way not fully conforming to its original purpose as stated herein.
- Children have to be instructed that the gate facility as well as the belonging parts may not be used improperly, e.g. for playing. Furthermore handheld transmitters have to be kept in safe places and other impulse emitters as buttons and switches have to be installed out of children‘s reach.
- Before beginning with the installation the installer has to make sure that all mechanical components of the gate facility, like carrier profile/rail, gate frame and panels, guiding elements etc. are sufficiently supportive and resistant for the purpose of gate automation.
- All electrical installations have to be made in full conformity with the applying rules and laws (e.g. using a fault current circuit breaker, proper grounding etc.).
- An all-pole disconnecting main switch with a contact opening-gap of minimum 3 mm has to be foreseen.
- After installation the proper function of the gate facility and the safety devices has to be checked!
- The TOUSEK Ges.m.b.H. rejects any liability for claims resulting from usage of the product in combination with components or devices which do not fully conform to the applying safety laws and rules.
- Only original spare and replacement parts may be used for repair of the product.
- The installer has to inform the user about all aspects of the automatic operation of the complete gate facility, as well as about emergency operation. The installer further has to supply to the user all instructions relating to the safe operation of the gate facility. The installation and operating instructions also have to be handed over to the user.

Characteristics

- reliable, weather-independent vehicle detection
- 2-channel, directional detection
- easy commissioning
- fast automatic adjustment
- wide adjustable response sensitivity range
- boost (sensitivity increase)
- continuous adjustment of frequency drifts by e.g. temperature changes, humidity
- no influence on the grinding frequencies among each other by „multiplexing“
- high immunity to interference due to frequency setting and oversampling
- permanent loop control and displaying via LED flashing code for the immediate detection of induction loop errors (loop short circuit, loop break, operating fault, adjustment period)
- large inductance range: 20 µH - 2000 µH
- simple simulation mode for testing peripherals
- selectable relay functions:
  - permanent signal or pulse signal
  - imulse when leaving the loop
  - switchable on / off delay
  - adjustable response sensitivity
  - current or working current principle
- CE

Function and operation of the detector

The induction impulse ISD 6 (2-channels) evaluates laid loops in the ground. These represent the inductance of a high frequency oscillator circuit. A vehicle passing the loop causes due to its metal parts, a change in frequency of the resonant circuit.These are evaluated by the loop detector, a switching signal via potential-free relay contact output and displayed on the LEDs on the front page.The analysis of the loop frequency is performed by a microprocessor system that automatically adjusts to the corresponding loop. There is no mutual influencing of the loop signals, because they are processed with the ISD 6 in a fixed sequence (multiplexing method), so that only a loop current flows through. The detector is easily adjusted via rotary and DIP switches on the front side.

DIP DIP-switch
RES Reset-button
M Molex strip

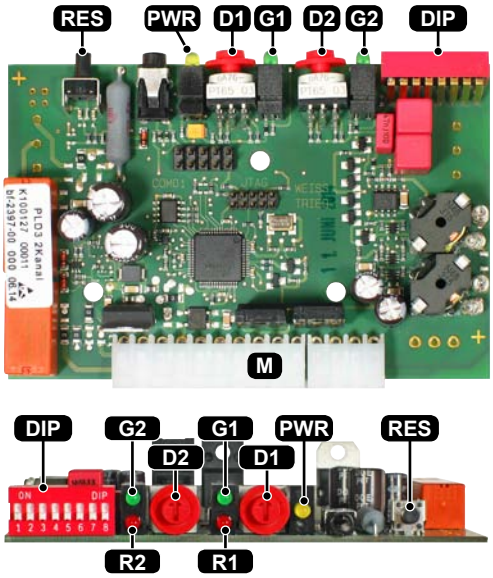
D1 rotary switch channel 1
D2 rotary switch channel 2

G1 green LED channel 1
G2 green LED channel 2

R1 red LED channel 1
R2 red LED channel 2

PWR yellow LED

LED´s	for channel	display
G1 (green)	1	detection
G2 (green)	2	
R1 (red)	1	defect
R2 (red)	2	
PWR (yellow)		blinks during adjustment/ power



technical data

2 channel induction loop detector ISD 6			
supply voltage	24 V AC/DC +/-10 % < 3,0 VA	operating frequency	20kHz–70kHz
working temperature	-25°C to +70°C	senisitivity	adjustable in 7 levels from 0,3%–0,007%
storage temperature	-40°C to +80°C	holding time	impulse operation and static holding time
measurements	L = 100mm, B = 70mm, H = 22mm	adjustment	autom. after switching on the power supply, after pressing the resetswitch, after parameter change or by reset switch
connection	via 14-pin. Molex connector (Type 2145/3215 KK 3,96 mm)		
weight	70g	switching outputs	potential-free relay contacts: 24V AC/DC → Umax = 42 V, Imax = 5 A
inductance range recommended area:	20 µH bis 2000 µH 100 µH bis 300 µH	displayed elements	LED red = loop defect, LED green = detection, LED yellow = blinks during adjustment/power
loop resistance	max. 30Ω		
measuring time per channel	min. 5ms–max. 25ms	protective circuit loop input	galvanic separation by transmitter, glow lamps
cycle time	measurement time Channel 1 + measurement time Channel 2		
frequency area	2 steps (LOW or HIGH)	article number	13430140

Warning

- **The operator must ensure that the chosen means of operation will not cause damage to equipment or danger to persons and that all protective and safety devices are installed and functioning.**
- **Before installation and initial operation make sure you follow the instructions first.**
- **The manual must be available on site at all time. It has to be read thoroughly and be applied by the person who is entrusted with the operation, maintenance or repair of the device.**

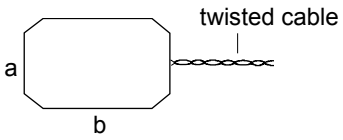
Important

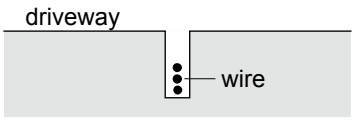
- **The device is intended for mounting on a compact controller board. The compact control system must be installed in an enclosure with additional IP54 insulation.**
- **<u>Specific instructions for loop</u>:**
  The safe operation of the device depends mainly on the technically correct installation and relocation of the loops, since they are the sensors of the device. The loop must not be mechanically stressed or agitated. The loop cable is twisted about 20 to 50 times per meter and has to be laid separately from the power cables.
- **After each device setting a recalibration has to be made by pressing the reset button (RES).**

loop geometry

- The safe function of the device depends essentially on the technically perfect installation and laying of the loops since they are the sensors of the device. The loop must not be loaded or moved mechanically. The loop wire lines have to be twisted approx. 20 to 50 times per meter and laid separately from voltage-carrying cables.
- the loop form should always be a rectangle. The number of turns/windings of the loop depends on the size of the loop circumference.

loop extent	number of turns
4–5 m	5
5–6 m	4
6–15 m	3
15–25 m	2

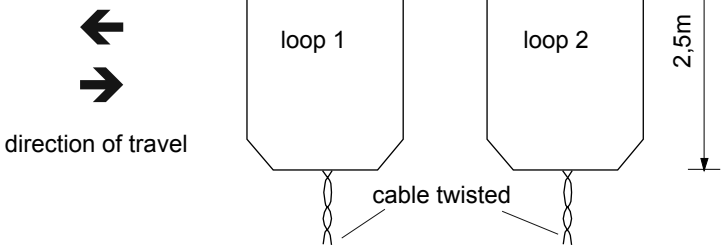




The table shows the required number of windings at various extent areas (for an aspect ratio b: a = 3: 1)

loop geometry „direction-finding“

example:



3 windings per loop

***) attention**

- **The distance between the two loops must be selected in such a way that both loops are always damped by the vehicle.**

laying the loop

- Before laying the loop, cut a groove approximately 5-8mm wide and at least 30-40mm deep into the roadway.
- At the corners the loop should not be laid at a right angle but at approx. 45 °.
- If possible, the long side of the loop should be parallel to the direction of travel.
- After carefully inserting the wire (PTFE 1.0²) into the groove, this has to be protected against moisture.

- **The loop has to be laid and shed in such a way that no mechanical change occurres when driving onto it.**
- **230V lines may not be installed in the I-loop (at least 1 m away)!**

laying the loop lead

- The supply line to the loop must be firmly twisted (at least 20 twists per meter) and can run either in an empty pipe or in a groove to the detector.

cable length > 30m should be avoided. If a longer lead is required, or if there is a likely influence by a 230V (400V) lines, then a twisted pair cable with screen has to be used (for example, A-2YF telecommunications cable 0,8 mm²).

foreign influence on the loop

To avoid function disturbances, the following minimum distances must be observed:

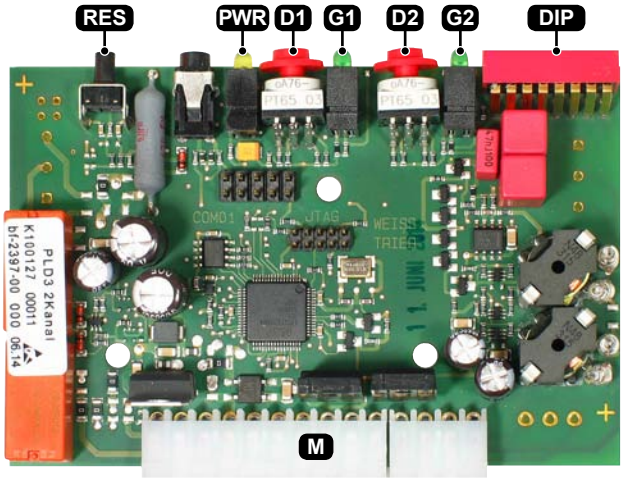
• **Rolling gates, sliding gates, etc.: 1m**	• **Steel reinforcements in the roadway at least 15 cm below the loop**
• **Non moving metal parts (hydrants, channel covers, ...): 0,5m**	• **Minimum distance to supply lines ≥ 230V: 1m**

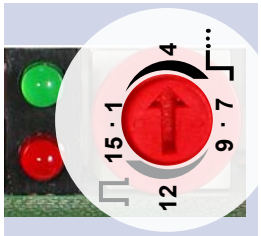
- All settings are performed using rotary coding switches **(D1)** for channel 1 and **(D2)** for channel 2 as well as dip switches **(DIP).**

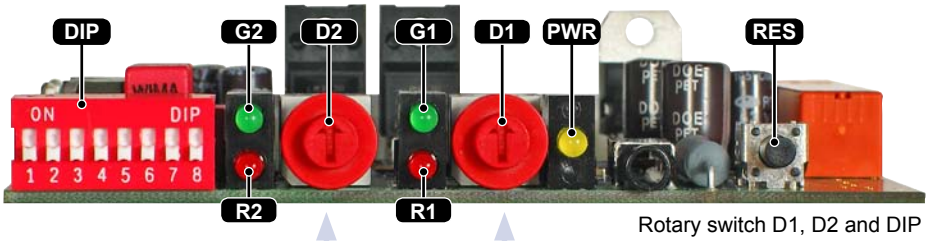
Factory settings (DIP1–DIP8 = OFF, D1 and D2 = 4).

LED´s	for channel	display
G1 (green)	1	Detection
G2 (green)	2	
R1 (red)	1	Defective
R2 (red)	2	
PWR (yellow)	Flashes in case of adjustment / power	

DIP DIP switch
RES Reset button
M Molex strip
D1 Rotary switch channel 1
D2 Rotary switch channel 2







Rotary switch D1, D2 and DIP in factory setting

Important

- A new adjustment is carried out automatically after every setting of the device.
- **After changing the frequency (DIP-1 switch: OFF/ON), the reset button (RES) must be pressed.**

3.1 Switch- and fault status display

- The state „loop occupied“ gets signalized by the green channel LED **(G1)** or **(G2).**
- A disturbance gets signalized by the red channel LED **(R1)** or **(R2)** separately for each channel.
- A detector failure, e.g. Short circuit, is indicated by a cyclic flashing of the green channel LED **(G1)** or **(G2).**
- A defined number of LED flashing is foreseen for each error, which is repeated every 5s.

Channel LED (G1 / G2): Switch- and fault status display	
Number of flashes	**Channel - failure**
1	Loop short-circuit
2	Loop open, loop break
3	Reserved
4	Breakdown
6	error other channel of directional logic
7	Maximum adjustment period exceeded

3.2 Reset button (RES)

The reset button (RES) has two functions, depending on how long the push button is pressed:

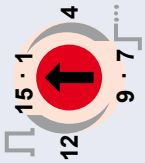
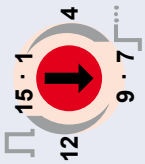
- **Adjustment:** short keystroke (<2s), initialization of all activated loop channels.
- **Reset:** average duration of the keystroke (> 2s), reset of the detector, subsequent initialization of all channels.

Adjustment

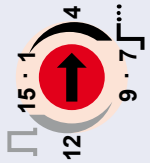
- **When the operating voltage is applied, in case of power interruption or when pushing the reset key (RES), the loop detector adjusts itself automatically to the connected loops and switches the relays to the „loop not damped“ position. During the adjustment the power LED (PWR) flashes at a frequency of 5 Hz and lights up when the adjustment is completed. This operation is usuell completed within <2 seconds.**
- **During the adjustment phase no vehicles shall be on the loops, otherwise these will be no longer recognized!**

3.3 Settings with rotary switch (D1, D2)

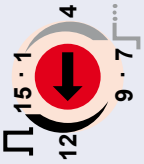
Symbol	Function
	**Static (Static Hold Time):** With this setting, the relay switches „statically“ - that means, so long as a vehicle is detected by the detector - **Use this mode when using tousek controllers !**
	**Pulse (Pulse mode):** With this setting, the relay switches only one pulse regardless of the vehicle detection time. Pulse length 100 ms (optionally up to 1s)

Position		Function
	0	**Off (Switch OFF)** The corresponding detector channel can be switched off through this switch position.
	8	**Test mode Relay** This switch position allows to check the devices / controls connected to the detector: As long as both switches (D1 & D2) are set to this switch position, the two relay contacts can be switched on and off alternately by pressing the reset button (RES). starting setting: Relay channel 1 and channel 2 not active => Keystroke (RES): only relay channel 1 active => Keystroke (RES): only relay channel 2 active => Keystroke (RES): both relays active => Keystroke (RES): => starting setting

Static holding time

Position		Function	
Static holding time 	1	min. sensitivity	0,3*
	2	sensitivity	0,17*
	3	sensitivity	0,1*
	4	sensitivity **factory setting**	**0,035***
	5	sensitivity	0,02*
	6	sensitivity	0,012*
	7	max. sensitivity	0,007*

Pulse mode

Position		Function	
Pulse mode 	9	min. sensitivity	0,3*
	10	sensitivity	0,17*
	11	sensitivity	0,1*
	12	sensitivity	0,035*
	13	sensitivity	0,02*
	14	sensitivity	0,012*
	15	max. sensitivity	0,007*

*(frequnency change in %)

3.4 DIP switches (DIP)

DIP-1 *Frequency*		**Frequency setting:** This setting avoids couplings caused by adjacent loops: OFF = Freq. HIGH ON = Freq. LOW **Two or more detectors should not operate at the same frequency**
DIP-2 *BOOST - Sensitivity boost*	ON	**Boost - Increased sensitivity:** the Boost function causes an automatic sensitivity increase limited to the max. sensitivity. For example: this way truck drawbars can be easly detected. After the vehicle leaves the loop, the sensitivity returns to the originally set value. This function is disabled in pulse mode.
DIP-3 *Switch on delay*	ON	**Switch-on delay activated:** the switching signal is given when the loop is damped for more than one second. **This function must not be selected when the detector is used with barriers or gates!**
DIP-4 *Switch off delay*	ON	**Switch-off delay activated:** the switching signal is switched off with a delay of 2 seconds after the loop is released (not when in pulse mode).
DIP-5 *Pulse on exit*	ON	**Pulse on exit/ when leaving the loop:** The detector does not switch the channel relay until the loop has been exited. The setting is only active if the channel setting has also been set to pulse mode. (Rotary coding switches D1, D2). **„Pulse on exit“ can only be used with the dual-channel operation.**
DIP-6 *Detection by fault*	ON	**Relay output activated in case of fault:** a loop fault is indicated by the corresponding LEDs. In addition, the corresponding channel relay is switched. **The function „detection by fault/ busy signal in the event of disturbance“ must be selected when the detector is used for the protection of gates or gate systems!**
DIP-7 *Relay mode*		**Relay mode:** OFF = open-circuit-principle / working current ON = closed-circuit-principle / quiescent current *see page 4 „Switching states“*
DIP-8 *Directional logic*	ON	**Directional logic active:** the first loop is attenuated, the detector registers this event, but no relay is switched yet. Only when also the second loop is attenuated at the same time, the relay of the last attenuated channel switches on and remains switched on until the second loop is free again. This function applies to both directions. **A switch-on delay is not permitted when using the directional logic!**

Attention

- **Mount und dismount the device only when no voltage is present!**
- **Installation, connection, commissioning and maintenance may only be carried out by qualified personnel, observing the assembly instructions, the practical rules of conduct and in compliance with the applicable standards. Incorrect assembly can lead to serious injuries and property damage!**
- **Do not use the connector as a mechanical attachment!**
- **Observe the general rules fro loops installation.**

- Before switching on the supply voltage, the device must be plugged into the socket. To use the device in an environment with higher protection class requirements you need to use a suitable housing.
- The frequency setting can be selected freely in case of operation with a loop.

If two or more induction loop detectors are used, different frequencies must be selected in order to avoid mutual interference.

- **Adjustment:** When the operating voltage is applied, in case of power interruption or when pushing the reset key (RES), the loop detector adjusts itself automatically to the connected loops and switches the relays to the „loop not damped“ position. During the adjustment the power LED (PWR) flashes at a frequency of 5 Hz and lights up when the adjustment is completed. This operation is usuell completed within <2 seconds. Longer adjustment periods are caused by frequency instabilities, whose causes must be identified and eliminated..

During the adjustment phase no vehicles shall be on the loops, otherwise these will be no longer recognized!

- If a different frequency is set during operation, the detector must be re-adjusted by pressing the RESET button **(RES).**
- The sensitivity is adjusted by means of the rotary coding switches **(D1, D2).**

Error	Possible cause	Remedy
Detector does not match, yellow LED **(PWR)** does not light	no power supply for the detector	Check connection of the power supply
Red LED lights up, Green LED flashes cyclically twice	Detector finds „break in the loop“	Check loop and loop connection
Red LED lights up, Green LED flashes cyclically once	Detector finds „Loop short-circuited“	Check loop and loop connection
Green LED is continuously on	„Relay Test Mode“ is activated, Rotary coding switches **D1 and D2 = 8,** relay switched	Deactivate relay „test mode“ (see „Setting for sensitivity and hold time „)
Yellow LED **(PWR)** flashes with approx. 5 HzAfter adjustment / reset	Vehicle movement on the loop	Release the loop during the adjustment
Detector does not switch despite adjustment	Rotary coding switches: **D1 and D2 = 0** → „Channels switched off“ or **D1 and D2 = 8** → „Test mode“	Activate the channel (see „settings for sensitivity and hold time „)
	Sensitivity too low	Increase sensitivity step by step until vehicles are detected

Konformitätserklärung:

Die Firma TOUSEK Ges.m.b.H., Zetschegasse 1, 1230 Wien, erklärt, dass das Produkt ISD 6 mit Verwendungszweck "Fahrzeugdetektion" gemäß Artikel 3 der R&TTE-Richtlinie 1999/5/EG entspricht, und dass die folgenden Normen angewandt wurden:

1. Sicherheit / Gesundheit (Artikel 3.1.a der R&TTE-Richtlinie)

angewandte Normen:	IEC 60950-1	2005 (2nd Edition)+A1:2009
	EN 60950-1	2006+A11:2009+A1:2010+AC:2011+A12:2011

2. Elektromagnetische Verträglichkeit (Artikel 3.1.b der R&TTE-Richtlinie)

angewandte Normen:	ETSI EN 301 489-1	V1.9.2
	ETSI EN 301 489-3	V1.4.1

3. Effiziente Nutzung des Funkfrequenzspektrums (Artikel 3.2 der R&TTE-Richtlinie)

angewandte Normen:	ETSI EN 300 330-1	V1.7.1
	ETSI EN 300 330-2	V1.5.1

September 2015

www.tousek.com

tousek PRODUCTS

- sliding gate operators
- cantilever systems
- swing gate operators
- garage door operators
- folding door operators
- traffic barriers
- carpark management system
- window operators
- domelight operators
- sliding door operators
- electronic controls
- radio remote controls
- key operated switches
- access control
- safety devices
- accessories

Tousek Ges.m.b.H. Austria
A-1230 Vienna
Zetschegasse 1
Tel. +43/ 1/ 667 36 01
Fax +43/ 1/ 667 89 23
info@tousek.at

Tousek GmbH Germany
D-83395 Freilassing
Traunsteiner Straße 12
Tel. +49/ 8654/ 77 66-0
Fax +49/ 8654/ 57 196
info@tousek.de

Tousek GmbH Switzerland
CH-6275 Ballwil
Bahnhofstraße 14
Tel. +41/ 0/ 41 448 2965
Fax +41/ 0/ 41 448 2966
info@tousek.ch

Tousek Benelux NV
BE-3930 Hamont - Achel
Buitenheide 2A/ 1
Tel. +32/ 11/ 91 61 60
Fax +32/ 11/ 96 87 05
info@tousek.nl

Tousek Sp. z o.o. Poland
PL 43-190 Mikołów (k/Katowic)
Gliwicka 67
Tel. +48/ 32/ 738 53 65
Fax +48/ 32/ 738 53 66
info@tousek.pl

Tousek s.r.o. Czech Republic
CZ-130 00 Praha 3
Jagellonská 9
Tel. +420/ 2/ 2209 0980
Fax +420/ 2/ 2209 0989
info@tousek.cz

tousek®
GATE AUTOMATION

your service partner:

tousek
E_ISD-6_00
15. 12. 2015

STAATLICH AUSGEZEICHNETES UNTERNEHMEN