CORRSYS DATRON
Sensorsysteme GmbH

CORREVIT® S-350

non-contact
2-axis Optical Sensor

for
slip free measurement of longitudinal and transversal
dynamics

USER MANUAL
VOLUME I

Sensor Hardware

Note: **For a general description of the CeCalWin Pro Software refer to the separate user manual Volume II.**

For the specific software description for the S-350 Sensor refer to the separate user manual Volume III.

VOLUME I - Sensor Hardware

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Contact

International Headquarters:
CORRSYS-DATRON Sensorsysteme GmbH
Charlotte-Bamberg-Str. 12
35578 Wetzlar / Germany
Phone   ++49 (6441) 9282-0
Hotline ++49 (6441) 9282-82
Fax   ++49 (6441) 9282-17
E-mail   sales@corrsys-datron.com
URL   www.corrsys-datron.com

North American Headquarters:
CORRSYS-DATRON Sensorsystems, Inc.
21654 Melrose Avenue, Building 16
Southfield, MI 48075 / USA
Phone   ++1 (248) 204-0850
Toll-free++1 (800) 832-0732
Fax   ++1 (248) 204-0864
E-mail   USA-sales@corrsys-datron.com
URL   www.corrsys-datron.com

China Headquarters:
CORRSYS-DATRON Sensorsysteme GmbH, China Office
Room 708, JinTianDi International Mansion,
No. 998 RenMin Road, Shanghai (200021), P.R.China
Tel.: ++86-21-63114144
Fax: ++86-21-63114154
E-mail: Xiaoying.Li@corrsys-datron.com.cn
URL: www.corrsys-datron.com.cn

Safety Instructions

Please read carefully before operating the equipment.

CORRSYS-DATRON is not responsible for damage that may occur when this system is used in any way other than that for which it is intended.

To assure safe and proper operation, all supplied equipment, components and/or accessories must be carefully transported and stored, as well as professionally installed and operated. Careful maintenance and usage in full accordance with operating instructions is imperative.

CORRSYS-DATRON equipment should be installed and operated only by qualified persons who are familiar with devices of this type.

Local regulations may not permit the operation of motor vehicles on public highways while the equipment is mounted on the exterior of the vehicle.

- Use the equipment only for intended applications. Improper application is not advised.

- Do not modify or change the equipment or its accessories in any way.

- Improper use or mounting of the equipment may affect the safety of the vehicle and/or occupants.

- The equipment must not be mounted and/or operated in any way that may compromise vehicle or and/or occupant safety.

- Equipment must be mounted firmly and securely.

- Use only original equipment, components and/or accessories included in the scope of delivery.

- Do not mount equipment, components and/or accessories near heat sources (e.g. exhaust).

- Do not use defective or damaged equipment, components and/or accessories .

- Always note correct pin assignments and operating voltages when connecting equipment to power supplies, data acquisition/evaluation systems, and/or any other applicable system or component. Equipment may be damaged if not properly connected and/or operated.

- For additional information, please call the CORRSYS-DATRON Hotline: ++49 (6441) 9282-82 or email: hotline@corrsys-datron.com.

Danger
- Use caution when exchanging sensor lamps – lamps are extremely hot, and may cause injury.
- Do not look into sensor lamps – lamps are extremely bright, and may cause eye injury.
- Sensor head can become very hot and may cause injury if power has been applied to the sensor for extended periods of time. This is especially true if the sensor is used in hot environmental conditions.
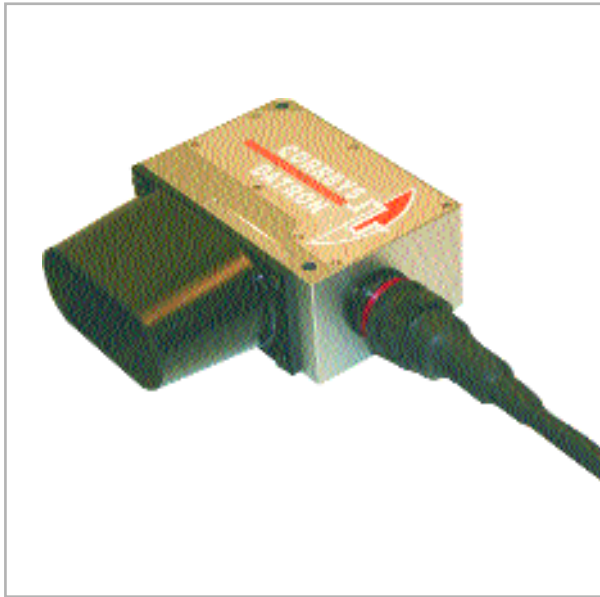
Warning
- The sensor and/or sensor components may be damaged if power is applied for extended periods, especially in hot environmental conditions.
- To avoid damage to the sensor lens, please do only clean it with a micro-fiber cloth.

- Disconnect power from the sensor if the vehicle is stationary for extended periods.

1. Overview

CORREVIT® S-350

Non-Contact 2-Axis Optical Sensor

for

slip-free measurement of longitudinal and transversal dynamics

Art. No.
S-350 longitudinal   15377
S-350 transversal   15378

The new CORREVIT® S-350 Optical Sensor represents yet another step forward in the advancement of optical measurement technology. It produces unparalleled accuracy, even under the most challenging conditions.

Compact and lightweight, the S-350 Sensor can be mounted in seconds, and features the latest advanced spectral/optical filters, state-of-the-art digital signal processing and surface-adaptive illumination.
Speed and distance information is updated at 250 Hz to track every highly dynamic maneuver.

The extended working range of the CORREVIT® S-350 Sensor makes it ideal for measurement of transversal dynamics with trucks, busses and off-road vehicles.

Features

- CORREVIT® S-350 with working range of 350 ±100 mm

- Applicable from 0.5 kph ... 250 kph*

- Due to its considerably extended working range, the S-350 Sensor is ideally suited for application with trucks, busses and off-road vehicles.

- Sensor Electronics provide option for connection of a Gyro to attain yaw rate for measurement of sideslip angle relative to the vehicle´s center of gravity

- Adjustable filter time (unfiltered, 8 ... 512 ms)
  FIR Filter with constant filter time (adjustable)

  Considerably improved performance is enabled by the application of the latest technologies:
  ⇨ Latest halogen lamp with aluminum reflector
  ⇨ Smallest dimensions
  ⇨ Improved distance linearity,
  ⇨ Easier mounting
  ⇨ Improved signal processing by ideal combination of the analog and digital signal conditioning (DSP-FPGA technology).
  ⇨ Reduced noise of the output signal
  ⇨ Improved measurement features on various surfaces
  ⇨ Improved standstill
  ⇨ Quick filter start-up

- Extremely high measuring accuracy** better than ±0.1% as a result of precise optics and digital signal processing.

- Programmable standard analog and digital signal outputs

- All measured values available

- Direct connection to PC and virtually all data acquisition systems

  Signal outputs: Analog
                        Digital
                        CAN Bus V 2.0B
                        USB or RS232

- Negligible service and maintenance requirements as a result of durable technology

- Tested and used under extreme environmental conditions

Application

The compact, low-weight CORRSYS-DATRON S-350 Sensor is designed for application in dynamic vehicle tests, which require precise measurement of the following parameters:

- Distance
- Speed (longitudinal and transversal dynamics)
- Angle

*   optional: calibrated up to 400 kph
**   with calibration on the test surface

2. Extent of Delivery

Standard Extent of delivery for Art.no. 15377 - S-350 longitudinal

1.	(1)	15714	Sensor head S-350 longitudinal
2.	(1)	15248	Sensor Electronics L-350 Aqua/S-350
3.	(1)	14862	Sensor cable, 5m, MIL, small version, #K-003-1J2-12-5m
4.	(1)	10413	Power cable, 2m, MIL 6P banana plug, #K-003-16N-12-2m
5.	(1)	13946	CAN cable 2m 3P Binder 9pin Sub-D, #K-030-14N-10-2m
5.	(1)	13425	PC cable RS232 2m 4P Binder -> 9P Sub-D for HT500, RV4 and L-400 Brake, L-350, MSW processor II, RV3 processor II; #K045-14N-10-2m
7.	(1)	10527	1m, 5xBNC, S-400, HS-CE, SL, #K003-592-11-1m
8.	(1)	13947	Cable USB 2m ->4P Binder, #K-041-14N-20-2 m
9.	(1)	14893	Halogen lamp 20W/12V for L-350 Aqua / S-350
10.	(1)	15176	Plastic transport case, black, 545x405x120 mm
11.	(1)	15182	Foam insole for transport case L-350 Aqua / S-350
12.	(1)	15478	Foam insole for transport case L-350 Aqua / S-350
13.	(1)	15271	Spray guard L-350 Aqua / S-350
14.	(1)	15437	Tool to exchange the Sensor halogen lamp
15.	(1)	15436	Screw Driver Torx
16.	(1)	14283	Allen wrench 4mm
17.	(1)	14643	Mini folding rule
18.	(1)	11343	Software CeCalWin Pro
19.	(1)	11427	Calibration of a Sensor with DIN EN ISO 9001 manufacturer certificate type "M" to DIN 55350, part 18 for all 2-axis optical sensors

Standard Extent of Delivery for Art.no. 15378 - S-350 transversal

(see photo on page 8)

1. (1) 15713 Sensor head S-350 transversal
2. (1) 15248 Sensor Electronics L-350 Aqua/S-350
3. (1) 14862 Sensor cable, 5m, MIL, small version, #K-003-1J2-12-5m
4. (1) 10413 Power cable, 2m, MIL 6P banana plug, #K-003-16N-12-2m
5. (1) 13946 CAN cable 2m 3P Binder 9pin Sub-D, #K-030-14N-10-2m
5. (1) 13425 PC cable RS232 2m 4P Binder -> 9P Sub-D for HT500, RV4 and L-400 Brake,
   L-350, MSW processor II, RV3 processor II; #K045-14N-10-2m
7. (1) 10527 1m, 5xBNC, S-400, HS-CE, SL, #K003-592-11-1m
8. (1) 13947 Cable USB 2m ->4P Binder, #K-041-14N-20-2 m
9. (1) 14893 Halogen lamp 20W/12V for L-350 Aqua / S-350
10. (1) 15176 Plastic transport case, black, 545x405x120 mm
11. (1) 15182 Foam insole for transport case L-350 Aqua / S-350
12. (1) 15478 Foam insole for transport case L-350 Aqua / S-350
13. (1) 15271 Spray guard L-350 Aqua / S-350
14. (1) 15437 Tool to exchange the Sensor halogen lamp
15. (1) 15436 Screw Driver Torx
16. (1) 14283 Allen wrench 4mm
17. (1) 14643 Mini folding rule
18. (1) 11343 Software CeCalWin Pro
19. (1) 11427 Calibration of a Sensor with DIN EN ISO 9001 manufacturer certificate type "M" to
   DIN 55350, part 18 for all 2-axis optical sensors

About replacement halogen lamps
It is recommended that only halogen lamps supplied by CORRSYS-DATRON be used as these have been subjected to a special treatment. Optimal sensor function can only be assured when using original-equipment lamps.

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3. Typical Technical Data

3.1 Specifications

Performance specifications

Speed range:	0.5 ... 250 kph *
Distance resolution:	2.47 mm
Distance measurement deviation:	<±0.2% **
Angle range:	±40°
Angle resolution:	<±0.1°
Working distance and range:	350 ±100 mm

Signal outputs

Digital output 1 - IVI or V_L ***:	1 ... 1000 pulses/m
Digital output 2 - V_q or angle *** :	f_{center} = 5 kHz
Analog output 1 - IVI or V_L ***:	0 ... 10 V
Analog output 2 - V_q:	-10 ... +10 V
Analog output 3 - angle:	-10 ... +10 V

Signal inputs

Trigger input:	for calibration with LB / Brake switch
Analog input 1+2:	-10 ... + 10 V
Counter input:	0 ... 100 KHz

Interfaces:	CAN 2.0B (Motorola or Intel)
	USB 2.0 Full Speed
	RS232

System specifications

Power supply:		12 ... 14 V; 40 W (12 V DC)
Temperature range:	Operation:	- 25 ... 50° C
	Storage:	- 40 ... 85° C
	Rel. humidity:	5 ... 80% non condensing
Protection standard sensor head (with mounted cable):		IP 67
Protection standard electronics:		IP 50
Dimensions of the sensor head (l x w x h):		105 x 70 x 45 mm
Weight of the sensor head:		500 g
Dimensions of the electronics (l x w x h):		180 x 125 x 95 mm
Weight of the electronics:		1100 g
Shock:		50 g half-sine, 6 ms
Vibration:		10 g, 10 ... 150 Hz
Illumination:		Halogen

*   optional: calibrated up to 400 kph
**   with calibration on test surface
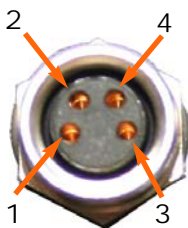*** switching-over between the respective measured variables via CeCalWin Pro possible

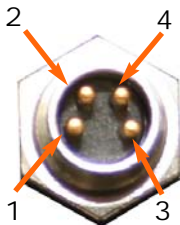## 3.2   Pin Assignments
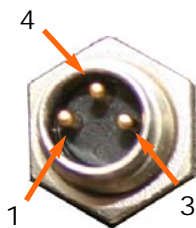
CAN 3 pin Binder 718 flange, male

Pin 1: CAN high
Pin 3: CAN low
Pin 4: CAN-GND

USB 4 pin Binder 718 flange, female

Pin 1: D+
Pin 2: D-
Pin 3: DGND
Pin 4: Switch

RS-232 4 pin Binder 718 flange, male

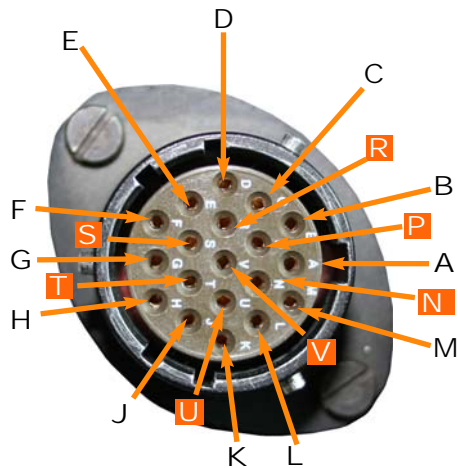Pin 1: TX
Pin 2: RX
Pin 3: RS232 GND
Pin 4: RS232 GND

> **ATTENTION!**
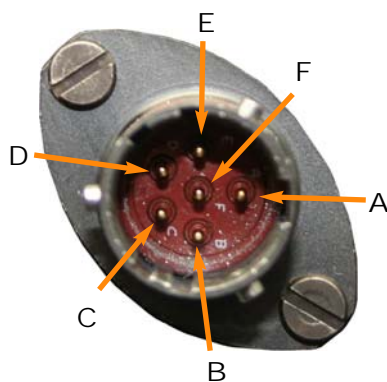> All views are of the front of the connector.

3.2 Pin Assignments (continued)

SENSOR   19-pin MIL, female

|	
Pin A: V_ILLU	Pin L: OPT_01
Pin B: V_ILLU	Pin M: V_ILLU
Pin C: A1	Pin N: OPT_05
Pin D: +8V	Pin P: A2
Pin E: B1	Pin R: AGND
Pin F: GND_ILLU	Pin S: B2
Pin G: GND_ILLU	Pin T: OPT_04
Pin H: GND_ILLU	Pin U: OPT_03
Pin J: OPT_02	Pin V: -8 V
Pin K: Internal use	

POWER   6 pin MIL, male

Pin A: +UB (12 ... 14 V)
Pin B: +UB (12 ... 14 V)
Pin C: +UB (12 ... 14 V)
Pin D: GND
Pin E: GND
Pin F: GND
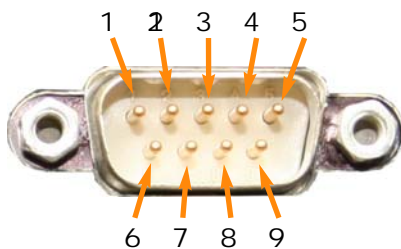
IN: 9 pin SUB-D, male

Pin 1: n.c.	Pin 6: used for CDS brake switch
Pin 2: n.c.	Pin 7: n.c.
Pin 3: counter IN (TTL Input)	Pin 8: light barrier input
Pin 4: +UB (12 ... 14 V), max. 300 mA	Pin 9: GND
Pin 5: GND	
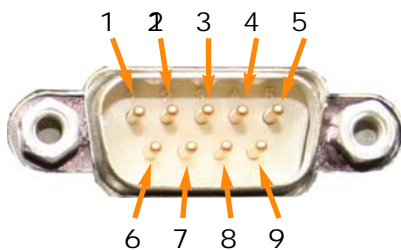
OUT: 9 pin SUB-D, male

Pin 1: analog 1	Pin 6: digital 3
Pin 2: analog 2	Pin 7: digital 1.
Pin 3: analog 3	Pin 8: digital 2
Pin 4: analog GND	Pin 9: digital GND
Pin 5: analog 4	

ANA IN1 / IN2:   6 pin Lemo, female

Pin 1: +5 V out
Pin 2: +12 V out
Pin 3: -ANA_IN
Pin 4: n.c.
Pin 5: +ANA_IN
Pin 6: AGND

3.3 Default Settings for Analog and Digital Outputs

3.3.1 Analog Output Default Settings

Analog 1	40	$\frac{mV}{kph}$	magnitude speed IVI
			or
	40	$\frac{mV}{kph}$	longitudinal speed V_L

| Analog 2 | 100 | $\frac{mV}{kph}$ | transversal speed V_q |

| Analog 3 | 100 | $\frac{mV}{°}$ | angle |

The above settings produce the following values:

    50 kph =   2.0 V
  100 kph =   4.0 V
  150 kph =   8.0 V
  250 kph = 10.0 V

All signals can be used as inputs to all common data acquisition systems. Should any problems arise, please contact CORRSYS-DATRON.

Use CeCalWin Pro Software to change the settings.

3.3.2 Digital Output Default Settings

Digital 1	340	$\frac{pulses}{m}$	magnitude distance (output as pulses)
			or
	340	$\frac{°}{m}$	longitudinal distance (output as pulses)

Digital 2	5 KHz+100	$\frac{Hz}{kph}$	transversal speed
			or
	5 KHz+50	$\frac{Hz}{°}$	angle

Use CeCalWin Pro Software to change the settings.

3.4   Internal Signal Filtering

Signals may be smoothed by using a signal filter that can be set in CeCalWin Pro Software. You can choose between a moving average filter and a symmetric FIR filter.
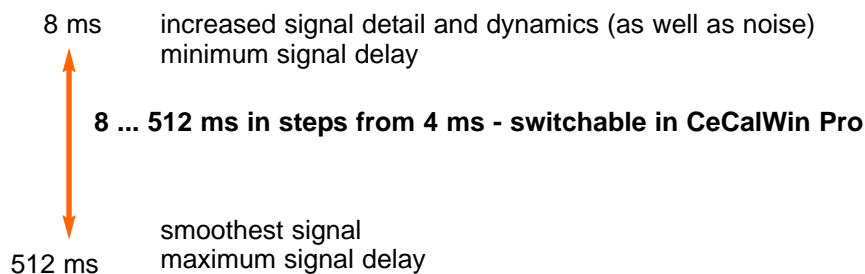When using the FIR filter, you will see the signal dynamic in the selected frequency range (0 Hz to selected frequency) without a reduction of the signal amplitude. The delay time is constant over the complete frequency range.
When using the moving average filter, the signal amplitude is reduced with increasing frequency.

The FIR filter is preferably used for dynamic tests. The moving average filter shall be used to achieve a smoother signal.

Please note that signal accuracy and dynamic decreases with increasing smoothing of the signal (higher filter times with the moving average filter, lower frequency limit with the FIR filter).

3.4.1 Moving Average Filter

8 ms   increased signal detail and dynamics (as well as noise)
                minimum signal delay

8 ... 512 ms in steps from 4 ms - switchable in CeCalWin Pro

                smoothest signal
512 ms   maximum signal delay

The moving average filter can be set within the range of 8 ms to 512 ms. Signal delay increase and signal accuracy and signal dynamic (as well as noise) decrease with ascending values.
Use CeCalWin Pro Software to change the settings. Please note that in CeCalWin Pro Software multiple of 4ms are set.
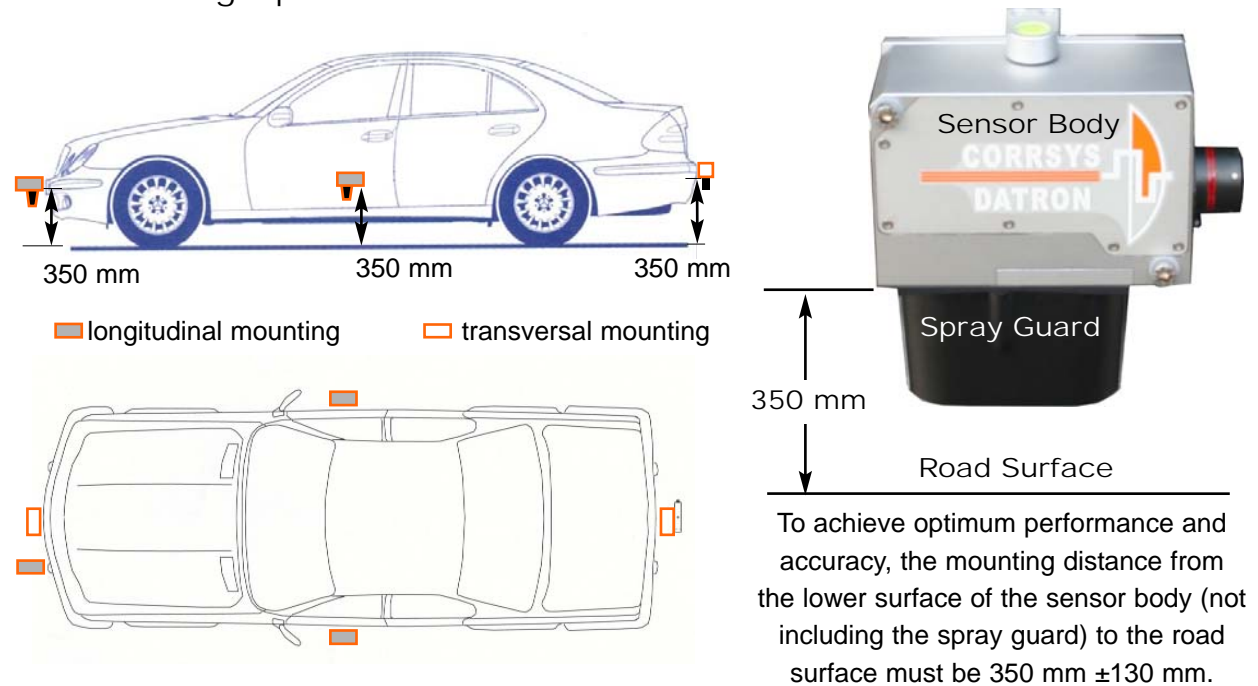
3.4.2 FIR-Filter*

With the FIR filter the limit frequency can be set in varying steps with CeCalWin Pro Software. A lower limit frequency means also a lower signal dynamic. The delay time of the filtered signal is stated in brackets. You can take over this value to your data acquisition, to show all signals (e.g. trigger signals) isochronous.

Use CeCalWin Pro Software to change the settings.

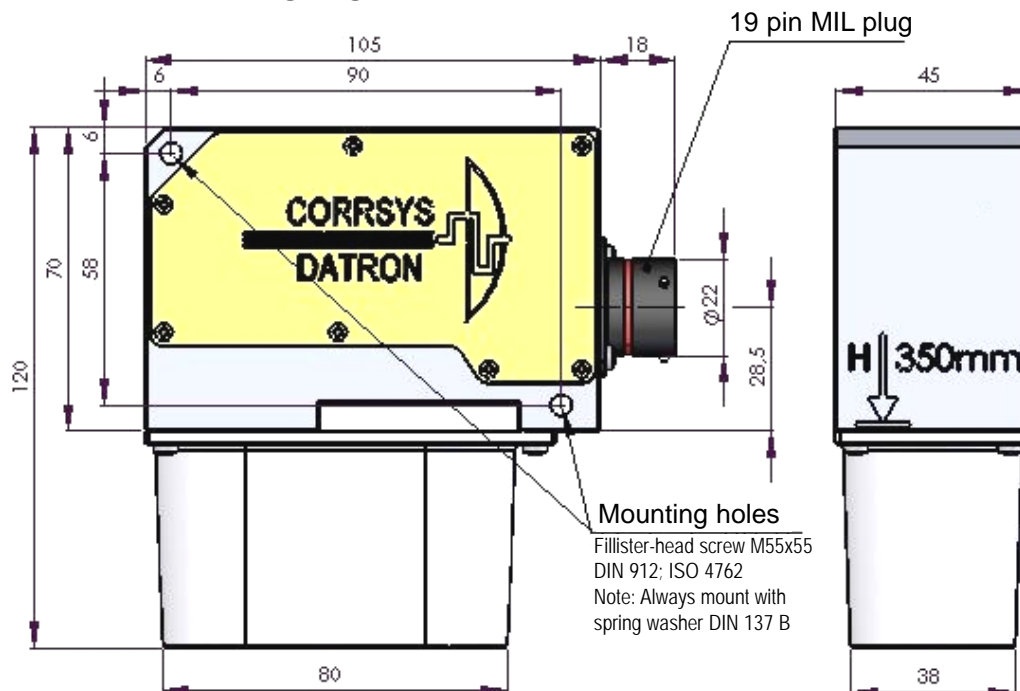* FIR = Finite Impulse Response

4. Set-Up and Connection

4.1 Mounting Options

350 mm   350 mm   350 mm

▣ longitudinal mounting   ▢ transversal mounting

Sensor Body

CORRSYS DATRON

Spray Guard

350 mm

Road Surface

To achieve optimum performance and accuracy, the mounting distance from the lower surface of the sensor body (not including the spray guard) to the road surface must be 350 mm ±130 mm.

> **i** **Notice:** In wet or snowy conditions, please mount the sensor at the front of the vehicle. This will help to prevent measurement anomalies that can be caused by spray and/or blowing snow.

4.2 Sensor Mounting Jig

19 pin MIL plug

105

6

90

18

45

6

70

58

120

Ø22

28.5

CORRSYS DATRON

H | 350mm

80

38

Mounting holes
Fillister-head screw M55x55
DIN 912; ISO 4762
Note: Always mount with
spring washer DIN 137 B

4.3 Mounting Instructions

4.3.1 Installation with Suction Holder for Front Mounting

CORRSYS-DATRON 3-Point Suction Holder S-350
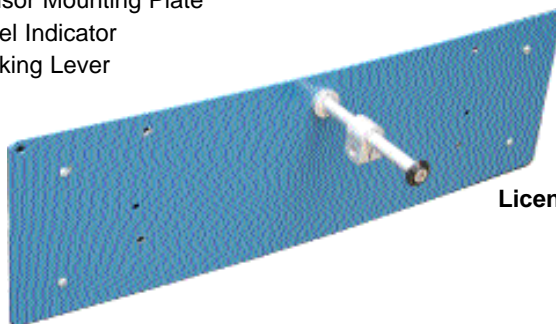Art.no. 15408

**Stabilizing Element of
the Suction Holder Unit**

A = Suction Pad
B = Pumping Piston
C = Stabilizer Rod 1
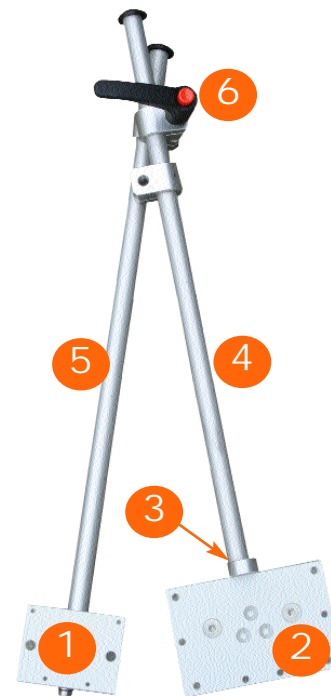**D** = Stabilizer Rod 2
E = Locking Levers
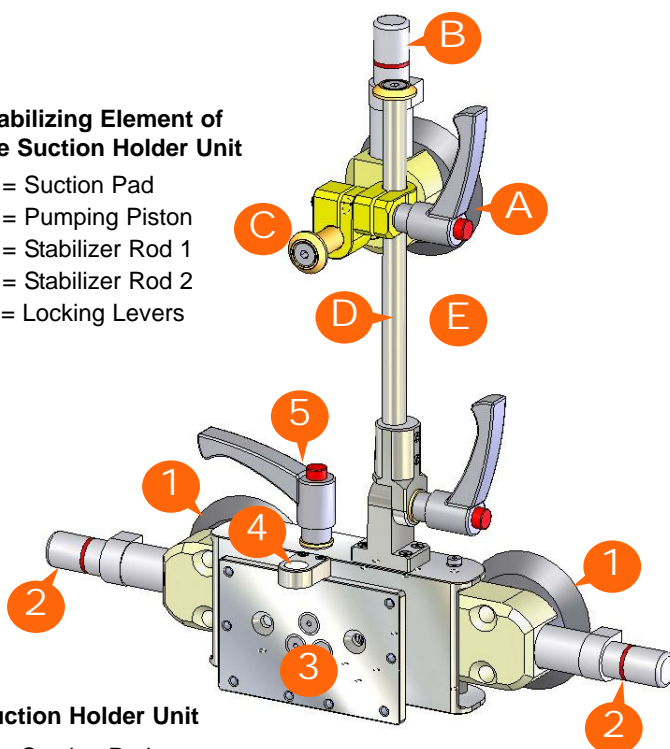
Suction Holder Unit

1 = Suction Pads
2 = Pumping Pistons
3 = Sensor Mounting Plate
4 = Level Indicator
5 = Locking Lever

Extension with Mounting Plates

1 = Mounting Plate 1
2 = Mounting Plate 2
3 = Level Indicator
4 = Rod 1
5 = Rod 2
6 = Locking Lever

License Plate Mounting Device

Photo of the complete installation with suction holder for front mounting, see Appendix B, page 27.

ATTENTION:

To assure proper function of the suction holders, the mounting area must be free of grease, oil, dust and other contaminants. For this reason it its necessary to clean the painted surface in the mounting area before attaching the suction holders. Do not use cleaning products that leave residue of any kind on the surface.

Always inspect the Suction Mounting Unit before use. Special attention should be paid to the condition of the rubber suction pads, which must be absolutely intact. Replace damaged pads immediately.

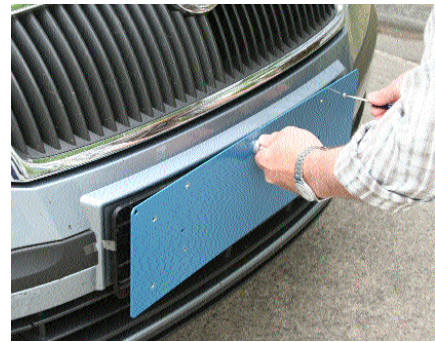1. Remove the license plate and attach the license plate mounting device.

Fig. 1

2. Remove the protection caps of the suction holder pads (Fig. 2b) and place the suctions holder unit onto the hood (Fig. 2a).

   ℹ️ Preferred mounting position is the middle of the hood, but you may also place it laterally shifted if the design of the hood does not allow a position in the middle.
   You can mount the suction holder device either horizontal or vertical.

Fig. 2b

Fig. 2a

3. When the suction holder unit is correctly positioned, press the suction holders - one after the other - firmly against the vehicle body to flatten the rubber pads against the body surface. Then, push the two pumping pistons repeatedly until the red warning ring is not visible any more (Fig. 3a).

   ⚠️ **ATTENTION:** Please monitor the pumping pistons during use to be sure that the suction pads adhere firmly!

   If the red warning ring is going to become visible (Fig. 3b) , the suction pad are going to loosen. In this case please interrupt use and push the pistons until the red ring is invisible again.

   A completely visible red warning ring (Fig. 3c) means that the vacuum is lost and the suction pads do not adhere any more. Interrupt use immediately and remount the suctin holder unit.

   It is strongly recommended to use a safety line to secure the suction holder unit during the applicationl
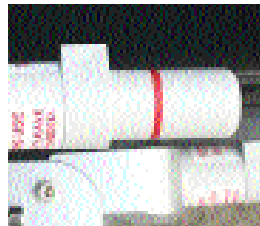

Fig. 3

Fig. 3a

Fig. 3b

Fig. 3c

4. Tighten the locking lever of the stabilization element of the suction holder unit.

Fig.4

5. Take the Extension with Mounting Plates and affix it to the License Plate Mounting Device as shown in Fig. 5.
Measure the sensor mounting height to be sure that the sensor will be within the specified vertical operating range of 350 ±130 mm; this distance is measured from the bottom of the sensor body (= the bottom of the mounting plate) to the road or track surface (Fig. 5a).

Fig. 5a   Fig. 5

6. Mount the upper mounting plate (Mounting Plate 1) of the extension to the mounting plate of the suction holder unit.

   NOTE: Take care that the nuts of the mounting screws (see Fig. 6a) are retained when you tighten the screws.
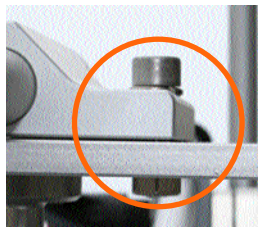

Fig.6a   Fig. 6

7. Adjust the lower mounting plate (Mounting Plate 2) on which the sensor is to be mounted perpendicular to the ground (observe the built-in level indicator, Fig. 7a) and lock the levers.

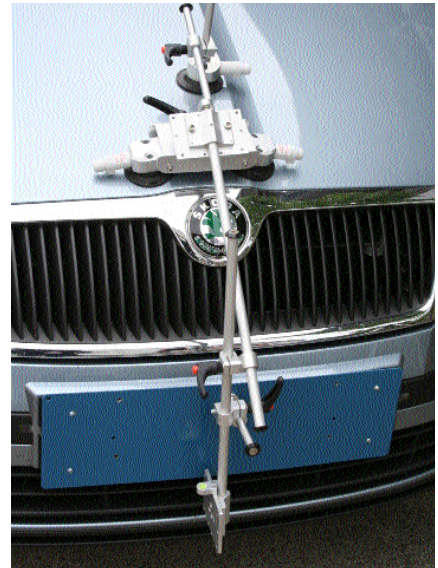   Fig. 7 shows the completely installed mounting unit Art. no. 15408.

Fig.7a

Fig. 7

8. Attach the S-350 Sensor and tighten the screws with an allen wrench (size 4 mm).
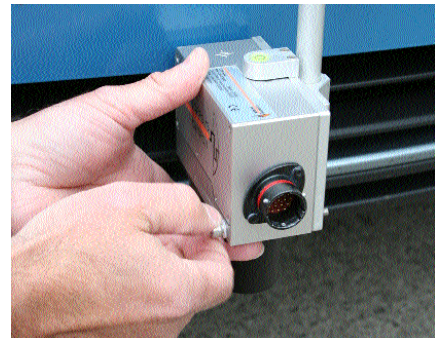

Fig.8a

Fig.8

9. Connect the signal cabel to the sensor (Fig. 9a) and route it into the interior of the car to the sensor electronics unit (Fig. 9).

Fig.9a

Fig. 9

10. Use cable ties to fix the signal cable at the mounting unit.

Fig. 10

11. Affix the safety line at the mounting unit (Fig. 11) and secure it as shown in Fig. 11b.
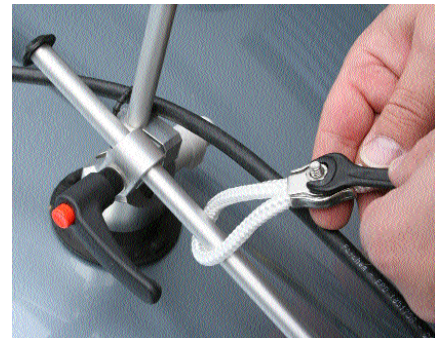

Fig.11a   Fig.11b   Fig.11

i   We recommend to protect the painted surface in this area with an easy-to-remove tape (Fig. 11a).

i   To avoid temperature drifts of the electronics during the measurement, we recommend to switch on the Sensor 15 minutes before you will start the measurement.

12. **Now, your S-350 Sensor is ready for use.**

Fig.12

4.3.2 Installation with Magnetic Plate Holder for Mounting at the Vehicle Side

CORRSYS-DATRON
6-Point Magnetic Plate Holder S-350
Art.no. 15213

Stabilizing Element of the Magnetic Plate Holder

A = Magnet
B = Magnet Release Device
C = Stabilizer Rod 1
D = Stabilizer Rod 2
E = Locking Lever

Magnetic Plate Holder

1 = Magnet
2 = Magnet Release Device
3 = Sensor Mounting Plate
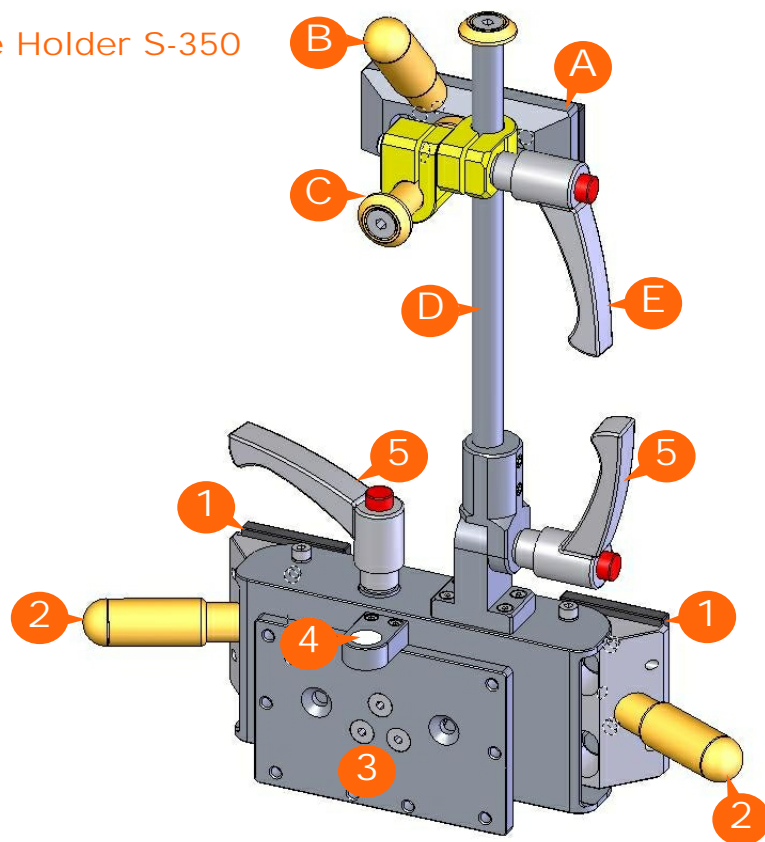**4** = Level Indicator
5 = Locking Levers

Photo of the complete installation with magnetic plate holder for mounting at the vehicle side, see Appendix C, page 28.

ℹ 1. You can install the magnetic plate holder S-350 either horizontal (Fig. 1) or vertical (Fig. 1a).

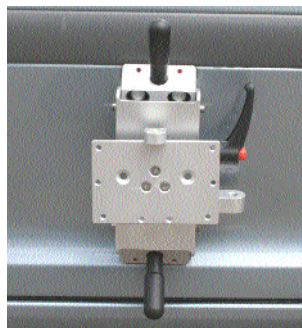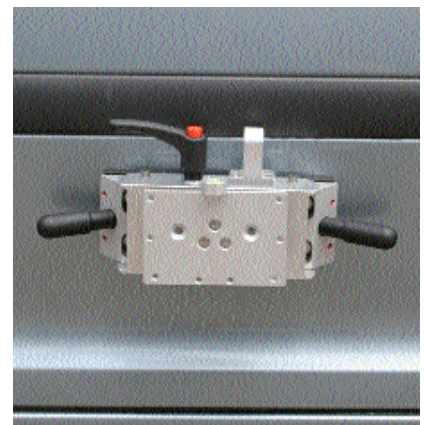

Fig. 1a   Fig. 1

2. Mount the stabilizing element to the magnetic plate holder as shown in Fig. 2a and 2b.
   The complete magnetic plate holder should look as shown in Fig. 2.
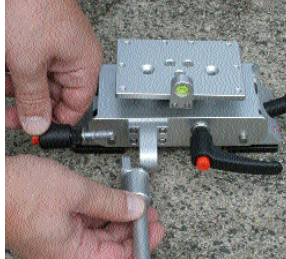

Fig. 2a   Fig. 2b

Fig. 2

3. Take the pre-assembled CORRSYS-DATRON magnetic plate holder S-350 and place it parallel to the vehicle body (e.g. at the rear passenger door), as shown in Fig. 3. The magnetic plates will automatically hold fast to the (metal) vehicle door/body panel.

Measure the sensor mounting height to be sure that sensor is within the specified vertical operating range (see page 9). This distance is measured from the bottom of the sensor body (i.e. the lower edge of the mounting plate) to the road or track surface. If the sensor is not within the operating range of 350 ±130 mm, loosen the black levers at the magnetic holder and reposition the mounting unit so that the height is correct.

Fig. 3a

Fig. 3

4. Adjust the sensor mounting plate so that it is perpendicular to the ground. The top of the sensor mounting plate is fitted with liquid level indicator for this purpose (Fig. 4a).
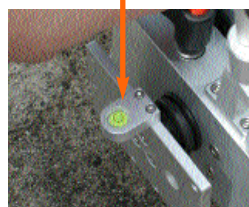
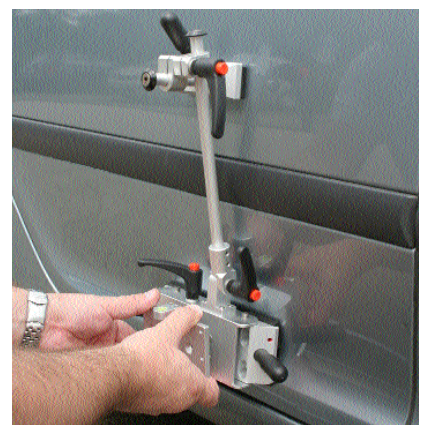liquid level indicator

Fig. 4a

Fig. 4

5. Insert the sensor mounting screws (included in the scope of delivery) through the mounting holes in the sensor, then into the holes of the mounting plate and tighten the screws with an allen wrench (size 4 mm).
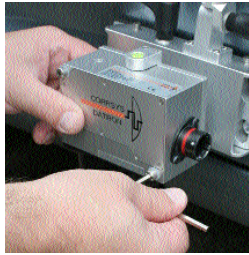

Fig. 5a   Fig. 5

6. Connect the signal cable to the sensor and route the cable into the interior of the vehicle to the sensor electronics device and connect it there too.

> **i** To avoid temperature drifts of the electronics during the measurement, we recommend to switch on the Sensor 15 minutes before you will start the measurement.

Now, Your CORREVIT® S-350 Sensor is ready for use.

Fig. 6

7. In most cases it will not be necessary to use a safety line as the magnets hold automatically fast to the (metal) vehicle body. If you think it is indicated to use a safety line, you may mount it as shown in Fig. 7.

⚠ Pay attention that the metal clamp of the safetyline cannot come into contact with the painted surface of the vehicle body!

Fig. 7a: Wind the safety line around stabilizer rod 2
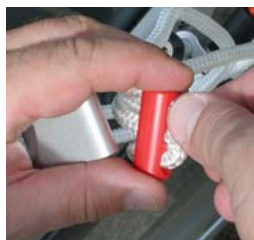
Fig. 7b: Mount the metal clamp

Fig. 7c: Adjust the lenght of the safety line

Fig. 7d: Secure the safety line (at the window in this case)
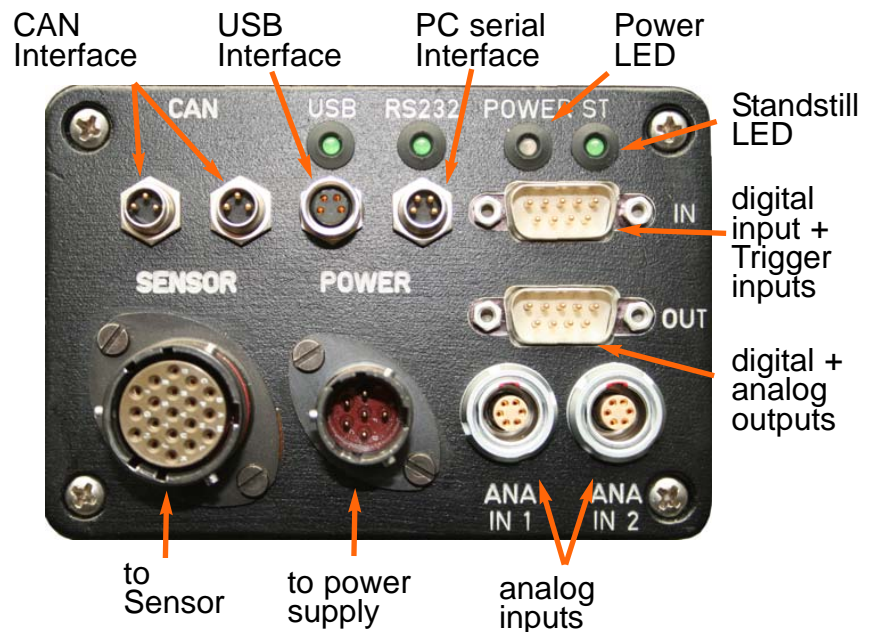
Fig. 7

4.5 Connecting the Sensor

Sensor Connections

Sensor Electronic Connections

CAN Interface   USB Interface   PC serial Interface   Power LED

Standstill LED

digital input + Trigger inputs

digital + analog outputs

to Sensor   to power supply   analog inputs

Reverse polarityprotection
The electronic unit is equipped with reverse polarity protection. In the event that polarity is inverted (10 V - 14,5 V DC), the unit will not be damaged but the power LED will illuminate red! Immediately disconnect power from the unit and correct the power supply connection.

1. Connect the sensor to the electronics unit:
   Connect signal output on the sensor to the signal input on the electronics with cable #K003-1J2-12-5 m.

2. Connect the electronics to data acquisition:

   Connect the data acquisition with 9-Pin D-SUB (Out) to 5 BNC cable #K003-292-11-1m and/or connect the CAN connector to data acquisition with cable #K030-14N-10-2m.

   Note: The CAN bus of the S-350 electronics is equipped with a 120 Ω termination resistor! Switch-on/Switch-off the Resistor with CeCalWin Pro.

3. Connect the power cable from the electronic to a CORRSYS-DATRON power distribution unit with cable #K003-16N-12-2m (6-pin to 2 banana plugs).

4. Be sure that the individual switches on each power output circuit on the power distribution unit are in the "OFF" position.

5. Start the vehicle engine and carefully connect the power distribution unit to the vehicle power supply.

6. Switch the power circuit on to send power to the sensor electronics unit. The S-350 Sensor is ready when the USB and RS232 LED stop to blink regularly.

7. The sensor is now ready for set-up and calibration using CeCalWin Pro Software. Connect the PC output (RS 232) on the electronics to a PC operating CeCalWin Pro (see **Volume II**: "**CeCalWin Pro Sensor Configuration and Data Acquisition Software**" for complete details). Use the RS-232 to 9-pin D-SUB serial communication cable (#K045-14N-10-2m) or the USB cable (#K-041-14N-20-2 m) to make the connection between electronic and PC.

5. Troubleshooting

When troubleshooting the CORREVIT® S-350 Sensor, begin by checking the following:

Cables and power supply
- Check all connections to determine that each is complete and that the system is connected to a power supply that provides voltage output within the specified range.
- Check to determine that the correct cables have been used for all connections.
- The following problems can be caused by incorrect or incomplete cable connections and/or connection to incorrect power supply voltage:
    - Output signals are not available to data acquisition and/or connected PC.
    - A sensor will not go out of standstill mode with vehicle motion.

Status LED's on sensor electronic boxes
- If all connections are correct and no faults are present, the "PWR" (power) LED on the sensor electronic will be illuminated orange. If the "PWR" LED is red, a fault is indicated. Additionally, the green "ST" (standstill) LED will be illuminated if all connections are correct and no faults are present.
- If the "PWR" LED is red and the green "ST" LED is not illuminated, polarity of the power supply has been reversed and must be corrected.
- The sensor cannot be read out with CeCalWinPro Software and the USB-LED is illuminated, although the RS232 interface is used:
  Solution: As long as the sensor electronics is not ready for reading out with CeCalWinPro Software, the RS232- and USB LED are illuminated constantly. During this time, the sensor must not be read out with CeCalWin Pro Software.

Halogen Lamps
Check to be sure that the lamp in the sensor is illuminated. Check and replace lamps as necessary. Also be sure that connections and supply voltage are correct.

Operating range
If the sensor is mounted out of the recommended height range (standoff distance), it may not go out of standstill mode with vehicle motion, and no measurement signals will be output. Check and correct mounting as necessary.

Sensor lens
The sensor lens (located on the underside of the sensor housing) may occasionally become dirty, preventing proper operation. Check and clean the sensor lens regularly.

- If one or more output signals appear to be incorrect, the sensor may have been set-up incorrectly via CeCalWin Pro Software. Check all relevant settings in CeCalWin Pro:
  - All analog voltage settings must be within range and should be conforme with the data acquisition system settings to which they are connected.
  - All digital pulse and resolution settings must be set within range and should be conforme with the data acquisition system settings to which they are connected.
  - Check all offset values and recalibrate sensor as necessary.

- If no output signals are available and all connections are correct, use the CeCalWin Pro Test Function to determine that all outputs are fully operational. See Section 6, Using the CeCalWin Pro Software Package for complete details.

EMC interference

If the sensor starts to send output signals without vehicle motion, triggering may have been caused by excessive EMC interference from the test vehicle. To correct this condition, reset the sensor by disconnecting from power and then re-connecting, or by switching power off and then back on at the power distribution box. If the condition persists, disconnect sensor from vehicle ground and isolate it at all mounting points

If none of the above recommendations provides a solution, you may wish to contact CORRSYS-DATRON. Before doing so, please be ready to supply the following:

- A .ccw file saved from CeCalWin Pro Software to serve as an example of the problem or fault condition.

- A list of all outputs that appear to be problematic, i.e. analog, digital, CAN, RS-232.

- The serial numbers of all relevant components.

Appendix A: Technical Drawing
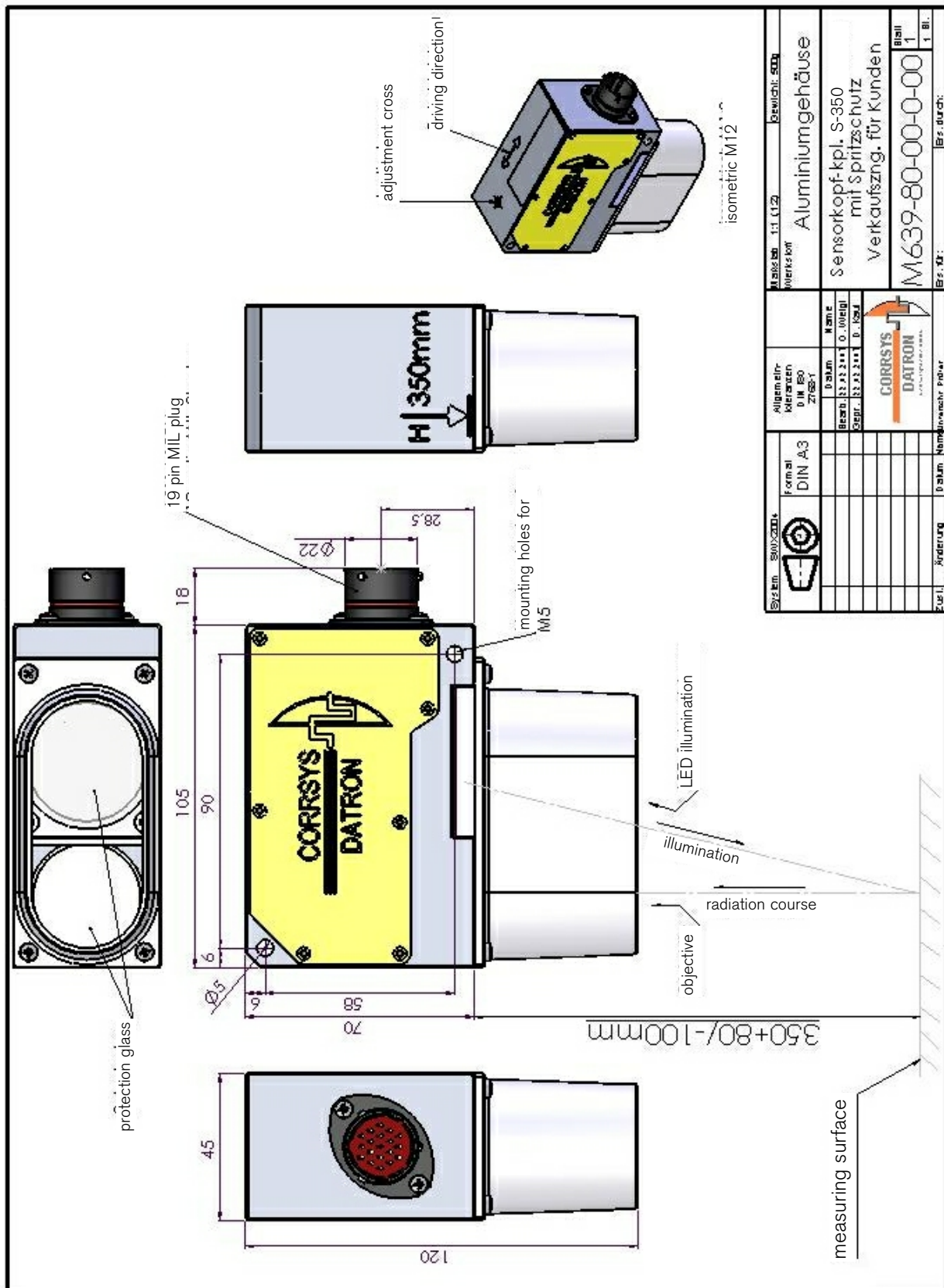
Appendix B: Mounting Photo S-350 Installation with Suction Holder for Front Mounting

Appendix C: Mounting Photo S-350 Installation with Magnetic Plate Holder for Mounting at the Vehicle Side

NOTE: In contrary to the suction holder mounting unit, the use of a safety line is not strict-
ly recommended for the magnetic plate holder.
If you think it is indicated to use a safety line, please pay attention that the metal clamp of the
safetyline cannot come into contact with the painted surface of the vehicle body!