X62T

Universal Tank Thermometer with HART capability

Excalon Delft
electronic product design

Installation Guide
IG-X62T-07
PN 500013
Date: June 21, 2016

Associated documents
Operating Instructions
OI-X62T
PN 500014

de Sicherheitshinweise für elektrische Betriebsmittel für explosionsgefährdete Bereiche.
Wenn Sie dieses Handbuch nicht lesen können, können Sie ein in Ihrer Sprache kostenlos bestellen.

en Safety instructions for electrical apparatus certified for use in explosion-hazardous areas.

fr Conseils de sécurité pour matériels électriques destinés aux zones explosibles.
Si vous ne pouvez pas lire ce manuel, vous pouvez commander un en votre langue gratuitement.

es Instrucciones de seguridad de aparatos eléctricos homologados para su utilización en áreas expuestas a riesgos de deflagración.
Si no entiende este manual, puede pedir un ejemplar en su idioma.

it Istruzioni di sicurezza per apparecchiature elettriche certificate per l'utilizzo in aree con pericolo di esplosione.
Se il presente manuale non risulta comprensibile potete orninarcene una copia tradotta nella vostra lingua.

nl Veiligheidsinstructies voor elektrisch materieel in explosiegevaarlijke omgeving.

fi Turvallisuusohjeita sähkölaitteille, jotka on vahvistettu käytettäväksi räjähdysvaarallisilla alueilla.
Jos et ymmärrä tätä käsikirjaa, voit tilata meiltä käännöksen omalla kansallisella kielelläsi.

sv Säkerhetsföreskrifter för elektrisk utrustning certifierad för användning i explosionsfarliga områden.
Om du inte förstår denna manual, kan en översatt kopia på ditt eget språk beställas från oss.

da Sikkerhedsforskrifter for elektriske apparater certificeret til brug i eksplosionsfarlige områder.
Hvis du ikke forstår denne manual, kan en oversat kopi af den på dit eget sprog bestilles fra os.

pt Instruções de segurança para dispositivos eléctricos certificados para utilização em áreas de risco de incêndio.
Se não compreender este manual, pode encomendar-nos directamente uma cópia na sua língua.

X62T

Universal Tank Thermometer with HART capability

es **Declaración de conformidad**
Por la presente declaración y la inclusión dela marca CE, el fabricante Exalon Delft, Delft, Nederland, garantiza que elproducto cumple lo estipulado por la Directiva CEM 2014/30/CEE y la Directiva 2014/34/CE.
La prueba de conformidad se presenta
según las normas expuestas.

it **Dichiarazione di conformità**
Con questa dichiarazione e con l'applicazione del marchio CE, il costruttore Exalon Delft, Delft, Nederland, assicura che il prodotto è conforme ai regolamenti della direttiva CEM 2014/30/CEE e della direttiva 2014/34/CE.
Prova della conformità è fornita dall' osservanza degli standard elencati.

fi **Varmennustodistus**
Tällä varmennustodistuksella sekä CE-merkillä, valmistaja Exalon Delft, Delft, Nederland, vakuuttaa, että tuote on direktiivien EMC 2014/30/ETY ja 2014/34/EU mukainen.
Näyttö vastaavuudesta on annettu asiakirjoissa, jotka on listattu varmennustodistukseen.

sv **Försäkran om överensstämmelse**
Exalon Delft, Delft, Nederland försäkrar med denna försäkran om överensstämmelse och med CE-märkningen att produkten uppfyller bestämmelserna i EMC-direktivet 2014/30/EEG och direktiv 2014/34/EG.
Överensstämmelsen påvisas genom givna standarder.

da **Overensstemmelseserklæring**
Med denne overensstemmelseserklæring og tilføjelsen af CE-mærket, sikrer producenten Exalon Delft, Delft, Nederland, at produktet er i overensstemmelse med bestemmelserne i det EMC-regulativ 2014/30/EEC og Directiv 2014/34/EC.
Dokumentation for overensstemmelsen gives i de anførte standarder.

pt **Declaração de Conformidade**
Com esta Declaração de Conformidade e o anexo do CE-Mark, o fabricante Exalon Delft, Delft, Nederland, garante que o produto obedece aos regulamentos da Directiva EMC 2014/30/EEC e Directiva 2014/34/EC.
A prova da conformidade é apresentada segundo os padrões indicadas.

Exalon Delft
electronic product design

EG Verklaring van overeenstemming

EC declaration of conformity
Déclaration CE de conformité
EG-Konformitätserklärung

Exalon Delft, Rotterdamseweg 183C, 2629 HD, Delft
verklaart als enig verantwoordelijke, dat het product
declares in sole responsibility, that the product
déclaré sous sa seule responsabilité que le produit
erklärt in alleiniger Verantwortung, dass das Produkt

X62T *(Universal Tank Thermometer with HART capability)*

Met serienummer: **X62T-2015-xxxx**
With serial number
Avec numéro de série
Mit Seriennummer

overeenstemt met de voorschriften van de volgende Europese richtlijnen:
conforms with the following European Directives:
est conforme aux prescription et directives Européennes suivantes:
mit dem Vorschriften folgender Europäischer Richtlinien übereinstimmt:

EMC Richtlijn 2014/30/EG
ATEX Richtlijn 2014/34/EG

Toegepaste normen of normatieve documenten:
Applied standards or normative documents:
Normes ou documents normatifs appliques
Angewandte Normen oder normative Dokumente:

EN60079-0	(2004)*	EN61000-6-2	(2001)
EN50020	(2002)*	EN61000-3-2	(2000)
EN60079-26	(2004)*	EN61000-3-3	(2001)
EN55011	(2002)		

* Een vergelijking tegen de geharmoniseerde normen in de publicatie PB 2016/C 126/13 toont geen significante wijzigingen die relevant zijn voor de "State of the Art". A review against harmonized standards in publication OJ 2016/C 126/13 shows no significant changes relevant to the "State of the Art". Un examen des normes harmonisées dans la publication JO 2016/C 126/13 ne montre aucune modification importante de l '«Etat de l'Art". Eine Überprüfung gegen die harmonisierten Normen im Veröffentlichung ABl. 2016/C 126/13 zeigt keine wesentlichen Veränderungen, die für die "State of the Art "

ATEX markering: **II 2(1) G Ex ia IIB T4**
ATEX marking:
Marquage ATEX:
ATEX Kennzeichnung:

EG Typecertificaat Nr. / Nr. aangewezen instelling **KEMA 06ATEX0294 X / 0344**
EC-Type Examination Certificate No. / Notified body No.: DEKRA Certification B.V.
Numéro de l'attestation d'examen CE de type / Numéro de organisme notifié: Meander 1051, 6825 MJ
EG- Baumusterprüfbescheinigung Nr. / Benannte StelleNr.: Arnhem, Nederland

Eerste aanbrenging van de CE markering: **2016**
CE-mark first affixed:
Année de misé en conformité CE:
Erstmalige Anbringung des CE-Zeichens:

Kwaliteitsmanager
Quality assurance manager
Delft, 21. jun. 2016

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X62T

Safety Instructions
for electrical apparatus
for use in potentially explosive atmospheres

Designation according to Directive 2014/34/EC: CE 0344 Ex II 2(1) G

- Notified body performing the QA surveillance (when __: internal production control)
- Equipment Group II
- Equipment Category 2(1)
- For explosive mixtures of gases, mists, or vapors in air

Hazardous zones at the mounting points corresponding to the explosion protection category of the devices or sensors:

Zones at the mounting points	Category acc. to Directive 2014/34/EC
Installed in Zone 1	2 G
Feeding circuits extending into Zone 0	(1) G

Ex marking: Ex ia IIB T4

- Electrical apparatus with explosion protection Ex ia when connected to ATEX certified associated apparatus with protection [Ex ia] or Ex [ia]
- Type of protection
- Apparatus group
- Temperature class

EC-Type Examination Certificate Number: KEMA 06ATEX 0294X

Environmental conditions:

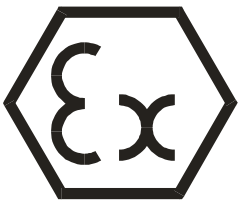
Temperature	-40 °C < Ta < +70 °C
Ingress Protection	IP65 (with proper installation)
Pressure	Atmospheric
Humidity	0 – 100%RH

Ex i parameters:

Power supply / Output circuit / HART (CN1)		Sensors / Input circuit (CN3) (circuits combined)	
Ui	30V	Uo	5.9V
Ii	270mA	Io	62mA
Pi	1.2W	Po	92mW
Ci	5nF	Co	900uF
Li	-	Lo	30mA

Power supply / Output circuit are infallibly galvanically isolated from Sensors / Input circuit.

Special conditions for use:
Use of Programming Connector CN9 is limited (see Page 6).



General

Document conventions

Warnings, **Cautions** and **Notes** are used throughout this installation guide to bring special matters to the immediate attention of the reader.

- A Warning concerns danger to the safety of the technician or user.
- A Caution draws the attention to an action which may damage the equipment.
- A Note points out a statement deserving more emphasis than the general text.

Preface

This installation guide is intended for technicians involved in the mechanical and electrical installation of the Exalon Delft X62T Interface. The technician must have basic technical skills and knowledge of safety regulations and explosion proof equipment in hazardous areas and must work in accordance with the (local) requirements for electrical equipment in hazardous areas.

Warning
In hazardous areas it is mandatory to use personal protection and safety gear such as:
hard hat, fire-resistive overall, safety shoes, safety glasses and working gloves.
Avoid possible generation of static electricity.
Use non-sparking tools and explosion-proof testers.
Make sure no dangerous quantities of combustible gas mixtures are present in the working area.
Never start working before the work permit has been signed by all parties.
Pay attention to the kind of product in the tank. If any danger for health, wear a gas mask and take all necessary precautions.

The X62T is installed external to storage tanks and converts temperature and capacitance parameters from sensors provided by third parties which are installed inside the storage tank. Please refer to the sensor manufacturers installation guide for details on installing the sensor inside the tank.

Warning
Do not use the instrument for anything else than its intended purpose.

Warning
Improper installation of cable glands, conduits or stopping plugs will invalidate the Ex approval of the X62T Interface.

Caution
The X62T Interface has intrinsically safe output/input circuits.
Modifications to the instrument may only be carried out by trained personnel with written authorization from Exalon Delft.
Unauthorized modifications will invalidate the approval certificate and impair safety.

Legal aspects

The mechanical and electrical installation shall only be carried out by trained personnel with knowledge of the requirements for installation of explosion proof equipment in hazardous areas.

 Exalon Delft B.V. disclaims any responsibility for personal injury or damage to equipment caused by:

- Deviation from any of the prescribed procedures.
- Execution of activities that are not prescribed.
- Neglect of the general safety precautions for handling tools, use of electricity and microwave radiation.

The contents, descriptions and specifications are subject to change without notice. Exalon Delft B.V. accepts no responsibility for any errors that may appear in this installation guide.

Additional information

Please do not hesitate to contact Exalon Delft or its representative if you require additional information.

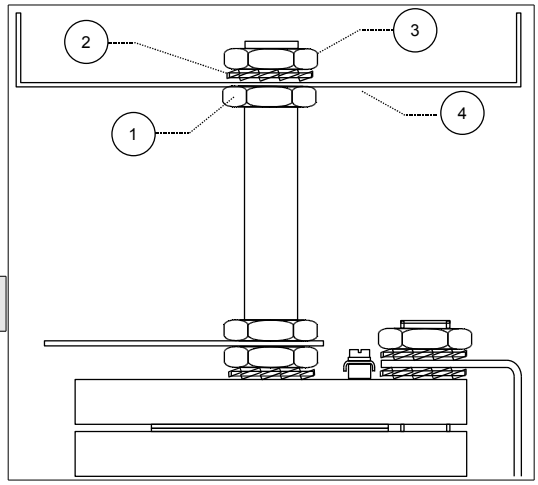
Mechanical installation

> ***Caution***
> *The X62T Interface may be installed in hazardous areas.*
> *Before starting installation, check whether the actual area of installation complies with the area classification on the X62T Type Identification Plate or the EC-Type certificate.*

> ***Note***
> *The entire installation procedure shall be in accordance with national, local and company regulations.*
> *The electrical installation shall be in accordance with IEC 60079-14 for electrical equipment to be installed in hazardous areas.*

Refer to the diagram.

- Use lock nut G½ (depending on the tank temperature sensor). For other diameters utilize an adapter.
- Use a suitable pipe sealant (for example Loctite 572).
- Turn lock nut (1) for appr. 15 mm (0.6") on adjusting pipe of the tank temperature sensor.
- Open cover of X62T interface (4).
- Feed flying leads through the opening of the X62T Interface.
- Carefully turn the X62T onto the adjusting pipe.
- Feed flying leads through lock washer (2) and lock nut (3) and lock.



> ***Note***
> *Make sure not to damage the flying leads.*

- When electrical installation is carried out at a later stage, close cover of X62T Interface.

Electrical installation

> ***Warning***
> *Make sure that all power to associated instrument is switched off before opening the cover of the X62T Interface.*
> *The cover must be closed before switching on power.*

Grounding

Proper grounding of the X62T Interface to the tank (P.E.) is required. Use the external ground terminal on the X62T Interface housing (refer to drawing X62T-00-00 in the Appendix).

> ***Caution***
> *Safety depends on proper grounding.*
> *Check the resistance of the ground connection directly after installation.*
> *The measured ground resistance shall be below the maximum prescribed by local grounding requirements.*

> ***Warning***
> *When measuring the ground resistance, use a suitable explosion-proof tester.*

> ***Note***
> *Grounding shall be performed according to local regulations.*

The field bus terminals of the X62T are floating except for a 90V gas arrester. If the field wiring isolation needs to be tested the internal wire from terminal GA_EARTH (CN1-2 and CN1-4) to the enclosure may need to be temporarily disconnected.

> ***Warning***
> *When using capacitive probes grounding the sensor inputs through terminal CN3-38 to Protective Earth (P.E.) is mandatory.*
> *When only non-capacitive probes are used the sensors can be left floating in the tank only when they have 500 V isolation to the tank shell.*

> ***Note***
> *For non-capacitive probes grounding the sensors inputs is highly recommended.*

Separation between supply and input circuits inside the enclosure

Supply and input circuits are separate Intrinsically safe circuits. Keep wiring separated with a minimum distance of 6 mm. When necessary use a suitable cable binder (not supplied).

Supply / transmission

Follow local and company requirements for routing of I.S. wiring.

Power rating of the X62T: 12 - 28 V_{dc} nominal @ 4 mA_{nom}(at the terminals of CN1).

Cable requirements:
- Shielded twisted pair.
- For point-to-point connections refer to 1.
- For multi-drop connections apply appropriate HART recommendations or contact Exalon Delft or your local distributor.

Table 1: Cable requirements for a point-to-point connection between a HART master and a X62T

Master Ro < 250 Ω	*Cable length*	*Cable capacitance*	*Master open circuit voltage (min.)*
#24 AWG (Ø 0.51 mm)	<800 m	< 200 pF/m	13 V
#20 AWG (Ø 0.81 mm)	<1000 m	< 200 pF/m	13 V

Caution
Wiring to X62TInterface shall be protected against EMC influences.

Note
Use metallic cable glands (M16/EMC/IP68) to provide good contact between cable shield and X62T Interface housing.
The shield of the cable shall be connected inside the cable gland and connected to ground at both ends of the cable.

- Open cover of X62T Interface.
- Connect supply/transmission cable to the positive terminal HART_P (CN1-1) and and the negative HART-N (CN1-3).

Sensor connections

Connect the sensors wiring as indicated in the connection diagrams and CON-200002 in the Appendix.

Note
There is only an orange wire with those MTT probes which have a thermocouple spot below the Pt100 reference resistor. That orange wire must be connected to terminal CN3-19.
When there is no orange wire from the temperature probe, then connect one of the blue wires to terminal CN3-19.

- Close cover of X62T Interface.

Caution
Always connect the probes wires to the grounded input terminals (CN3-1 to 4 & CN-23 to 30) first to prevent damage due to electrostatic discharge.

Programming connector

The programming terminal CN9 of the X62T is not Intrinsically Safe. Programming can only be done using special tools provided by Exalon Delft.

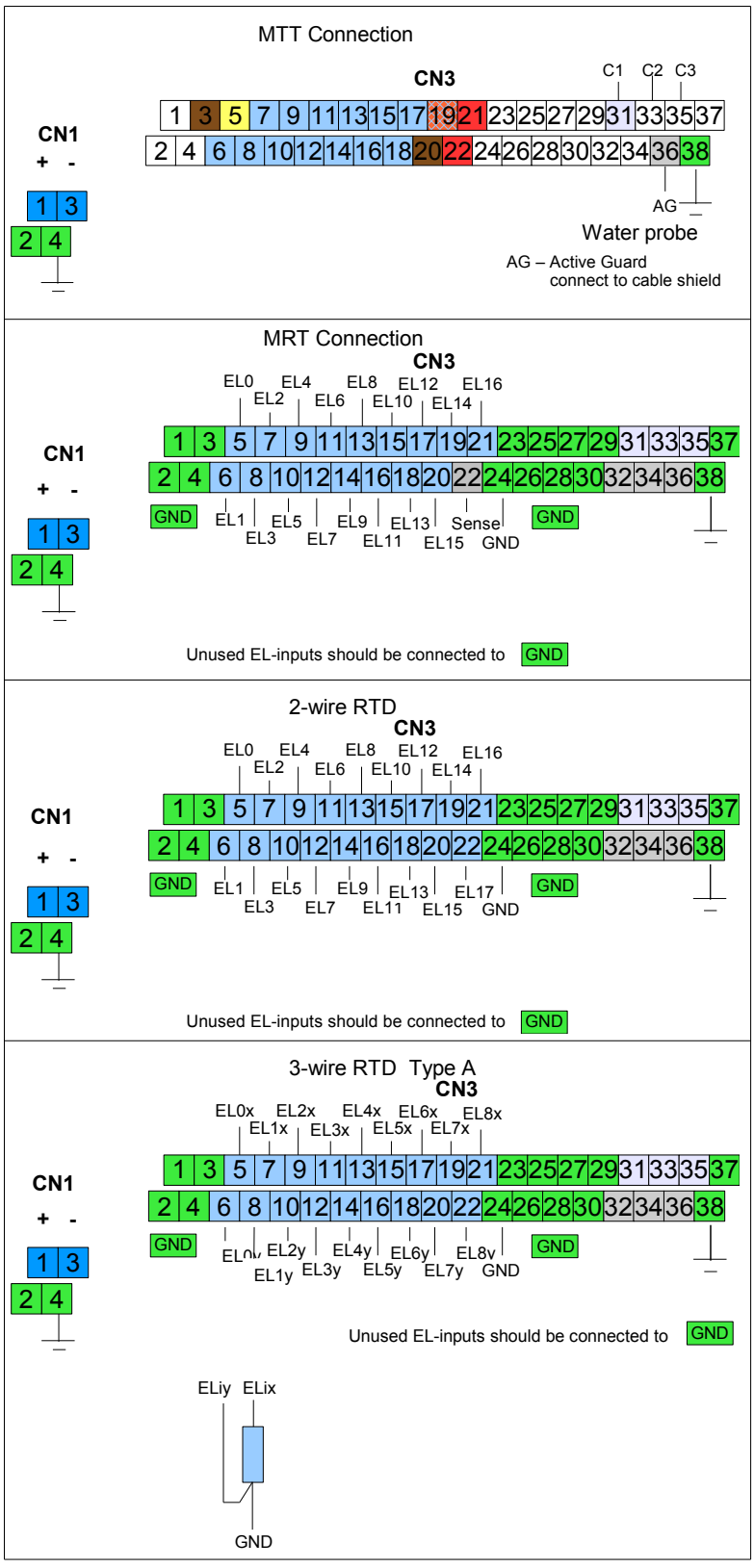
Warning
Do not program the X62T in the Hazardous Area.

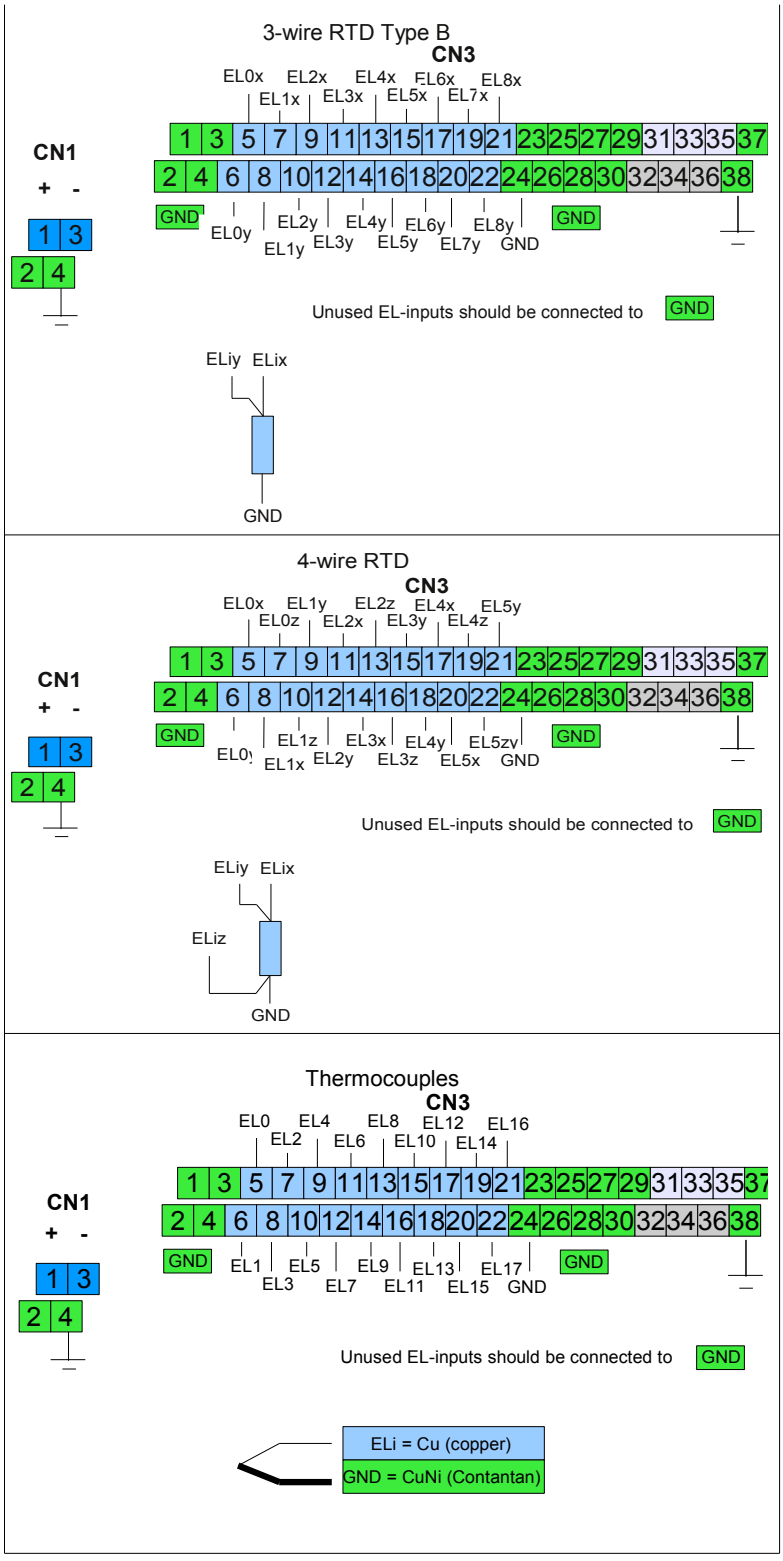
Caution
Connecting the X62T directly to a RS232 port may (unnoticeable) damage the Intrinsically Safe circuitry inside the X62T. The X62T shall only be connected to an Exalon Delft supplied RS232/TTL converter.

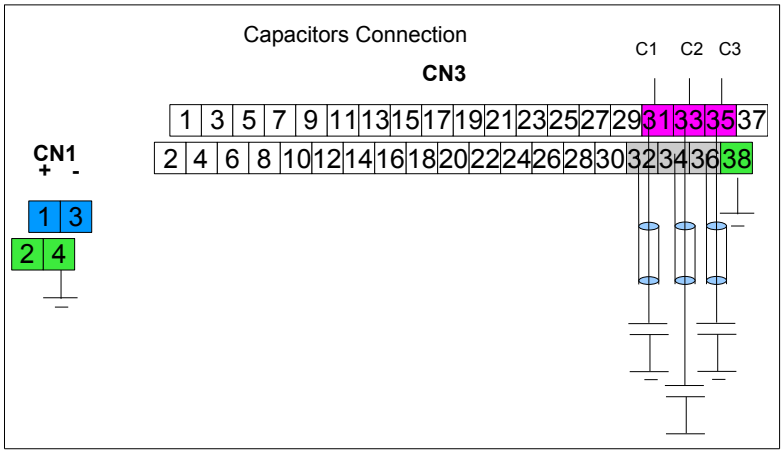
Note
Attempting to read or write the internal memory with unapproved tools or by following the incorrect procedure may inadvertently erase the software and/or the configuration settings. Refer to your local distributor when a software upgrade is necessary.

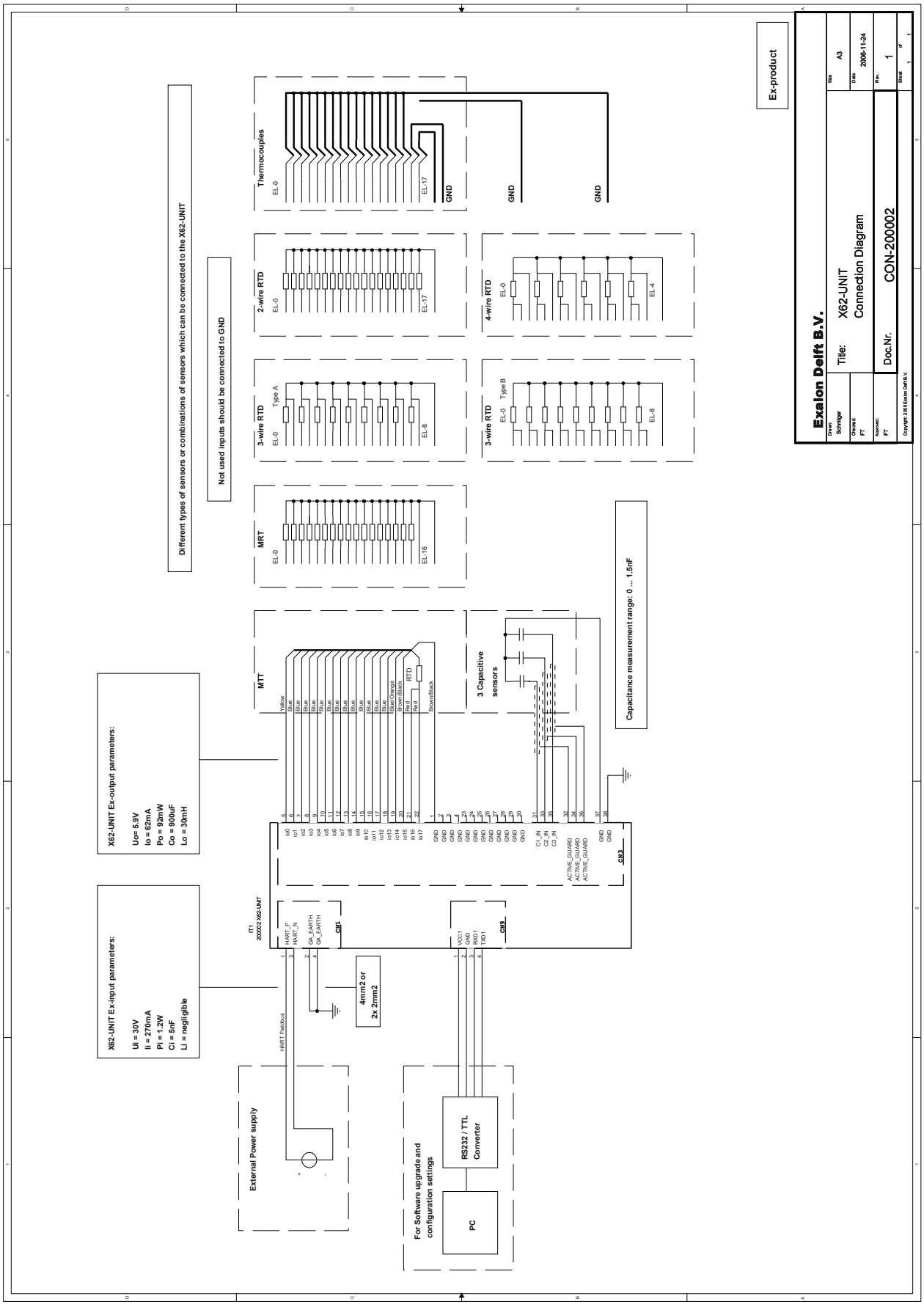
Appendix

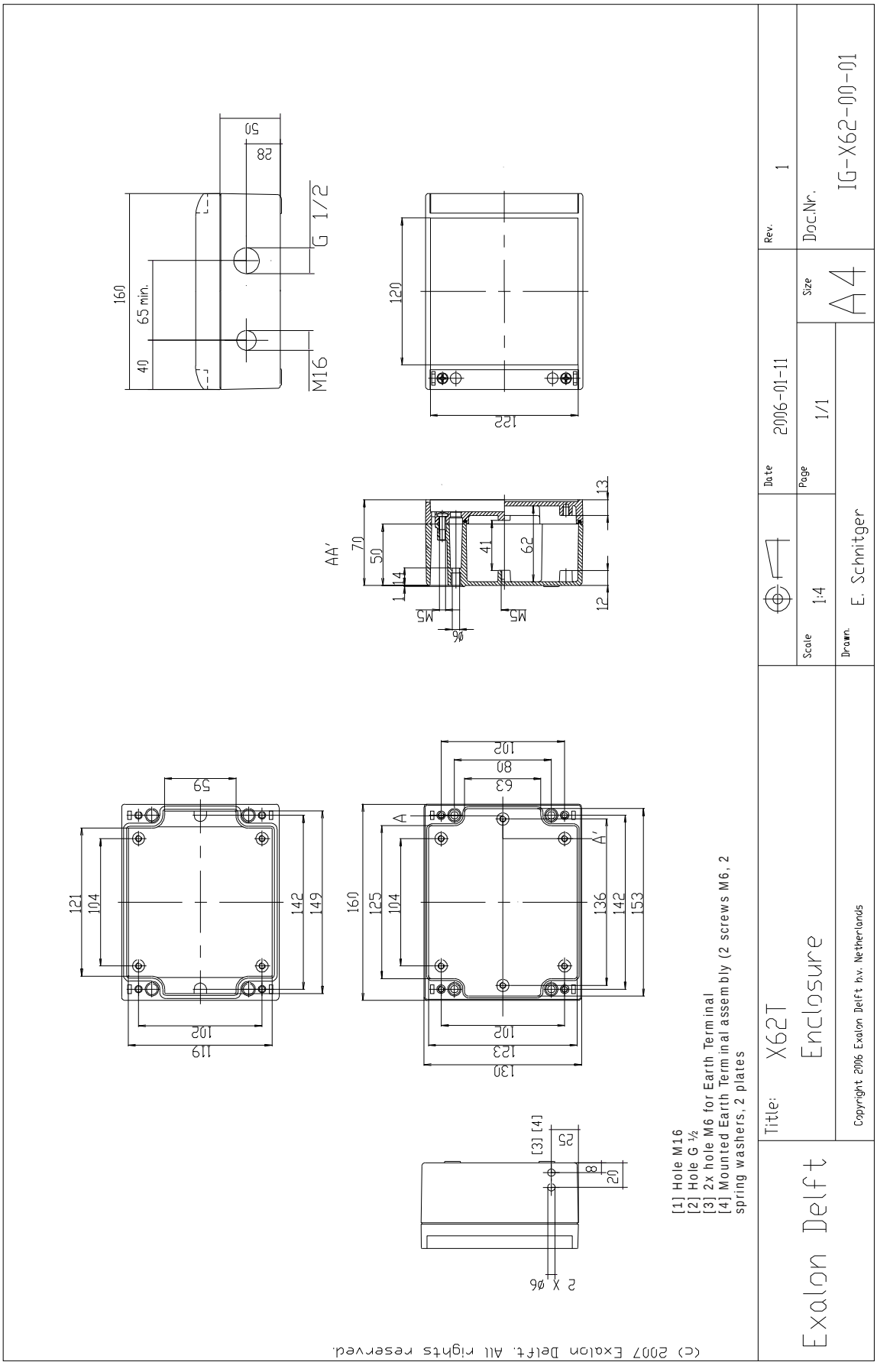
Diagrams for connecting various type of probes




3-wire RTD Type B
CN3
EL0x EL2x EL4x EL6x EL8x
EL1x EL3x EL5x EL7x
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
GND
EL0y EL2y EL4y EL6y EL8y
EL1y EL3y EL5y EL7y GND
GND
CN1
+ -
1 3
2 4
Unused EL-inputs should be connected to GND
ELiy ELix
GND
4-wire RTD
CN3
EL0x EL1y EL2z EL4x EL5y
EL0z EL2x EL3y EL4z
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
GND
EL0y EL1z EL3x EL4y EL5zy
EL1x EL2y EL3z EL5x GND
GND
CN1
+ -
1 3
2 4
Unused EL-inputs should be connected to GND
ELiy ELix
ELiz
GND
Thermocouples
CN3
EL0 EL4 EL8 EL12 EL16
EL2 EL6 EL10 EL14
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
GND
EL1 EL5 EL9 EL13 EL17
EL3 EL7 EL11 EL15 GND
GND
CN1
+ -
1 3
2 4
Unused EL-inputs should be connected to GND
ELi = Cu (copper)
GND = CuNi (Contantan)


Capacitors Connection
CN3
C1
C2
C3
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
CN1
+ -
1 3
2 4


Ex-product
Exalon Delft B.V.
Drawn: Schrijver
Checked: PT
Approved: PT
Title: X62-UNIT Connection Diagram
Doc.Nr: CON-200002
Size: A3
Date: 2006-11-24
Rev: 1
Sheet: 1 of 1
Copyright 2006 Exalon Delft B.V.
Different types of sensors or combinations of sensors which can be connected to the X62-UNIT
Not used inputs should be connected to GND
Thermocouples
EL-0
EL-17
GND
GND
GND
2-wire RTD
EL-0
EL-17
4-wire RTD
EL-0
EL-4
3-wire RTD
EL-0
Type A
EL-8
3-wire RTD
EL-0
Type B
EL-8
MRT
EL-0
EL-16
MTT
Yellow
Blue
Blue/Orange
Brown/Black
Red
Red
RTD
Brown/Black
3 Capacitive sensors
Capacitance measurement range: 0 ... 1.5nF
X62-UNIT Ex-output parameters:
Uo= 5.9V
Io = 62mA
Po = 92mW
Co = 900uF
Lo = 30mH
X62-UNIT Ex-input parameters:
Ui = 30V
Ii = 270mA
Pi = 1.2W
Ci = 5nF
Li = negligible
IT1
200002 X62-UNIT
HART_P
HART_N
GA_EARTH
GA_EARTH
CN1
CN2
CN3
io0
io1
io2
io3
io4
io5
io6
io7
io8
io9
io10
io11
io12
io13
io14
io15
io16
io17
GND
C1_IN
C2_IN
C3_IN
ACTIVE_GUARD
ACTIVE_GUARD
VCC1
GND
RXD1
TXD1
HART Fieldbus
4mm2 or 2x 2mm2
External Power supply
For Software upgrade and configuration settings
RS232 / TTL Converter
PC


50
28
G 1/2
160
65 min.
40
M16
120
122
AA'
70
50
14
1
41
62
13
12
M5
M5
Ø6
102
80
63
A
A'
160
125
104
136
142
153
102
123
130
59
121
104
142
149
102
119
[3] [4]
25
8
20
2 X Ø6
[1] Hole M16
[2] Hole G ½
[3] 2x hole M6 for Earth Terminal
[4] Mounted Earth Terminal assembly (2 screws M6, 2 spring washers, 2 plates
Exalon Delft
Title: X62T Enclosure
Scale 1:4
Date 2006-01-11
Page 1/1
Size A4
Rev. 1
Doc.Nr. IG-X62-00-01
Drawn. E. Schnitger
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Authorized local distributor/reseller