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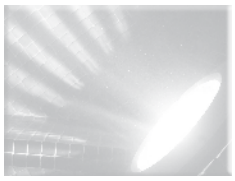
ecom instruments
mobile experts



Product catalogue 2009/2010

Dear ***ecom*** customer,

Your safety is our top priority!
Devices for use in explosive areas must fulfil specific requirements. ecom has been involved in this field for over 20 years and has acquired extensive expertise in explosion protection for everyday industrial use in potentially explosive atmospheres.

. . . . . mobile experts
This slogan is used by ecom to develop, manufacture and distribute mobile devices for all areas where hazardous substances, such as flammable liquids, gases and dust are involved.

ecom instruments are a manufacturer of equipment for use in various sectors, including oil and gas, chemicals, petrochemicals, mining, pharmaceuticals, energy and the environment.

As a manufacturer of corresponding products and services from a single source, ecom asserts itself to-day through a complete range of products in the four fields of mobile computing, communication, measuring & calibration and portable lamps.

The equipment allows the user to achieve professional results, even in demanding environments.
Distinguishing features include ruggedness, accuracy, ergonomics and various types of certification for the Ex-area. The quality assurance of our products is ensured in our testing facility by using the latest testing apparatus in accordance with our quality management system.

The phrase "Made in Germany" continues to gain in significance. The basic values of safety and reliability are particularly reflected on in times of economic unrest.

Over the past year ecom has invested considerably in Germany, created and safeguarded jobs, supported suppliers and gained new customers.

This strengthens ecom as a company and as a brand.

Specialised and competent sales staff are at your disposal throughout the world.

We would be happy to advise you. Please contact us.

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Contents

The complete one-stop solution!

ecom instruments is an innovative company characterised by respectability, professionalism, great competence and reliability while handling difficult tasks in the area of Atex-certified products.
ecom instruments is the ideal partner to the chemical industry with its great experience and knowledge. ecom instruments stands for safety inside and outside potentially explosive areas.

ecom engineering established in January 2002 with 22 development engineers and technicians offers:

- Comprehensive technological Ex-consulting
- Ex-modifications for standard products
- Tailor-made, customer-specific Ex-solutions

Ex-designation

Ex designation

Temperature Class:
Gases are divided into temperature classes based on their different ignition temperatures. The electrical equipment in Group II is divided in parallel to this according to the maximum surface temperatures at which the Ex-atmosphere can be reached.

Maximum permitted housing or component temperature of the operating devices

T1	T2	T3	T4	T5	T6
450°C	300°C	200°C	135°C	100°C	85°C

Explosion groups:
The equipment group, amongst other items, appears again in this Designation Section. Group I comprises operating devices for coal mining where coal dust and methane atmospheres prevail. Group II applies to the "aboveground" areas such as chemistry, petrochemistry, mills (dusts) etc. Due to the different minimum ignition energies of the various gases, there is a further division into the categories **IIA** to **IIC** for the ignition protection classes "personal safety", "pressure resistant casing" and "sand casing"

CENELEC marking	Type of Gas	ignition energy/µJ
I	methane	280
IIA	propane	> 180
IIB	ethylene	60 … 180
IIC	hydrogen	< 60

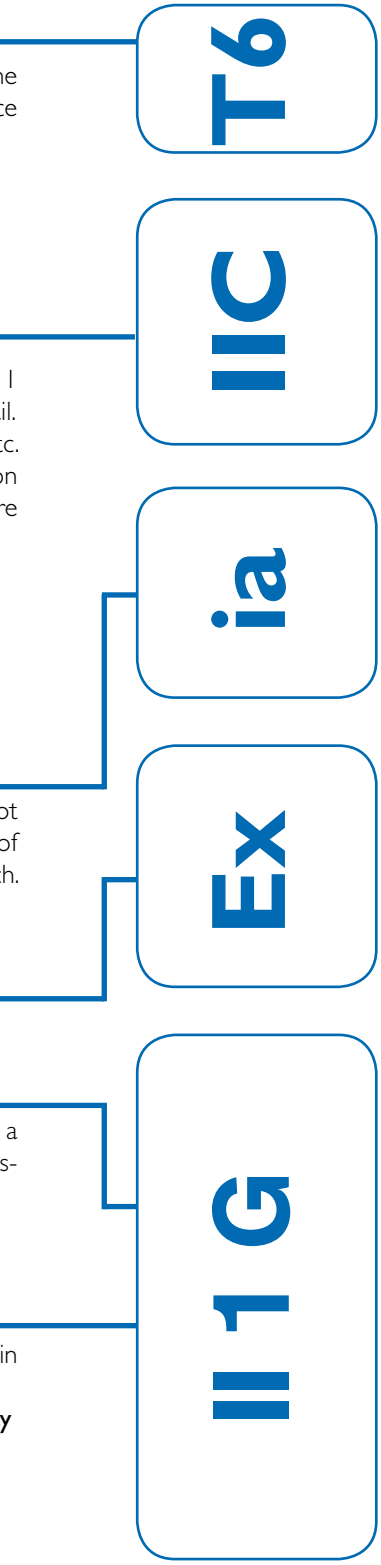
Type of protection:
In areas where the occurrence of an explosive mixture of flammable materials and air cannot be prevented by applying primary explosion protection, special measures for the prevention of ignition sources are to be taken. For example: separation (o, q, m), exclusion (p), special mech. construction (d, e), limitation of energy (ia, ib) or other methods (s).

Explosion protection

Use in hazardous areas:
Equipment which are certified according to Directive 94/9/EC (ATEX 95) regulations carries a special marking. The device group appears first, then the device category and finally the atmosphere reference: **(G)**as and **(D)**ust.

For category II, the following classification applies:
Category 1 very high degree of safety / Safety is provided by 2 protective measures – even in cases of rarely occurring machine errors or 2 independent machine errors.
Application in zones 0, 1, 2 or 20, 21, 22, atmosphere G/D / Category 2 high degree of safety
sufficient safety in cases of frequent machine errors/ in cases of 1 error
Application in zones 1, 2 or 21, 22, atmosphere G/D / Category 3 normal degree of safety
sufficient safety in cases of failure-free operation
Application in zone 2/22, atmosphere G/D* (*non-conductive dusts)

Mark identifying explosion prevention
(required in accordance with Directive 94/9/EC)



ATEX (Atmosphere Explosive)

94/9/EC Directive
Harmonises legal provisions of member states for devices and protection systems for designated use in potentially explosive areas.
New: ATEX 95 (Old: ATEX 100a)

1999/92/CE Directive
Minimum requirements for improving the health and safety protection of the worker at risk from explosive atmospheres.
New: ATEX 137 (Old: ATEX 118a)

Designation examples:

Use in gaseous atmospheres:
II 1 G EEx ia IIC T4

Use in dusty atmospheres:
II 2 D T90°C IP64

Use for mining applications:
I M2 EEx ia I

Temperature classes:
In the event of a malfunction, the maximum temperature of a surface that may be exposed to gas (in normal use with "n" type of protection). (Should not be used for dust ex-designations.)
T1 = 450°C
T2 = 300°C
T3 = 200°C
T4 = 135°C
T5 = 100°C
T6 = 85°C

Explosion group
(Data only for devices used in areas renderedpotentially explosive by gas)
I = Methane (mining)
IIA = such as Propane
IIB = such as Ethylene
IIC = most dangerous group (e.g. hydrogen)

IP Code
(Data only for devices used in areas rendered potentially explosive by dust)
Figure 1Contact and foreign body protection:
5 = Protection against dust deposits
6 = protection against dust penetration
Figure 2Water protection
Protection against:
0 = (no protection)
1 = vertically falling drip water
2 = drip water on operating device inclined to 15°
3 = spray water
4 = spray water
5 = jet water
6 = strong jet water
7 = temporary immersion
8 = continuous immersion

Ex	II 1 G	Ex	ia	IIC	T4	
Ex	II 2 D	Ex	td	A21	T90°	IP64

Device group
I = Mining
II = all other explosive areas

Category
1 = can be used in Zones 0 or 20
2 = can be used in Zones 1 or 21
3 = can be used in Zones 2 or 22
M1 = Mining
(In case of firedamp, continuation of operation is possible)
M2 = Mining
(Must be switched off in case of firedamp)

Atmosphere
G = Gas
D = Dust
(Mining – no details)

Types of protection:
o = oil immersion
p = high-pressure encapsulation
q = sand encapsulation
d = pressure-resistant encapsulation
e = increased safety
ia = intrinsic safety(permitted for Zone 0*)
*depending on the device category
ib = intrinsic safety (sufficient for Zone 1 (+ 2))
ma = cast encapsulation (for Zone 0*)
mb = (sufficient for Zone 1 (+ 2))
s = special protection
n = normal operation In normal conditions (only for Zone 2)
nA = non-sparking
nC = enclosed break
nR = vapour-proof housing
nL = energy limited
nZ = high-pressure encapsulation
op = optical radiation (is, pr, sh)
tD = protected by housing (dust)
pD = high-pressure encapsulation (dust)
iaD = Instrinsic safety dust (use for Zone 20*)
ibD = Instrinsic safety dust (sufficient for Zone 21 (and 22))
mD = cast encapsulation (dust)

Max. surface temperature
(Data for devices used in areas rendered potentially explosive by dust - rarely also used in gas ex marking.)
- Maximum temperature of a surface during a machine error (normal operation in the case of category 3 devices) that can be reached by the ex atmosphere.
Evaluation by the user:
a.) Limit temperature 1=2/3 of min. ignition temperature of dust present
b.) Limit temperature 2=min. glow temperature of dust present minus 75k (applies for layer thicknesses of up to 5mm)
The smaller value for the limit temperature must be above the indicated max. surface temperature of the device.

Zone
Procedure for determining the housing's leak tightness (A or B)

Explosion Protection

The important principles for integrated safety explosion protection are as follows:

1. Measures are taken to avoid hazardous atmospheres whenever possible.

2. Measures are taken which prevent the ignition of hazardous atmospheres.

3. Measures are taken which limit the explosive effect to a safe degree.

This differs from:

Primary explosive protection:
These are precautions taken to prevent or restrict the formation of hazardous explosive atmospheres.

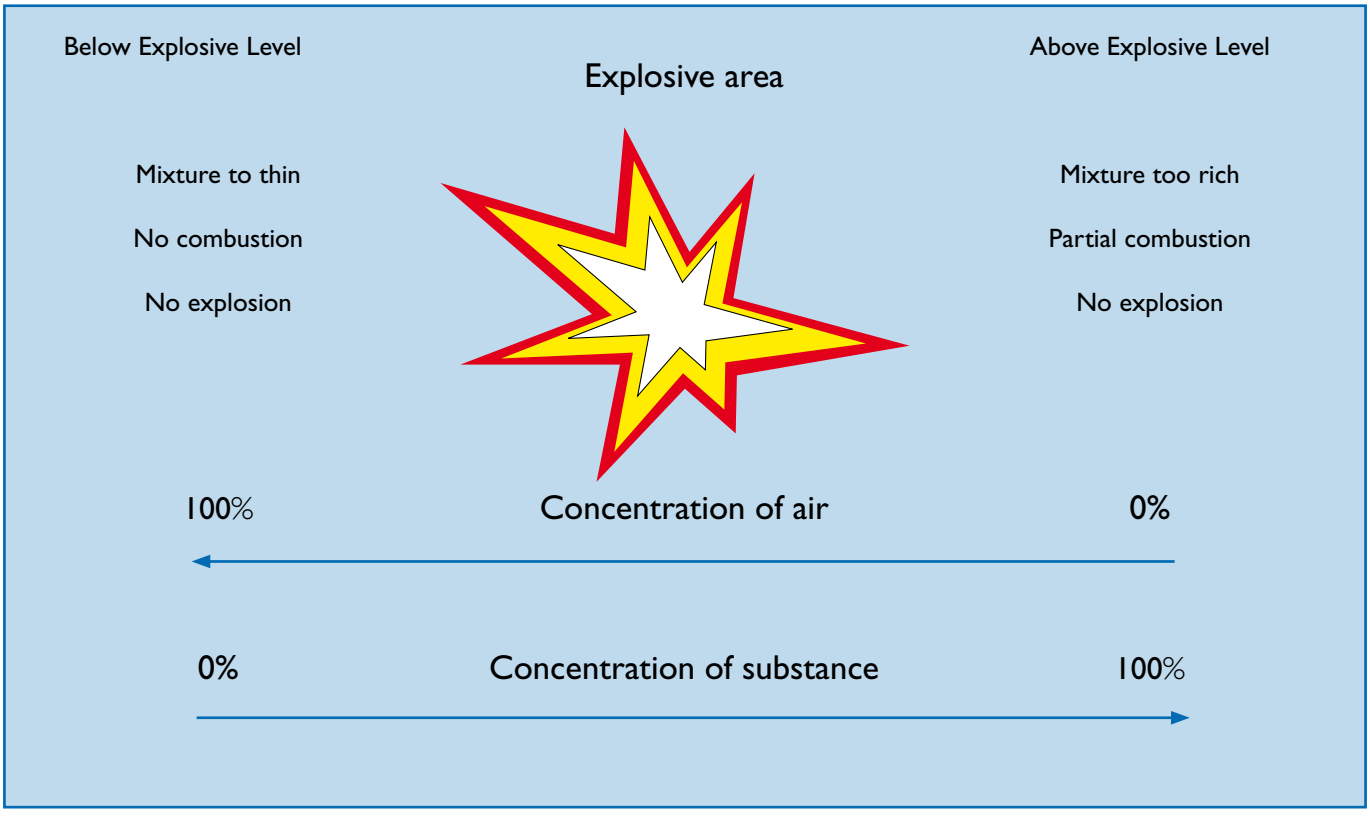
Secondary explosive protection:
This covers the second group of measures, which are intended to prevent the ignition of an atmosphere that is capable of exploding.

Definition in accordance with **1999/92/EC** Directive **(ATEX 137)**	Reference values (not standardised	Zone to CENELEC IEC	A device from the following device category must be used (see 1999/92/EC – ATEX 137 Directive):	Required identification of the resources permitted in accordance with 94/9/EC ATEX 95.
Area in which a potentially explosive atmosphere as a mixture of air and flammable gases, vapours or mists is present either frequently or over a prolonged period.	> 1000 h/a	0	1G	G
Area in which under normal operation a potentially explosive atmosphere as a mixture of air and flammable gases, vapours or mists can occasionally form.	10 ... 1000 h/a	1	2G (1G also possible)	G
Area in which under normal operation a potentially explosive atmosphere as a mixture of air and flammable gases, vapours or mists is not normally present but may occur for just a short period.	<10 h/a	2	3G (1G, 2G also possible)	G
Area in which a potentially explosive atmosphere in the form of a cloud of flammable air-borne dust is present either constantly, over prolonged periods or frequently.	> 1000 h/a	20	1D	D
Area in which under normal operation a potentially explosive atmosphere in the form of a cloud of flammable air-borne dust can occasionally form.	10 ... 1000 h/a	21	2D (1D also possible)	D
Area in which under normal operation a potentially explosive atmosphere in the form of a cloud of flammable air-borne dust is not normally present although may occur for just a short period.	<10 h/a	22	3D (1D, 2D also possible)	D

Division into Temperature Classes

The temperature class indication can be guaranteed only if the ambient temperature specified for the operating device is respected (see Technical Data or Rating Plate). Strict compliance is a mandatory requirement.
Once the maximum surface temperature of any apparatus reaches the ignition temperature of the surrounding hazardous atmosphere an explosion can occur.
Because of this, all equipment classified to Group II is divided into temperature classes. To allow for the possibility of potential hazardous atmospheres, the lowest ignition temperature must always be higher than the maximum surface temperature.

Temperature classes of flammable gases and vapours and permitted surface temperatures of the operating device in accordance with DIN EN 50014						
Temperature class	T1	T2	T3	T4	T5	T6
Ignition temperature in °C	>450	>300	>200	>135	>100	>85
Maximum Surface temperature in °C	450	300	200	135	100	85
E.g.	Propane Methane Ammonia	Ethylene Alcohols Acetylene	Petrol Solvents	Ethylether Acetaldehyde	-	Carbon-disulphide



Explosions are dependent on many parameters.
For only atmospherical conditions and pure substances sufficient comparitive values and data are shown. An explosion can only occur where a flammable substance in the form of gases, vapours, smoke and dust exists along with sufficient oxygen to support combustion and there is a source of ignition.

e.g.

- Hydrogen	4,0 bis 77,0% in air	- Propane	1,7 bis 10,6% in air
- Ammonia	15,4 bis 33,6% in air	- Methane	4,4 bis 16,5% in air

Fundamentals of dust explosion protection

Fundamental principles:
The manufacturer of operating devices for areas rendered potentially explosive through dust must indicate the maximum surface temperature of all devices that dust can penetrate (usually expressed in °C – indication of the temperature class should be avoided here). This temperature is part of the dust Ex-designation.

Designation examples:
II 2 D T90°C IP64, II 2 D Ex td A21 T90°C IP64
(If the ignition protection type is based on the housing, the housing protection rating should also be stated as an IP Code) or II 2 D Ex iaD 21 T96°C

(This device has been approved according to the IEC de-jure standard "Intrinsic Dust Safety – "iaD". This de-jure standard specifies that the designation also contains the corresponding zone – in this case 21)

Dust explosion protection – temperature:

Combustion and explosion parameters for dusts depend on their condition. Parameters that affect combustion and explosion behaviour include particle size, particle shape, water content, purity and where applicable the content of the flammable solvents. The particle size distribution and the mean value (value for average particle size) should also be known.

In accordance with 1999/92/EG Directive (ATEX 137), the system operator /employer is obliged to make a hazard assessment and must therefore be aware of the minimum glow temperature of the dust.

There are simple calculations to determine the two " temperatures " and they are carried out thus:

a) Limit temperature 1 = 2/3 of minimum ignition temperature
b) Limit temperature 2 = minimum ignition temperature* minus 75°K

These two limit temperatures must now be examined to confirm which guarantees the greater safety.

Example 1:
Minimum ignition temperature = +330°C, minimum glow temperature = +300°C:
a) Limit temperature 1 = 2/3 x +330°C = +220°C
b) Limit temperature 2 = +300°C - 75°K = +225°C
Greater safety: Limit temperature (1) = +220°C
Here a device with a max. surface temperature in the event of failure <= +220°C must be used. As stated, the device designation includes a corresponding value.
Example 2: Minimum ignition temperature = +186°C, minimum glow temperature = +180°C:
a) Limit temperature 1 = 2/3 x +186°C = +124°C
b) Limit temperature 2 = +180°C - 75°K = +105°C
Greater safety: Limit temperature (2) = +105°C
Here a device with a max. surface temperature in the event of failure <= +105°C must be used.

*The value for the glow temperature applies with a dust layer thickness of 5mm. The temperature safety distance must be increased for larger layer thicknesses.

Special case – Category 3 devices
In contrast to Category 1 and 2 devices, potential hazards in the event of failure (e.g. short circuiting, connection break etc.) do not have to be considered for Category 3 devices (for use only in Zones 2 respectively 22). The device is evaluated only in respect of hazards during normal operation. It is relatively unlikely that the device should fail at the same time as a short-term explosive atmosphere is present. No EC Type Approval Test Certificate is therefore required for Category 3 operating devices. The manufacturer may confirm that the operating device complies with the relevant standard. Nonetheless, ecom Category 3 devices are still tested by a certified centre and ecom is then awarded a declaration of conformity.

(- Of course, Category 2 operating devices also offer significantly greater safety in Zones 2 respectively 22..)

Dust explosions – albeit of a predominantly minor nature – occur relatively frequently.

A leaflet issued by the Government Safety Organisation of the Federal Republic of Germany states:

"According to documentation published by property insurers, it can be assumed that an average of one dust explosion per day occurs in the Federal Republic of Germany; around one in four of these explosions are caused by foodstuff or animal feed dusts." Dust explosions are a world-wide problem. Between 1980 and 1990 in the USA, for example, some 200 serious foodstuff or animal feed related dust explosions were recorded, causing 54 deaths, 256 injuries and property damage amounting to 165 million US dollars.

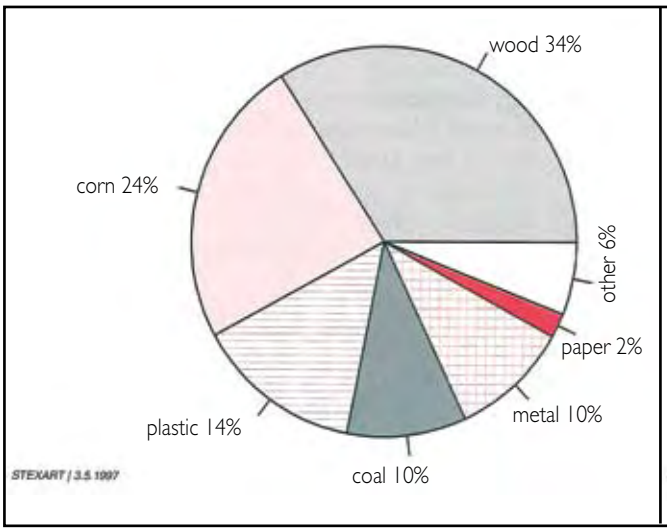


**Figure 1.1
Dust explosions by dust type

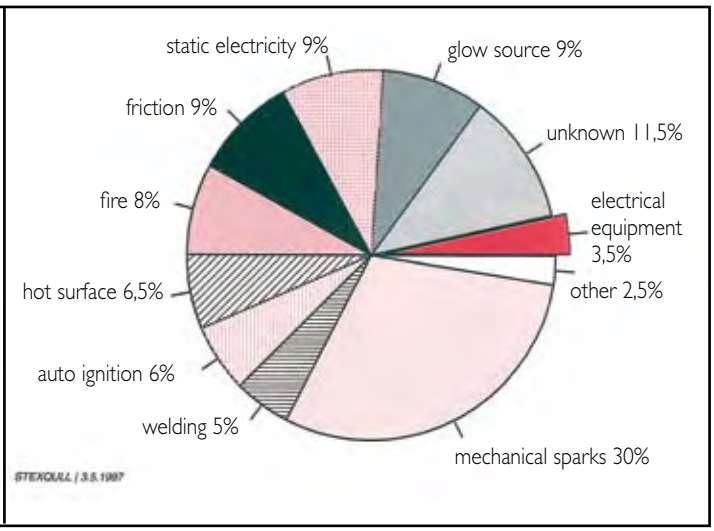
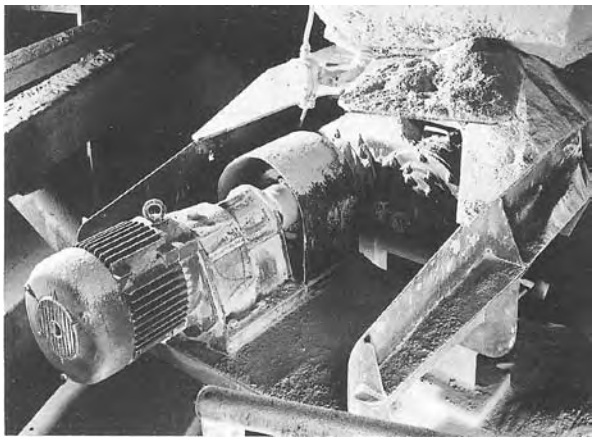


**Figure 1.2
Ignition sources by electrical operating device type

Electrical operating devices represent only a small proportion of the ignition sources found to cause dust explosions – not least due to the safety stipulations in the regulations for erecting electrical plants in potentially-explosive areas.

With the introduction of the already outdated "Regulation on electrical equipment in explosive areas, ElexV"[1.4] in 1980, a type approval test certificate by a prescribed nominated body was legally required for electrical equipment intended for use in zone 10 (in zones 20 and 21 from 01/07/2003).

"Dust explosion-protected" operating devices, the surface temperatures of which lies below the acceptable limit for standardised dust thickness of 5mm, can, despite the existence of an official test certificate, become a danger source if, contrary to the conditions, they become covered or completely encased with a thick layer of dust.

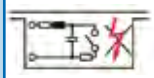
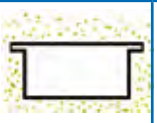


Dust explosion protection therefore, more than gas explosion protection, depends on the correct device option, the application conditions and a regular monitoring and maintenance routine.

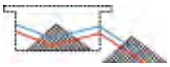
**Figure 1.3
Example of heavy dust deposits
on a screw conveyor.

** Pictures graphics and some text extracts with the kind approval of Danfoss Bauer GmbH and the author of the article entitled "Explosion protection for gear motors", Helmut Greiner.

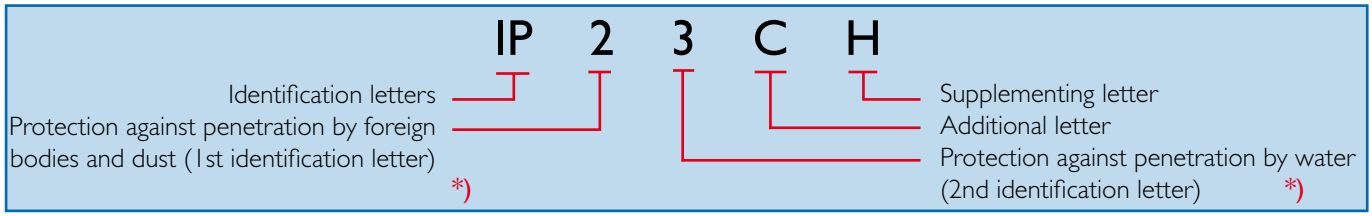
Types of ignition protection

Type of ignition protection	Designation	Symbol	Basic principle	Use (zone)	Standard
Explosion protection Basic concepts and methodology			Particular attention should be paid to the following, which applies for Zone 0: Surface temperatures should not exceed 80% of the ignition temperature of the gas, even in the event of rarely occurring malfunctions. (also includes information relating to temperature safety distances for the "Dust-Ex-area")		Still valid
General requirements			General requirements for the construction and testing of electrical devices in-tended for use in the Ex-area.		EN 60079-0
Special requirements for equipment in Group II Category 1 in a gaseous atmosphere	Ex ia or Ex ma*	Zone 0	Safety - even during the occurrence of two independent faults or - during failure of a technical protective measure caused by a second independent protective measure	0, 1 and 2	EN 60079-26
Intrinsic safety	Ex i		The development of inadmissibly high temperatures, ignition sparks and arcs are avoided due to the restriction of energy in the circuit. **Explanation in detail:** ia = use in zone 1, 2, (0) only in consideration of other standards! (depending on the device category) ib = use in zone 1, 2 (depending on the device category) ic = use in zone 2 (normal operation, no faults)	0, 1 or 2	EN 60079-11
Encapsulation	Ex m		Encapsulating the ignition source in a grouting compound prevents ignition of the atmosphere. **Explanation in detail:** ma = use in zone 1, 2, (0) - only in consideratiotn of other standards! (depending on the device category) mb = use in zone 1, 2 (depending on the device category)	0, 1 or 2	EN 60079-18
Increased safety	Ex e		Only applies to equipment or their components, which, under normal circumstances do not generate sparks or arcs, do not adopt dangerous temperatures and whose rated voltage does not exceed 11 kV.	1 or 2	EN 60079-7
Oil immersion	Ex o		Equipment or their components are put into an oil filled casing, which separates them from the Ex-atmosphere.	1 or 2	EN 60079-6
Pressurisation	Ex px		The ignition source is sealed by an ignition protection gas which is subjected to overpressure - this prevents penetration by the surrounding atmosphere. **Explanation in detail:** px = reduction from zone 1 or group 1 to "non- incendive" (within the pressurised enclosure) py = reduction from zone 1 to zone 2 (within the pressurised enclosure) pz = reduction from zone 2 to "non-incendive" (within the pressurised enclosure)	1 or 2	EN 60079-2
Powder filling	Ex q		Ignition source is encased by fine-grain sand - this prevents the Ex-atmosphere that surrounds the enclosure from being ignited, for example, by an arc.	1 or 2	EN 60079-5
Flameproof enclosure	Ex d		If an ignition occurs inside the casing, the explosion is kept entirely concealed and is not transferred to the surrounding environment.	1 or 2	EN 60079-1
Type of protection "n"	Ex n	Zone 2	Slightly simplified application of other forms of ignition protection. Equipment in this category ensures the required level of protection during normal operation. **Explanation in detail:** nA = non-sparking electrical equipment nC = sparking equipment that also has protected contacts nR = restricted-breathing enclosure nL = equipment and circuit with limited energy nZ = equipment with n-pressurisation	2	EN 60079-15
General requirements			General requirements for the design, construction, testing and designation of equipment intended for use in the "Dust-Ex-area"		EN 61241-0
Protection by enclosure (dust atmosphere)	New: Ex tD ***x***xx ***IPxx*** Txx Old: Txx°C IPxx		Application of a dust-protected or dust-proof housing with maximum surface temperature limit. **Designation:** The ignition protection type "tD" is followed by the letter ***A*** or B (= test procedure to which the protective casing has been tested), the zone indication, ***IP-protection rating in test procedure A*** and the maximum housing temperature (e.g. Ex tD ***A***22 ***IP54*** T75°C). * IP 5x only for non-conductive dusts	20, 21 (IP 6x) 22 (IP 6x, IP 5x possible*)	EN 61241-1

*or an applicable combination of two separate ignition protection types

Pressurisation dust	Ex pD xx IPxx Txx°		The ignition source is sealed by an ignition protection gas which is subjected to overpressure - this prevents penetration by the surrounding atmosphere. **Designation:** The ignition protection type is followed by the zone, IP-protection rating, and the maximum housing temperature	21, 22	EN 61241-4
Intrinsic safety dust	Ex ixD xx Txx°		The energy in electrical conductors is so low that the dust cannot be ignited even if dust deposits are placed on the conductors. **Explanation in detail:** iaD = use in zone 20, 21, 22 (depending on the device category) ibD = use in zone 21, 22 (depending on the device category) **Designation:** The ignition protection type is followed by the zone and the maximum surface temperature (of the housing or components)	20, 21, 22	EN 61241-11
Encapsulation dust	Ex mD xx Txx°		Encapsulating the ignition source in a grouting compound prevents ignition of the atmosphere. **Explanation in detail:** maD = use in zone 20, 21, 22 (depending on the device category) mbD = use in zone 21, 22 (depending on the device category) **Designation:** The ignition protection type is followed by the zone and the maximum surface temperature	20, 21, 22	EN 61241-18

IP Degree of protection



*) Should no degree of protection be specified,then the characters are replaced with the letter X e.g. **IP X4**

1. ident letter	Degree of protection	Symbol
0	No protection	
1	Protection against penetration by large foreign bodies, ø>50 mm No protection against intentional access	
2	Protection against small foreign bodies, ø>12,5 mm, exclusion of fingers or similar objects	
3	Protection against small foreign bodies, ø>2.5 mm, exclusion of tools, wires or similar objects	
4	Protection against grainy foreign bodies, ø>1 mm, exclusion of tools, wires or similar objects	
5	Protection against dust deposits (dust protected), complete exclusion of access.	
6	Totally protection against dust deposits (dust protected), complete exclusion of access.	

Additional letter	Significance (facultative)	
A	Back of the hand	
B	Finger	
C	Tools	
D	Wire	

2. ident letter	Degree of protection	Symbol
0	No protection	
1	Protection against drops of water falling vertically (water drop)	
2	Protection against water falling at an angle (water drop), inclined at 15° to the normal operating position	
3	Protection against water spray, up to 60° from the vertical	
4	Protection against water splashes from any direction	
5	Protection against water jet from any direction	
6	Protection against heavy sea or strong water jet (Flooding protection)	
7	Protection against submersion in water at a certain pressure and for a certain period	
8	Protection against continuous submersion in water	...atü

Supplementing letter	Significance (facultative)	
H	High voltage apparatus	
M	Machine running	
S	Machine not running	
W	Weather conditions	

Division into zones

Safety is our 1st priority

Safety plays a particularly important role wherever flammable substances are manufactured, processed, transported or stored, – particularly in the chemical and petrochemical industry, during the transportation of crude oil and natural gas and during mining.

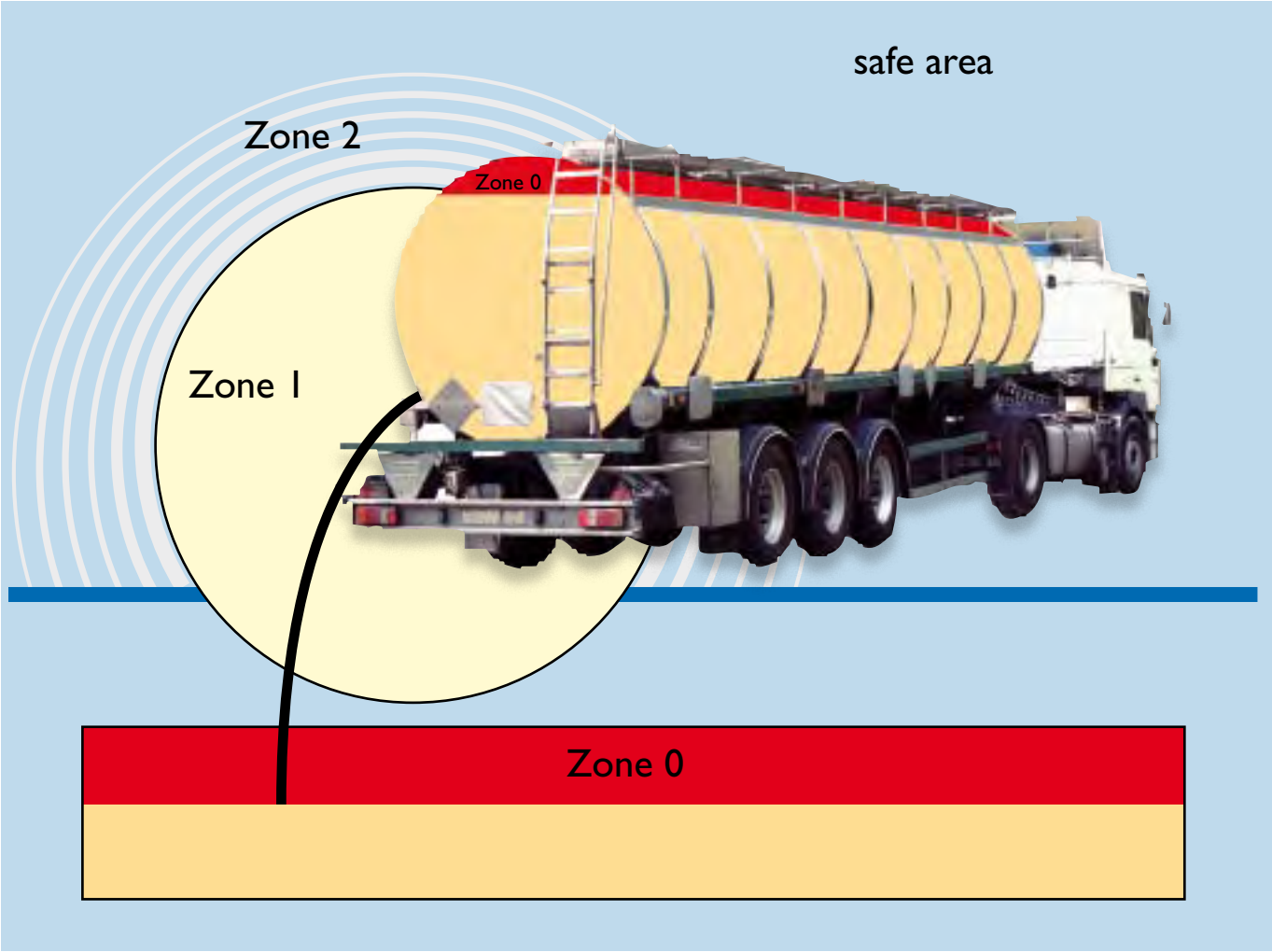
In order to ensure as high a safety level in these areas as possible, the legislative bodies of many countries have developed corresponding requirements in the form of laws, regulations and standards. Globalisation has enabled signi-ficant strides to be made in terms of compiling uniform directives for explosion protection.
The European Union has played a pioneering role in this aspect: Directive 94/9/EC created the conditions for complete standardisation when it came into effect on 1 July 2003, as it has resulted in all new appliances for the European market requiring certification according to the directive. The introduction of the new "60 and 61 standards" saw a harmonisation of the European standards with the increasingly accepted worldwide IEC standards.

Meaning of the zone classification:

Zone 0/20: Danger is always present, for a long time or frequently

Zone 1/21: Danger is occasionally present

Zone 2/22: Danger is seldom present or present for a short time



Quality Assurance - Production

Physikalisch-Technische Bundesanstalt (Test and Certification Body)
Braunschweig and Berlin

(1) **Notice**
of recognition of production quality assurance

(2) Devices or safety equipment or components for intended use in potentially explosive areas – **Directive 94/9/EC**

(3) Notification No: **PTB 97 ATEX Q013-4**

(4) Product group(s):

Test instruments, measuring instruments, calibrators, IT, communications, auxiliary equipment, lamps and lights with the determining protective type intrinsic safety "i" as well as the protective types of pressure-resistant encapsulation "d", increased safety "e", cast encapsulation "m", sand encapsulation "q" and of dust-explosion protection "tD", "iD" and "mD".

The appointed body keeps a list of the EC type-examination certificates for which this notice applies.

(5) Applicant: ecom instruments GmbH
Industriestraße 2, D-97959 Assamstadt, Germany

(6) Manufacturer: ecom instruments GmbH
Industriestraße 2, D-97959 Assamstadt, Germany

(7) The Physikalisch-Technische Bundesanstalt (PTB), as the body appointed with No. 0102 for Attachment IV in accordance with Article 9 of Directive of the Council of the European Community 94/9/EC dated 23 March 1994, informs the applicant that the manufacturer maintains a quality-assurance system for production that satisfies Attachment IV of this directive.

(8) This notice is based on the confidential audit report, No. 06-26316, issued on 8 December 2006
This notice is valid until 5 October 2009 and may be rescinded if the manufacturer no longer satisfies the requirements of Attachment IV.

The results of the regular inspection of the quality-assurance system are constituent to this notice.

(9) In accordance with Article 10 (1) of Directive 94/9/EC, the identification number 0102 of the PTB as the appointed body becoming active during the production monitoring phase must be stated behind the CE symbol.

Certification Body Explosion Protection Braunschweig, 8 December 2006

Declaration of Conformity

according to

- **2002/96/EC (WEEE Directive)** and
- **2002/95/EC (RoHS Directive)** and
- **The Elektro-Gesetz (German Electrical and Electronic Equipment Law) of 24 March 2005**

We, ***ecom instruments GmbH***, hereby declare that all electrical and electronic equipment we will supply starting on 1 July 2006 will have been manufactured according to the RoHS Directive and will have to be disposed of by us according to the WEEE Directive.

For you as an industrial customer, this means that after 1 July 2006 we will guarantee conformity with RoHS before any product leaves our premises.

Disposal of the waste electrical and electronic equipment we have supplied is arranged as follows:
Electrical devices and "historic" electrical devices of ***ecom instruments GmbH*** are transported to us for the obligatory disposal at our cost and are disposed free of charge in accordance with the European Directive 2002/96/EC and the German Electrical and Electronic Equipment Law of 24 March 2005.
The costs of transporting the equipment to ***ecom instruments GmbH*** are to be borne by the sender.

For our commercial partners, it basically holds true that the resale of products not compliant with RoHS is still permitted even after 1 July 2006, provided that these products were purchased from us prior to this date or fall into equipment category 3, 5 or 9 due to appropriate integration.
Disposal shall also remain unaffected by this.

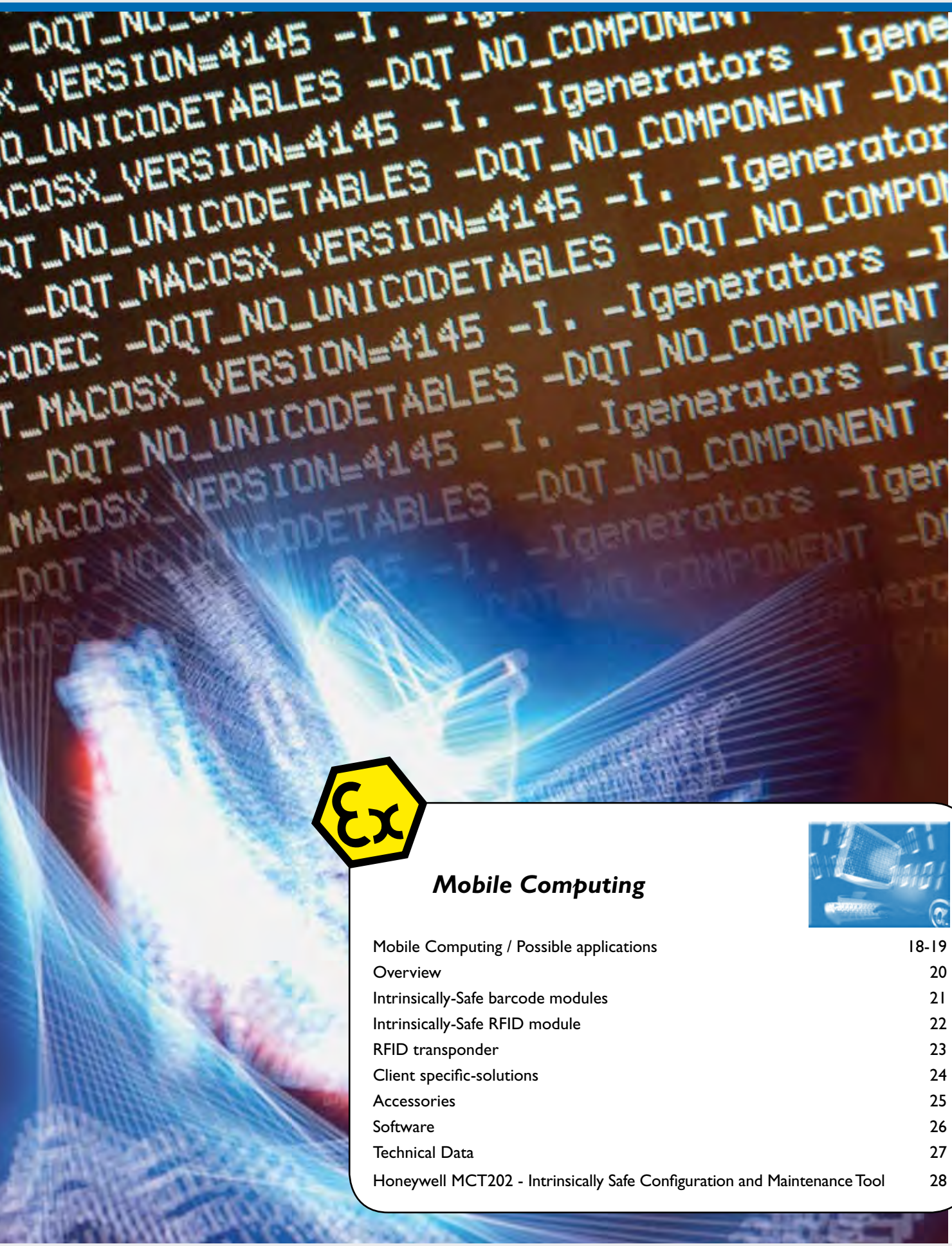
We are thus fulfilling our obligations according to the Electrical and Electronic Equipment Law as a manufacturer of electrical and electronic products. We would be pleased to answer your questions at any time regarding our Ex and standard products as well as the application of the Electrical and Electronic Equipment Law.

Assamstadt, 8 March 2006

Wolfgang Nusko
(Director Quality Management)

Rolf Nied
(The Management Board)

WEEE-Reg.-Nr.: DE 934 99306



Mobile Computing

Trend-setting success

The success of our industrial PDA ***i.roc***® x20 is an excellent example of how the use of mobile solutions can help optimise profitability and efficiency of your company. Whatever the size and type of business, there exists opportunities to further optimise production flow and data transfer. Customised and wisely applied mobile information technology can detect and utilise these opportunities, thereby helping to make the company more profitable. For process controlling this means continual identification and diagnosing of faults in order to make the correct decision for production flow. At management level, intelligent information systems can prevent the occurrences of standstill and waste, improve production performance and therefore help guide the company to higher efficiencies.

Application of state-of-the-art technology

The XScale processor, the operator interface featuring different Windows mobile operating systems, the impact resistant TFT display with touchscreen function and the extensive range of equipment and accessories all got to make the ***i.roc***® the perfect tool. The ***i.roc***® product concept is truly impressive, with its innovative power and flexibility allowing the early adoption and application of new ways of working in hazardous areas. The long term product strategy with HP further guarantees investment security for our clients.

Versatility by flexibility

ecom instruments already provide customised and flexible solutions for mobile applications in a variety of industries in co-operation with partners such as HP, Deister electronics, microsensys and Barcodat.
If you have a requirement for a tailored solution - please contact us.

Non-incendive PDA ***i.roc***® 520 -Ex
while process visualising

Concept

Many PDAs provide the possibility to integrate barcode scanners or RFID reading devices via CF card slot.
The ***i.roc***® x20 features the considerably more flexible way of integrating modules by interface into an individually designed casing. The dustproof and waterproof casing, consisting of three parts, facilitates customised hardware.

Active and passive RFID Tags

Especially when using RFID the customer and his application finally decide which kind of frequency, tags and reading devices are used. In cooperation with solution partners ecom instruments has developed optimised RFID modules especially for mobile applications. These guarantee the highest level of flexibility and freedom of decision.

Possible applications	
• Visualising of processes	• Logistics
• Water treatment	• Management Information System
• Maintenance	• Mobile internet access
• Quality assurance	• Commissioning
• Service sector	• Safety certification authorities and organizations

i.roc 620 -Ex with DS x10

2D barcode imager

All common linear bar codes as well as 2D codes with high amounts of data and integrated security features, such as Aztec or DataMatrix, can be read directly. Complete labels can easily and rapidly be scanned using the integrated CMOS camera. According to the needs and requirements of the client also other reading systems, like classic laser scanners, can be applied.

Interfaces

With the demand for efficiency of production and logistics, it is essential that high quality radio transmission solutions are available. The ***i.roc***® x20 provides adaptability, so that the latest technology can be applied. Depending on individual requirements, different ways of communication can be selected on the ***i.roc***® x20. Online access can allow direct access into the company. Both WLAN and Bluetooth interfaces are integrated as standard, allowing serial point to point connections or network access.

- ruggedised, IP 65
- flexibly applicable
- extensive equipment
- individual solutions for customers (even for low quantity requirements)
- integrated WLAN and Bluetooth
- handwriting recognition
- one-hand operation
- open system platform for easy integration

Handwriting recognition for verification of data

Bluetooth connection for data transfer

Radio transmission techniques like WLAN allow wireless control as well as working from a distance

i.roc® 420 in landscape mode with optional RFID module

Overview

Three model types of the ***i.roc***® x 20 series
i.roc® 42x
i.roc® 52x-Ex
i.roc® 62x-Ex

Based on HP iPAQ technology

Operating systems Windows Mobile 5

Onboard WLAN (802.11b) chip with a range of up to 300 m (985'), enable access to data wherever and whenever.

Integrated Bluetooth class II chip with a range up to 10 m (33'). Supports the most Bluetoothprofiles

Software package included, AutoInstall, Pre-Config Tool, Kiosk mode, virtual fullscreen keyboard

Programming other infrared enabled devices using
IrDA / SIR / FIR with up to 4Mbit/sec

Highspeed USB 2.0 client connection to a standard desktop PC via Dockingstation DS x10

Internal serial RS232 interface for connecting optional read/write modules or communication modems

RFID read / write modules for different frequencies like 125 kHz / 134 kHz / 13.56 MHz and technology TROVAN, TIRIS, MIFARE, ISO 14443, ISO 15693

Modules for collecting barcodes using 1D Barcode Laser or 2D Barcode Imager

Development of customer specific modules

Barcode-modules

Two main types of barcode reading devices are available. There are laser scanners that record the barcode by means of a reading line. This is more than sufficient for one-dimensional codes, since one line contains all information. After the introduction of two-dimensional codes, the laser scanners were improved in a way in which deflection mirrors create a second scan line that is generated at a certain angle.

This way it is possible to read stacked two-dimensional codes. The second type of device is called an "area imager". Integrated picture record modules record the barcode as if taking a photo. Then software algorithms are applied to find the barcode area within the picture, to recognise type and turning position and finally to identify the bar code. This makes it possible to read matrix codes as well.

The automatic recording and implementing of data to a wide range of concepts is of increasing importance. It is demanded to store as much data as possible in a space as small as possible. In addition it must be possible to read and process this data reliably.

Nowadays there are approximately 30 symbologies on the market. The optional integrable CMOS Barcode Imager BC x10-Ex fitted to the ***i.roc***® x20 can read all common barcodes, such as ID linear codes, 2D stacked/matrix codes, OCR fonts, postal codes. This module comprises an omni-directional (360°) scanning range and a double coloured "aimer" that marks the scanning area.

Example: check of goods issue

Application of the industrial PDA's ***i.roc***® 420 in a shipping department.

Technical data BC x10 -Ex imager:	
readable bar codes:	
2D:	PDF417, MicroPDF417, MaxiCode, Data Matrix, QR Code, Aztec, Aztec Mesas, Code 49, EANUCC Composite
Linear:	Code 39, Code 128, Codabar, UPC, EAN, Interleaved 2 of 5, Reduced Space Symbology, Code 93, Codablock F
Postal:	Postnet, Planet Code, British, Canadian, Japanese, KIX (Netherlands)
OCR Fonts:	OCR-A and OCR-B
Focus:	178 mm (7") from front panel (nominal)
Scan area:	360°
Viewing angle:	±40°
Surround light:	535 lux - 100.000 lux (49' cd - 9292' cd)
Technical data BC x21 -Ex laserscanner:	
readable bar codes:	UPC/EAN, Code 128, Code 39, Code 93, I 2 of 5, Discrete 2 of 5, Codabar, MSI Plessey
Focus:	min. 30 mm (1.18"), max 760mm (29.92")
Light Source:	Visible Laser Diode 650 nm
Scan Angle:	53° (typical)
Scan Patterns:	Linear
Scan Rate:	39 (± 3) scans/sec (bi-directional)
Ambient Light:	4844 lux - 107640 lux (450' cd - 10000' cd)
Laser Classification:	CDRH/IEC Class 2

Read/Write Modules

Flexible in application and robust, RFID write/read systems provide for quick and reliable identification of objects at various distances.

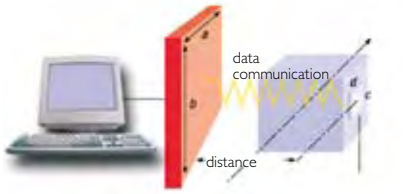
Primarily developed for application in production, commerce and logistics, the user memory has up to 2kb, depending on the type of transponder, which allows for the recording of information relating to the product to be stored without having to be connected to an external database.

Wherever the mobile storage of data is required, e.g. for object identification, service or storage management, the RFID module is the ideal solution.

- Integration into already existing systems is possible.
- relatively wide reading-range
- anti-collision, logging by more than one transponder in the field
- software updates possible

Basics of RFID technology

RWU
(Read/Write/Unit)



Radio Frequency Identification (RFID) comprises wireless data transfer on the physical basis of electro-magnetic alternating fields. A RFID system consists of a transponder and a mobile or stationary write/read unit with antenna.

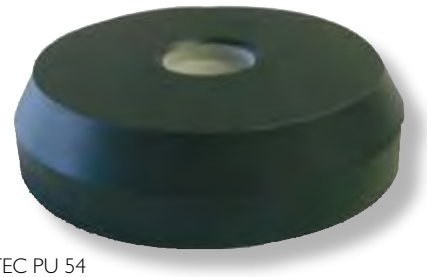
Transponders feature a micro chip and a coil/antenna in different casings (plastics, glass, coins, key holders, smart label) and work within different frequency ranges. With regard to power supply transponders are distinguished as:

- active
  (with battery for own power supply)
- passive
  (power supply for data transfer inductive from write/read unit)

During field operation
while inspecting system parts.

Extract from the technical data: RF x10 -Ex/AD (13.56 MHz)	
Operation frequency:	13,56 MHz
Write/Read range:	up to 80 mm (3.1"), depending on transponder type and environment
Speed of data transmissioin:	about 26 kB/sec
Writing transponder:	< 50 ms per block
Reading transponder:	< 50 ms per block
Transponder types:	ISO 15693, Tag-It, I-CODE, EM, SLI, HFI, LRI and Infineon
Extract from the technical data: RF x11 -Ex/AC (125 KHz)	
Operation frequency:	125 KHz (134 KHz on request)
Write/Read range:	up to 80 mm, (3.1") depending on transponder
Transponder types:	UNIQUE, HITAG-1, HITAG-S, TIRIS, EM 4X25, EM 4X70, Q5 (other types on request)
Special features:	Software loader for firmware update provides highest flexibility for customer applications

RFiD Transponder



TEC PU 54

RDC 30/50 sli disk

TEC PU 34

TEC PU 90

ecom instruments offers a vast variety of very different tags for industrial environments. Each of these transponders is optimised for the scanners we are providing. In order to provide the greatest variety possible, there are very different kinds of chip sets and types in different forms of casing. Therefore a corresponding tag can be delivered for almost every application and purpose. Some of them are also available as off-the-shelf products.

For example the PU Tag. It is available in 3 different sizes and forms. With diameters from 34 mm (1.3") , over 54 mm (2.2") up to 90 mm (3.5"). Special attention has been paid to the chemical resistance and the big reach of application concerning temperatures. Thanks to the special PU grouting and casing (IP 67) they can resist temperatures of up to 120 °C and most acids and bases used in industrial processes. On this page we can only show you a small selection of the possible transponders. Please contact us if you would like to discuss in further detail the complete available range.

Transponder			
LF	125kHz	410x Unique	TEC PU 34*
LF	125kHz	410x Unique	Ex-TEC PU 34*
LF	125kHz	410x Unique	TEC PU 54
LF	125kHz	410x Unique	Ex-TEC PU 54
LF	125kHz	410x Unique	TEC PU 90
LF	125kHz	410x Unique	Ex-TEC PU 90
LF	125kHz	410x Unique	Epoxy Disk 30 / RDC30
LF	125kHz	410x Unique	Ex-Epoxy Disk 30 / RDC30
LF	125kHz	HITAG S 2048	TEC PU 34*
LF	125kHz	HITAG S 2048	Ex-TEC PU 34*
LF	125kHz	HITAG S 2048	TEC PU 54
LF	125kHz	HITAG S 2048	Ex-TEC PU 54
LF	125kHz	HITAG S 2048	TEC PU 90
LF	125kHz	HITAG S 2048	Ex-TEC PU 90
LF	125kHz	HITAG S 2048	Epoxy Disk 30 / RDC30
LF	125kHz	HITAG S 2048	Ex-Epoxy Disk 30 / RDC30
HF	13,56MHz	I • Code SLI	TEC PU 34*
HF	13,56MHz	I • Code SLI	Ex-TEC PU 34*
HF	13,56MHz	I • Code SLI	TEC PU 54
HF	13,56MHz	I • Code SLI	Ex-TEC PU 54
HF	13,56MHz	I • Code SLI	TEC PU 90
HF	13,56MHz	I • Code SLI	Ex-TEC PU 90
HF	13,56MHz	I • Code SLI	Epoxy Disk 30 / RDC30
HF	13,56MHz	I • Code SLI	Ex-Epoxy Disk 30 / RDC30

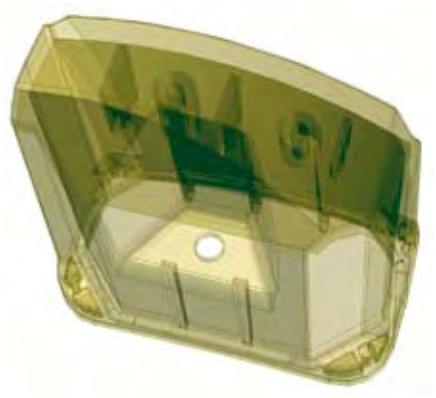
* Standard colour black, different colours on request.

Client specific solutions

Today it is more important than ever that there is a flexible approach to meeting client requirements.

ecom instruments offers this flexibility for clients projects - large or small. Not all projects require a high number of units and need only an individual and customised solution. Small challenging solutions in particular demand dedicated application. On this and the following pages we showcase the versatility of the **i.roc**® x20 by the way of client projects that have already been achieved. Many of these solutions are now part of our standard portfolio.

Please contact us to discuss in confidence your specific application requirements.



868 MHz radio module
Here, one of the main problems was the installation of an omni- directional rod antenna. In addition, it was interesting that the radio module that was to be used, was bigger than a certain mechanical size, which made it impossible to fall back on the previous solution. Finally, the project was realised by the vertical installation of the blanks and the mechanical protection of the antenna. In addition, the radio module was of a size and dimensions that meant it was neccessary to re-design the casing.

CAD production drawing

Non-Ex: Class 1 Bluetooth Module
High scope if a radio contact is used, global use without national restrictions as with WLAN 802.11b, total robustness and interference resistance, combined with a PDA that is easy to use – that was the profile of demand when the project was started. All this was put into practice by the way of installation of a Class 1 Bluetooth radio module. The Bluetooth interface still is one of the most secure radio contacts, it can be switched to "invisibility"-mode and cannot be "seen" by anyone anymore and changes the frequency 1600 times per second in the 2.4 GHz band, which is approved all over the world.

Variety via flexibility
This is only a selection of options that have already been realised. Also for you and your application **ecom instruments** can be the flexible partner for the realisation of such a solution.

Note:
Some of the solutions that have been presented on this site and solutions given have not been developed for hazardous locations. For application in hazardous locations only those modules with the designation "Ex" in the title (for example BC x10 -Ex) are allowed to be used.

Accessories

The extensive range of accessories (leather carry case, hand strap, USB data transfer set, car holder, additional batteries, charging cable, etc.) further enhances the application and use of the ***i.roc***®.

Here is just a selection of accessories currently available. If you have a specific requirement - please contact us.

Leather bag with belt loop and carrying strap

The leather bag combines carrying comfort and easy handling.

Handle

Ergonomically sound handling using the screw-on type handle broadens the possibilities of functions and applications.

Charging adapter for vehicles

The ***i.roc***® can also be recharged in cars using the charging adapter LG x10 car.

Hand strap

This hand strap reduces handling fatigue and helps prevent accidental dropping.

Docking Station

The docking station DS x10 can be used to charge the devices internal battery pack as well as synchronise data with a desktop PC connected via USB. Depending on custom configuration, when inserting the ***i.roc***® x20, a synchronisation software, like Microsoft Active Sync, will run automatically.

Leather carry case with carrying strap and stylus

Especially made for use with the ***i.roc***® series, this leather carry case further expands and enhances the usage of the ***i.roc***®.While providing much higher impact protection as well as comfortable carrying, its flexible design means that it is also suitable for ***i.roc***® units that are fitted with either RFID or Barcode modules.

Display-protection

This special antistatic display protection film is made in such a way as to replicate the sense of a pen writing on paper. The soft cushioning effect of the film also helps to protect the screen from scratches. Easily removed and cleaned - so it can be reused many times over.

Software

ecom Tools

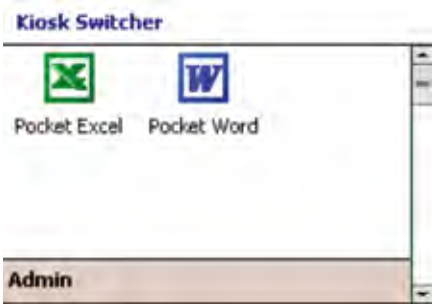
To set up the ***i.roc***® x20 series exactly to customers specifications, ***ecom instruments*** developed some smart software applications and tools. The functions described on these pages are principially available on every ***i.roc***® x20. Projects or customer specific programms can be realised easily and quickly.

ecom Edit

With the help of this tool the end-user is able to configure the PDA. With "AutoInstall" and the "SystemBackup", the new configuration will be loaded after next hardreset. The parameters are devided into several chapters like WLAN, Bluetooth, Power, Storage, Keyboard and others. The configuration file can be also modified on the desktop computer before distributing to your mobile devices. This allows an easy way to configure a large amount of devices within a project.

Kiosk-Mode

One of the favorite applications for Pocket PC is to allow only the use of predefined programs - This functionality is called Kiosk Mode. The tool KioskSwitcher which can be used on every ***i.roc***® x20 allows it to set up nearly every custom application in such a Kiosk-Mode.

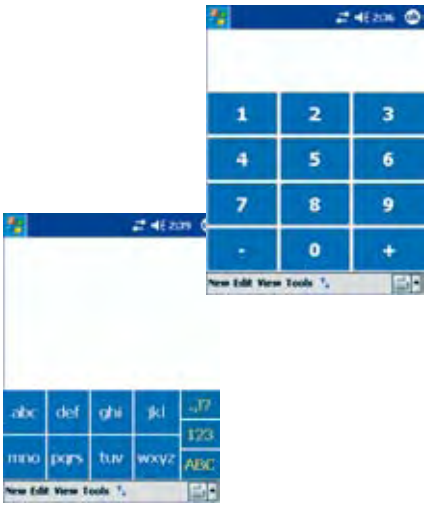


AutoInstall

One of the best ways to back up and restore all the information you wish to keep on your mobile device. It is safe, easy to install, simple to use and it's developed exactly for the ***i.roc***® x20 series efforts. System Super Visors can choose between using an AutoInstall or SystemBackup function, together these two applications fullfill every customers wish to preconfigure

Keyboards

Especially for PDAs for industrial use a reliable and easy method of recording data is required. Responding to these requirements ***ecom instruments*** decided to take a new road – with virtual full-screen keyboards.



Worn and dirty keypads, ingress of dust and contaminants and a lack of keypad illumination are now no longer a problem.

- three different layouts (numeric, alpha, special) available
- fast-switch key

Perfectly designed for data input while wearing gloves.

Technical Data

Processor
Intel XScale® PXA 270 Processor (520 MHz)

RAM
64 MB SDRAM/128 MB

ROM
Flash ROM 512 MB built-in SD card slot, (fitted with standard 1 GB SD card), build in CF card slot

Display
3.5'' transreflective TFT colour display, 64k, QVGA, 240 x 320 pixel, portrait and landscape mode, protected by a Makrolon panel

Audio
Integrated microphone and loudspeaker, internal 3.5mm Stereo audio jacket

Power supply
Rechargeable lithium-ion battery, different capacities depending on model type (***i.roc***® 420: 2880 mAh; ***i.roc***® 520 -Ex: 2880 mAh; ***i.roc***® 620 -Ex: 4000 mAh)
Note: The battery's service life depends on the user's operating habits and the PDA's configuration. The use of radio modules and background lighting significantly reduces operating time (larger batteries available on request).

Charger
LG x10 (Input: 100~240 VAC, 50/60 Hz, 0.3 A,
Output: 5VDC (typical), 2A (typical)
different country adapter included in delivery

Keyboard
On/off – switch, reset keys, 5 programmable function keys, 5-way navigation field (customised design on request)

Housing
Protection class IP 65 (immersion for brief periods), antistatic non-corroding housing, shock resistance 1m (3,281') onto concrete

Dimensions

L x W x D:	
420	178 x 85 (89) x 39 (49) mm 7'' x 3.3'' (3.5'') x 1.5'' (1.9'')
520 -Ex	178 x 85 (89) x 39 (49) mm 7'' x 3.3'' (3.5'') x 1.5'' (1.9'')
620 -Ex	178 x 85 (89) x 39 (49) mm 7'' x 3.3'' (3,5'') x 1.5'' (1.9'')

Weight

420	550 grams (19.4 oz)
520 -Ex	550 grams (19.4 oz)
620 -Ex	880 grams (31.1 oz)

Temperature ranges

Storage temp.:	-10 °C ... +60 °C (14°F ... 140°F)
Charging temp.:	- 0 °C ... +45 °C (32°F ... 113°F)
Working temp. 42x:	-10 °C ... +60 °C (14°F ... 140°F)
Working temp. 52x -Ex:	-20 °C ... +50 °C (-4°F ... 122°F)
Working temp. 62x -Ex:	-20 °C ... +50 °C (-4°F ... 122°F)

Relative humidity
Storage up to 90 % r.h.
Operation up to 90 % r.h.

Maximum altitude
Storage up to 12,192 m (40,000 ft)
Operation up to 4,572 m (15,000 ft)

Ex-data device types

i.roc® **620 -Ex**
ATEX Zone 1 / 21
Ⓔx II 2 G EEx ia IIC T4
Ⓔx II 2 D T99°C IP 65

i.roc® **520 -Ex**
ATEX Zone 2 / 22
Ⓔx II 3 G EEx nL IIC T4
Ⓔx II 3 D T99°C IP 65

i.roc® **623 -Ex**
ATEX Mining
Ⓔx I M1 EEx ia I
-10 °C ≤ T_a ≤ +50 °C

i.roc® **627 -Ex**
FM Class I, Division 1, Group A-D
FM APPROVED
(Certification 620 -Ex included)

i.roc® **527 -Ex**
FM Class I, Division 2, Group A-D
FM APPROVED
(Certification 520 -Ex included)

i.roc® ***420***
Ruggedized Industrial PDA

Honeywell MCT202 - Intrinsically Safe Configuration and Maintenance Tool

For HART® or DE protocol enabled pressure or temperature transmitters. Comprising of the industrial PDA PC *i.roc*® 620 complete with integrated HART®/DE Modem and software applications MC Toolkit and SDC 625.

The MCT202 is a mobile configuration tool for all Honeywell ST 3000 series transmitters (pressure, differential pressure, absolute pressure) and series STT 250/350 (temperature). With the use of this MCT202 all Honeywell transmitters with integrated DE protocol or HART® protocol can be configured. The SDC 625 software application utilises DD-IDE/SDC 625 technology and "Open" Tools standard. Each MC Toolkit is loaded with all HART® Device Descriptions files so that any HART® device can be configured – including common, universal and specific device commands. It will also allow vendor specific menus to be run. The intuitive use of the user interface offers detailed explanations and submenus during the whole configuration procedure. As well as the normal diagnostic functions the MCT202 provides transmitter built-in diagnostic routines. Furthermore, all process data can be shown for troubleshooting, calibration and service inspection routine.

- **mobile configuration tool - compatible with all main manufacturers of HART enabled transmitters.**
- **comfortable transmitter configuration - well known windows user interface**
- **closes the gap between PC based applications and uncomfortable "configuration-bones"**
- **futureproof and reliable, software updates can easily be downloaded by customer via PC connection, new DD´s (device descriptions) can be stored on internal SD memory card**
- **transmitter diagnostic or online monitoring possible**
- **transmitter calibration possible**
- **uses the HART® Smart Device Configurator (SDC 625) technology**
- **supports HART® 5.0/6.0**

Content of delivery

- ***i.roc***® 620 -Ex with integrated HART®/DE-modem
- Charger LG x10
- USB connection set x11
- Connection cables with clips
- CD containing MC Toolkit Software and SDC 625 Software
- Integrated SD card with preinstalled Software and HART Device Descriptions

Optional Accessories

- USB Dockingstation DS x11 with PC connecting cable
- Leather carry case

Ex-data *i.roc*® 620 -Ex
Ex designation:
Ⓔx II 2G EEx ia IIC T4
Ⓔx II 2D T99°C IP65
EC-Certificate of conformity:
ZELM 04 ATEX 0200

Technical data:	
HART® Device Descriptions:	Each MC Toolkit comprises of a complete set of HART® device descriptions loaded. If the Device vendor has qualified their device description with the HART® Foundation SDC 625 tool, the device description is assured of being compliant with the MC T202.
Protocol:	Honeywell DE (Digitally Enhanced) and HART® 5.0/6.0
Transmitter Interface cabel:	Uses same cables and connectors as Smart Field Communicator (SFC) and Smart Configuration Toolkit (SCT) (easy hook or alligator clip)
Dimensions: L x W x D:	178 x 85 (89) x 39 (49) mm

Communication

Intrinsically safe mobile phone x.com 200

The *x.com* 200 is a tri-band mobile phone designed for reliable mobile communications in harsh and hazardous environments. It is protected against water, dust and everyday impacts and is therefore particularly suitable for working in extreme conditions. The *x.com* 200 is extremely durable, which therefore makes it the ideal solution for all applications in the Ex area.

The ***x.com*** 200 can be connected to various Bluetooth-compatible devices via its Bluetooth® functionality. The PC software can be downloaded free of charge. After the user-friendly installation procedure you can transfer or synchronise data, contacts and schedules easily via Bluetooth® or by using the data cable.

It has a very bright colour, 128x160 pixel resolution display with an anti-glare coating. Another distinctive feature is the extremely loud separate speaker for ringtones and hands free function.

Thanks to its ruggedness, the super display and loud volume the ***x.com*** 200 is the ideal partner for anyone who has to work under tough conditions, yet appreciates the value of a reliable tool.

- **Tri-band mobile phone for GSM 900/ 1800/1900 networks**
- **LCD display with 65,536 colours**
- **Bluetooth®**
- **Data transmission via GPRS**
- **Rechargeable 1180 mAh Li-ion battery**
- **Free software for data transfer and synchronisation**
- **Integrated Office functionality**
- **Java™ MIDP 2.0 - platform**
- **WAP 2.0**
- **Opera Mini Web browser**

Optional accessories:
- ***x.com*** 200
- Battery AMX 20
- Charger LGX 20
- Safety information
- Instruction manual

Ex-data:
Ex-designation:
Ⓔx II 3 G Ex nA nL IIC T4

The ***x.com*** 200 mobile phone is an outdoor phone that can withstand extreme environmental conditions. It is ATEX certified for Zone 2 and 22 and it continuously provides the necessary degree of safety for your work - particularly in the Ex-area. The IP 67 protection class underlines the ruggedness of the device. It is waterproof, protected from dust and can withstand severe temperature fluctuations to minus 20 degrees. It is a tri-band phone that supports all 900/1800/1900-MHz networks worldwide. It is therefore flexible and accessible at any time.

Technical data:	
Networks:	Triband GSM 900 / 1800 / 1900 MHz
Data transfer:	GPRS class 8
Display:	LCD Display with 65.536 colours (resolution 128 x 160 pixel)
Power supply:	1180 mAh Li-ion battery
Talk time / standby:	max. 5,5 hrs / max. 220 hrs
Charging time:	ca. 3 hrs
Dimensions:	119 x 57 x 25 mm
Weight:	approx. 160 g
Ambient temperature Ta:	-20 °C ... +50 °C
IP protection class::	IP 67

Accessories for intrinsically safe mobile phone x.com 200

Headset HSX 20

Leathercase with slide swivel kit

Data cable PCX 20

Car-Kit ALX 20

Spare charger LGX 20

Intrinsically safe Bluetooth™ ear protection headset – EX-TRA BT

Spare battery pack

Intrinsically-Safe Mobile Phone x.com

X.clusive, X.treme X.plosion-proof - the *x.com*. It is the first mobile phone with an integrated acceleration sensor and GPS receiver for providing dead man's alarm and location of workers in emergency situations. The robust housing offers a high level of stability and durability against shocks and is also dust tight and splash proof according to IP64.

The ***x.com*** mobile phone series provides you with reliable and safe communication for your daily work inside the Ex-area. This extremely robust mobile phone meets your high industrial requirements according to the IP64 protection rating and is specifically suitable for demanding and loud environments.

The ***x.com*** supports GSM 900/1800 networks worldwide, so that you are flexible and can stay in touch. Besides the classic telephone functions, you can send and receive E-Mails and text messages everywhere. And with predictive text input (T9), messages are quickly written.

The ***x.com*** can be connected via Bluetooth® to various Bluetooth®-capable devices. For example, connect your mobile phone to a PC and synchronise your contacts. The integrated organiser functionality allows you to note appointments in the calendar or to be reminded about tasks.

x.com versions xx1 and higher are fitted with an 3D-acceleration sensor and the most up-to-date GPS chipset. The integrated acceleration sensor detects the position of the ***x.com*** user and is able to activate an automatic alarm in case of emergency.

The integrated GPS chip supports the exact location of people in an emergency situation. When the mobile phone sends an alarm, the current position data of the GPS chip is transmitted via SMS to a tracking software application. Please note that positioning using GPS is dependant upon the local physical surroundings.

Emergency situations can be recognised quickly and appropriate rescue operations can be initiated.

The ***x.com*** is available as an industrial version 40x without explosion protection and as the explosion-protected versions for Zones 1 / 21 (60x) and Zones 2 / 22 (50x). You can also select between the robust standard GSM version ***x.com*** x00 and the version ***x.com*** x01 with an integrated 3D-acceleration sensor and GPS receiver*.

* All versions of the x.com can be combined in any way (e.g. the x.com 601 is a Zone 1/21 mobile phone with an integrated 3D-acceleration sensor and GPS).

- **Dual band mobile phone for GSM 900/1800 networks**
- **LCD display with 65,536 colours**
- **Bluetooth®**
- **Data transmission via GPRS**
- **Java™ MIDP 2.0 - platform**
- **Integrated Office functionality**
- **Synchronisation with MS Outlook® or Lotus Notes®**
- **Rechargeable Li-Ion battery with 2500 mAh or 2000 mAh in the Ex-versions**
- **Man down sensor and GPS (version xx1)**

Standard delivery:

- ***x.com***
- Battery ***x.com*** AMH x0
- Charger LGX 00
- Codice di attivazione del software
- Safety instructions (in the I.S.-versions)
- Operating instructions

The mobile phone for extreme requirements.
The first mobile phone with integrated position sensor and GPS for alerting and locating workers in emergency situations.

Able to meet the diverse needs and requirements of industry operating both inside and outside of Ex-hazardous areas, the ***X.com x0x*** available in three different versions - ***40x***, ***50x -Ex*** und ***60x -Ex*** -along with a comprehensive range of Ex-certifications.

	***X.com* 40x** Industrial Mobile Phone	***X.com* 50x** for Zone 2 & 22	***X.com* 60x** for Zone 1 & 21
Ex-data:		⟨Ex⟩ II 3 G Ex ic IIC T4 ⟨Ex⟩ II 3 D Ex icD 22 T130°C	⟨Ex⟩ II 2 G Ex ib IIC T4 ⟨Ex⟩ II 2 D Ex ibD 21 T130°C
EC-Certificate of Conformity:		ZELM 08 ATEX 3380 X	ZELM 08 ATEX 0372 X
		***X.com* 51x** for Zone 2	***X.com* 61x** for Zone 1
Ex-data:		⟨Ex⟩ II 3 G Ex ic IIC T4	⟨Ex⟩ II 2 G Ex ib IIC T4
EC-Certificate of Conformity:		ZELM 08 ATEX 3380 X	ZELM 08 ATEX 0372 X
Networks:	Dual band GSM 900 / 1800 MHz		
Display:	LCD-Display with 65.536 colours (resolution 176 x 220 pixel)		
Power supply:	Li-ion battery with 2500 mAh	Li-ion battery with 2000 mAh	Li-ion battery with 2000 mAh
Talk time:	max. 4hrs		
Stand-by:	max. 150hrs		
Stand-by with GPS on:	max. 24 hrs		
Charging time:	approx. 4 hrs		
Ambient temperature:	-20°C ... 50°C		
Dimensions:	142 x 64 x 36 mm (153 x 64 x 36 mm only ***X.com* 60x**)		
Weight:	approx. 240 g		
Protection rating:	IP54	IP64	

Accessories for intrinsically safe mobile phone x.com

	Description		Description
	Battery pack AMX 40 AMX 50 AMX 51 AMX 60 AMX 61		Spare charger LGX 00 (universal for EU/UK/US)
	Data cable PCX 00		Leather case for ***x.com*** 4xx non Ex, black for ***x.com*** 5xx Zone 2 Ex, yellow and ***x.com*** 61x Zone 1 Ex, yellow for ***x.com*** 60x Zone 1 Ex, yellow
	Bluetooth Car Kit CK1		Car-Kit CKX 00 (Only for ***x.com*** 40x and x1x)
	Desktop charger DCX 00		Safety plug for ***x.com*** 60x
	Leather swivel kit belt 45 mm		Leather swivel kit belt 65 mm breit
	Case belt clip		Mounting button + slide & swivel clip plastic
	Metal belt clip		Mounting button for clip and belt loop or plastic metal

Intrinsically-Safe Mobile Phone Ex-Handy 05

Compact and safe! The Ex-Handy 05 combines simple and comfortable use with the flexibility of enabling you to stay in touch wherever you are – even if you work in ex-hazardous areas. Specifically designed for stability and durability, the Ex-Handy 05 is the ideal solution for working in Ex-areas.

Reliable and safe communication is essential to your everyday work in ex-hazardous areas. The Ex-Handy 05 is an ATEX-certified mobile phone for use in Zone 1, 2 and Zone 22, and always provides you with the necessary safety for your work. The compact housing and the integrated rubber parts provide you with a perfect grip and also deliver protection against dust and shocks in accordance with IP54 protection rating.

The Ex-Handy 05 supports all GSM 900/1800/1900 networks worldwide, so that you are flexible and can stay in touch. Besides the classic telephone functions, you can send and receive E-Mails and text messages from any location. And with predictive text input (T9), messages are quickly written.

The Ex-Handy 05 is equipped with Bluetooth® so that it can be connected to a variety of Bluetooth®-capable devices. For instance, connect your mobile phone to a PC and synchronize your mobile's telephone book or transfer files to your mobile phone. The integrated organizer functionality allows you to record appointments in your calendar or have your phone remind you of tasks.

In addition, Bluetooth® allows you to communicate wirelessly with PDAs. For example, you can transmit data via GPRS* (62.4 kbit/s) to a server or connect directly with your software system – and all in the ex-hazardous areas.

An integrated WAP browser (Version 2.0) provides you with fast and easy access to the mobile web.

The Ex-Handy 05 is particularly characterized by its intuitive use and practical functions. It is the ideal partner for use at the office or on site

* Depending on services available from your carrier.

- **Triband mobile telephone for GSM 900/1800/1900 networks**
- **LCD display with 65,536 colours**
- **Bluetooth®**
- **Data transmission via GPRS**
- **Java™ MIDP 2.0 - platform**
- **Integrated Office functionality**

- **Synchronisation with MS Outlook® or Lotus Notes®**
- **Rechargeable Li-Ion battery with 850 mAh**
- **Infrared interface**

Standard delivery:
- Ex-Handy 05
- Battery Ex-AMH 05
- Charger LGH 05
- Codice di attivazione del software
- Operating instructions

Technical data:	
Networks:	Triband GSM 900 / 1800 / 1900 MHz
Data transmission:	GPRS Class 10 (up to 62.4 Kbit/s)
Display:	LCD display with 65,536 colours (resolution 128 x 128 pixels)
Power supply:	Li-Ion rechargeable battery with 850 mAh capacity
Talk time / stand-by:	max. 4h / max. 150h
Charging time:	approx. 3 h
Ambient temperature:	-10 °C ... +50 °C
Dimensions:	117 x 52 x 24 mm
Weight:	approx. 175g
Protection rating:	IP54

Ex-data:
Ex-designation:
⟨Ex⟩ II 2 G Ex ib IIC T4
⟨Ex⟩ II 3 D Ex ibD 22 IP54 T55°C
EC-Certificate of Conformity:
ZELM 07 ATEX 0337

Accessories for intrinsically safe mobile phone Ex-Handy 05

	Description		Description
	Spare battery pack Ex-AMH 05		Bluetooth Car Kit CK1
	Spare charger LGH 05 /EU		Metal button for Ex-Handy 05
	Spare charger LGH 05 /UK		Screwdriver Torx T6
	Spare charger LGH 05 /US		Rubber seals for charging socket
	Car charger ALH 05		Rubber seals for SIM-card slot
	Car-Kit CKH 05		Rubber seals for charging socket and SIM-card slot
	Data cable PCH 05		Screws for backside housing

Accessories for all leather cases and vehicle brackets Ex-Handy 05

	Description		Description
	Leather case for Ex-Handy 05, yellow		Mobilie bracket
	Mounting button + Slide & Swivel Clip, plastic		Vehicle bracket - flexible with suction mount
	Leather swivel kit 45 mm belt		Suction cup adaptor plate, 70 mm, self-adhesive
	Leather swivel kit 65mm belt		Suction cup adaptor plate, 70 mm, screwable
	Case belt clip		Vehicle bracket - flexible with screw mount
	Mounting button, plastic		Vehicle bracket for ventilation ports
	Metal belt clip		

Intrinsically-Safe Two-Way-Radio Ex-PMR 1000

The Ex-PMR 1000 is a license and charge-free two-way radio for wireless communication in Ex-hazardous areas.

Safe and reliable communication is an important aspect in Ex-hazardous areas. Stringent requirements have to be satisfied by all radio transceivers used, to ensure a safe communication, even over long distances.

The ecom Ex-PMR 1000 portable radio transceiver was developed specifically for this purpose. Featuring ATEX certification in protection class Ex II 2 G Eex ib IIC T4 or Ex II 3 D T130°C IP 54, the device can be used in Zones 1 and 2, or 22.

The frequency band ranging from 446.000 MHz to 446.100 MHz was opened for public use by the ERC with the publication of its decision ERC/DEC/(98) 25, 26, 27 dated 1 December 1998. All handheld devices with fixed antenna which operate in this frequency range conform to the ETS 300296 licensing standard and are allowed to be used license- and charge-free in many European countries.

The Ex-PMR 1000 fulfils the rigid specifications of IP54 and therefore meets the high demand for industrial ruggedness and reliability especially for applications in Ex-hazardous areas.
The maximum transmission power is limited to 500 mW ERP, giving a range of up to 5 km. The CTCSS and DCS pilot tone systems are configured for selective analogue and digital coding. A variety of pilot tones enables users to communicate within groups.

All functions of the radio unit can be easily preconfigured via a PC using the optional software kit.

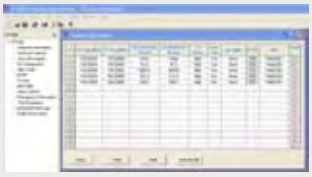
- **16 channels**
- **DCS selective call for transmission and reception**
- **Up to 5 km range**
- **Scan function**
- **Approved for dust-Ex-areas (zone 22)**
- **Squelch tail elimination (9 levels)**
- **TOT (transmission time limit)**
- **Battery save function**
- **IP54 protection rating**

Standard delivery:
- Radio unit Ex-PMR 1000
- Ex-battery pack Ex-AM PMR 1000
- Belt clip for Ex-PMR 1000
- Charger LS PMR 1000
- Power supply unit PS PMR 1000
- Operating instructions

Ex-data:
Ex designation:
Ⓔx II 2 G EEx ib IIC T4
Ⓔx II 3 D T130°C IP 54
EC-Certificate of Conformity:
ZELM 05 ATEX 0271

Technical data:	
Frequency range:	446.00625 – 446.09375 MHz
Sensitivity:	approx. 0.25 µV at 12 dB SINAD
Channel spacing:	12.5 KHz
Max. transmission power:	500 mW ERP
IP protection:	IP 54
Battery pack:	Rechargeable Li-Ion battery pack Ex-AM PMR 1000 with 1700mAh
Ambient temperature:	-20 °C ... 50 °C
Operating time:	approx. 12 h (90 % standby, 5 %TX, 5 %RX)
Dimensions (LxWxD):	140 x 60 x 35 mm
Weight:	approx. 430g

Accessories for Intrinsically-Safe Two-Way-Radio Ex-PMR 1000

	Description		Description
	Battery Ex-AM PMR 1000 (1700 mAh Li-Ion)		Charger Power adaptor and charger (UK or EU)
	Leather case incl. carrying strap and belt loop (black)		Software Kit incl. data cable (attention serial plug needed)
	Microphone-/Remote speaker combination Ex-HS01		Ear Protection Headset Ex-TRA 300 Available with helmet adapter for popular safety helmets
	Neck band Headset Ex-TRA 300		Fire brigade headset Ex-TRA 300 Adapter for almost every helmet available
	Belt clip		Ear plug for HS01
			Hand Strap (included in the set)

Intrinsically-Safe Professional Mobile Radio Ex-PMR 2000

ecom has developed a professional handheld radio specifically for your daily work in ex-hazardous areas. The Ex-PMR 2000 offers safe and reliable voice communication in daily operation or even in emergency situations. Communicate simply and without risk with your colleagues – at any time in all situations.

The Ex-PMR 2000 can be used in the Zones 1 and 2.
This professional radio operates in two different frequency bands and is available in either the VHF 136-174 MHz or the UHF 400-470 MHz version. The radio's transmission power has been limited to 1.2 watts for safe working in potentially explosive areas and initiating calls even over large distances.

In addition, the Ex-PMR 2000 complies with IP 64 and therefore satisfies high industrial demands on ruggedness and reliability, particularly in ex-hazardous areas. The CTCSS and DCS pilot tone systems and the signalling modes with five-tone signals guarantee that communication is secure thus preventing interference from other radio communication.

The Ex-PMR 2000 is equipped with a variety of mechanisms to protect lone workers. The integrated position sensor enables the monitoring of angles and will in emergency situations trigger an automatic alarm (dead-man's switch). The functions for protecting lone workers as well as the emergency button also allow manual alarms to be triggered by workers in emergency situations.

All parameters for the Ex-PMR 2000 functions may be comfortably set on a PC using the corresponding software kit and can also be saved for programming several units. Thus minimizing work and ensuring that all radios harmonize with each other.

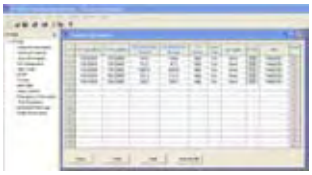
- **16 channels**
- **Programmable channel spacing**
- **CTCSS, DCS, 2- and 5-tone signalling**
- **Scan mode**
- **Adjustable squelch levels**
- **Transmission time limitation (TOT)**
- **Emergency alarm functions**
- **Lone worker protection**
- **Dead-man's switch with position sensor**

Standard delivery:
- Ex-PMR 2000 U/V
- rechargeable battery Ex-AM PMR 2000
- Belt clip
- Operating instructions

Ex-data:
Ex-designation:
Ⓔx II 2 G Ex ia IIC T4
EC-Certificate of Conformity:
ZELM 06 ATEX 0318

Technical data:	
Frequency range:	VHF 136-174 MHz, UHF 400-470 MHz
Number of channels:	16
Channel spacing:	12.5/20/25 KHz
Operating voltage:	7.4 V
Operating temperature:	-20 °C ... +50 °C
Antenna impedance:	50 Ω
Protection rating:	IP64
Dimensions (LxWxD):	119 x 59 x 45 mm
Weight:	approx. 400g
Battery:	1700 mAh, Lithium-Ion
Operating time:	approx. 12 h (90 % standby, 5 %TX, 5 %RX)

Accessories for Intrinsically-Safe Two-Way-Radio Ex-PMR 2000

	Description		Description
	Battery Ex-AM PMR 2000 (1700 mAh Li-Ion)		Charger Power adaptor and charger (UK or EU)
	Leather case incl. carrying strap and belt loop (black)		Multi Docking Station MC PMR 2000
	Microphone-/Remote speaker combination Ex-HS02		Ear Protection Headset Ex-TRA 300 Available with helmet adaptor for popular safety helmets
	Neck band Headset Ex-TRA 300		Fire brigade headset Ex-TRA 300 Adaptor for almost every helmet available
	Ear plug for HS02		Software Kit incl. data cable (attention serial plug needed)

Intrinsically safe TETRA THR880i Ex handportable radio

The ATEX approved radio has been specially designed for use in the chemical and petrochemical industry, as well as at airports and on oil rigs.

Numerous accessories such as headsets, chargers and leather cases make the unit attractive for many different areas of application.
The THR880i Ex radio fulfills the following specifications for TETRA radio equipment in the temperature range of •20°C to +50°C:

- EN 300 392 V+D air interface
- EN 300 394 V+D conformance testing
- II 2G Ex ib IIC T4 ATEX certification
- The ex-protected modification of the handportable radio is conducted by ecom instruments GmbH

Power class
- EN 300392
- 2 compliant, power class 4
- Receiver class A
- RF power control, 4 steps of 5dB

GPS receiver
- Sensitivity –152 dBm
- Cold start accuracy (open sky*)
  - 5 metres (50% confidence level)
  - 10 metres (95% confidence level)

*measured at –130 dBm

GPS activity indicator
- Automatic position saving
- Position information sending on request or on triggers (e.g. time, distance, status message)
- Position sending during red key calls and public emergency calls
- Waypoints, waypoint guidance
- NMEA routing to serial port
- Support for ETSI location information protocol for TETRA (LIP)

Group communication
- Up to 2000 talk groups
- Up to 200 talk group folders
- Up to 400 groups per folder
- Dynamic Group Number Assignment (up to 200 DGNA groups)
- Up to 10 background groups
- Priority scanning
- Scanning list up to 59 talk groups
- Voice override in group calls (pre-emption)
- Late entry

Direct mode features
- Up to 180 DMO groups
- 60 DMO channels
- DMO gateway and repeater support
- Scanning
- Red key call to DMO group, red key call to TMO within TETRA network coverage
- Public emergency call within TETRA network coverage
- DMO SCK encryption
- Status messages in DMO

The dual operating concept and the battery, which can be exchanged outside the Ex-area, fulfil the needs of customers in an optimum manner.
Simple standard communication via the radio element and the ability to use all of the conveniences of a mobile phone have already won over numerous customers.
It's IP55 protection rating ensures the unit is protected against water splash and dust, and is therefore ideal for use in Ex-Zone 1 + 2.

Technical data:	
Frequency range:	380 - 400 Mhz, 410 - 430 Mhz, Non-Ex
Display:	High-resolution active TFT color display Supports up to 65,536 colors within 130 x 130 pixels
Power supply:	Internal Battery BLN-Ex, Li-Poly 1400 mAh
Talk time:	up to 1,5 - 3 h (Duplex operating)
Stand-by:	up to 17 h
Charging time:	up to 2,5 h (with ACP-12, off)
Dimensions:	157 x 57 x 35 mm
Weight:	275 g
Protection rating:	IP 55

Call types
- Phone calls in TETRA network
- Phone calls to public network
- Express and group calls in TETRA networks
- TETRA emergency calls
- Public emergency calls

- **Dual operating concept (telephone and radio)**
- **Direct mode feature**
- **Air interface encryption**
- **GPS receiver**
- **Text messages**
- **Group communication with up to 2000 talk groups**
- **WAP browser and Java support for customised applications!**
- **Lightweight and handy design**
- **Impact resistant, dust and splash water proof**

Standard delivery:
- EADS THR 880i Ex
- BLN-Ex battery
- ATEX Battery-Saftey-Plug
- Travel charger ACP-12E
- Operating instructions
- Safety instructions

Ex-data:
Ex-designation:
⟨Ex⟩ II 2G Ex ib IIC T4
EC-Certificate of Conformity:
ZELM 07 ATEX 0347 X

Accessories for TETRA THR880i Ex

Desktop charger DCR-1

Portable active holder CRR-1

Travel charger ACP-12E

Removable BLN-Ex battery

Car charger LCH-12

Leather case with clip

Car-Kit CARK-91B

Headset with helmet adaptor

Fire brigade headset

Neckband headset

Intrinsically safe headsets – Ex-TRA 300

The Ex-TRA 300 headsets are a new series of explosion-protected headsets for use under extreme conditions. The products have been developed in conjunction with demanding users and subjected to rigorous examination. We are therefore sure that the headsets will fulfil your requirements for industrial capability and reliability.

Being heard in a noisy environment is very difficult. Without the right equipment it is virtually impossible to relay information and instructions to employees. The headset series from ecom has been specifically designed for these applications.

Furthermore, the Ex-TRA ear protection headset also protects against subsequent health damage, which can be caused by too loud a noise level. Soft sealing rings and gentle contact pressure ensure high wearing comfort and high insulation values.

The Ex-TRA neckband headset can be easily worn with a helmet without being connected. The speaker is connected to the ear via a soft silicone sound tube, which prevents altering the natural amplification of the ear. The system thus enables clear vocal communication, even in noisy environments.

The Ex-TRA fire brigade headset has been optimally designed for communication between fire-fighters. The rugged design, the waterproof electret goose neck microphone and the splash-resistant transmit button ensure high performance. The universal communication unit can be easily adapted to all common fire-fighter helmets.

The headsets are available for the ecom radio units Ex-PMR 1000 and Ex-PMR 2000, as well as for the Motorola GP series and the THR880i Ex. All headsets are equipped with their own PTT button. The versions applicable for the digital TETRA radio standard have an integrated amplifier circuit. This also ensures clear, loud communication here as well.

Technical data:	
Ambient temperature Ta:	-20°C ... +50° C
Protection rating	IP 54
Sound insulation (ear protection headset only)	approx. 27 dB
Weight	approx. 520 g (ear protection headset, incl. PTT button)
	approx. 118 g (neckband headset, incl. PTT button)
	approx. 130 g (fire brigade headset, incl. PTT button)

Types and accessories for Headset Ex-TRA 300

Type: Fire brigade headset

Accessories

Windscreen for microphone M995

Adaptor for Fire brigade helmet, type on application

- ATEX approved for Zone 1
- Different helmet adaptations possible
- Hearing protection with extremely high insulation values
- High wearing comfort thanks to perfect positioning and comfortable contact pressure
- Available for ecom, Motorola and TETRA THR880i Ex radio units

Standard delivery:
- Ex-TRA 300
- Operating instructions

Ex-Data:
Ex-designation:
⟨Ex⟩ Ex II 2G Ex ia IIC T4
EC-Certificate of Conformity:
ZELM 08 ATEX 0390 X

Type: Neckband headset

Type: Headset with helmet adaptor

Accessories

Windscreen for microphone M995

Ear olive

Ear pad

Ear Mould

Dam foam

Ear adaptor

Frame pad / Nappa leather

Sound hose

Helmet adaptor type on application

Intrinsically safe Bluetooth™ ear protection headset – EX-TRA BT

The intrinsically safe Ex-TRA BT headsets make optimum use of innovative Bluetooth™ technology to facilitate communication in noisy environments. They are on-hand at any time - quickly, easily and wirelessly. No bothersome cables get in the way and you are ensured of constant contact through your phone or radio unit - even if they are not in sight.

The wireless communication headset with integrated Bluetooth chip enables connection to other Bluetooth units within a radius of approximately 10 metres. No more cumbersome fiddling with cables and connectors: Once the connection has been established full-duplex communication is available at any time - a standard that works around the world. Operation is conducted via four buttons: The function button, call button (PTT/push-to-talk button), volume increase and volume decrease buttons. The headset is even convincing in very noisy environments due to its effective level of sound insulation. It not only ensures hearing protection, but also enables clear, reliable communication at very high noise levels. The efficient noise compensation of the microphone reduces interference from ambient noise. Provided the devices are switched on and located within range, communication is effected between them exactly as if they were connected via a cable. When you have connected your headset with your mobile phone, simply press the call button on the headset to answer a call.

If your phone supports voice-activated calling, it is also possible to utilise this function via the headset. The Ex-TRA BT unit is particularly suitable for use with the ***Ex-Handy 05*** mobile phones from ecom and the entire ***X.com*** series.

Even existing W-LAN networks can be used for communication when utilised in conjunction with our explosion-protected PDA ***i.roc***.

Technical data:	
Ambient temperature Ta:	-20 °C ... +50 °C
Storage temperature:	-20 °C ... +50 °C
IP protection class:	IP 54
CE designation:	CE0102
Range:	approx. 10 m (0 dBm)
Operating time:	Standby approx. 750 hrs
Talk time:	approx. 20 hrs
Sound insulation:	30 dB

Types and accessories for Headset Ex-TRA BT

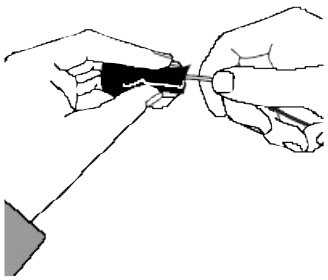
Ear protection headset
MT53H7P3EWS2-EC Helmet mounting

Ear protection headset
MT53H7BWS2-EC Neckband

Ear protection headset
MT53H7AWS2-EC Headband

Helmet adaptor

Windscreen for microphone M995



Microphone guard HYM1000

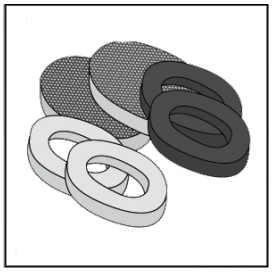
- **Different versions available depending on area of application**
- **Integrated Bluetooth circuit**
- **Ear protection with high insulation values**
- **Possible to connect to other Bluetooth devices within a 10 m radius**

Scope of delivery:
- Ex-TRA BT
- Battery ACK15-EC
- Charger FR15-EC
- Operating instructions

Ex-data:
Ex-designation:
Ⓔx II 2G Ex ia IIC T4
Ⓔx II 2D Ex iaD 21 T130° C
Ⓔx I M1 Ex ia I
EC-Certificate of Conformity:
IBExU 08 ATEX 1111

Charger FR15-EC

Spare battery pack ACK15-EC



Hygiene set HY79

Intrinsically-Safe ear capsule radio unit Lite Com Pro

Lite Com Pro is a radio unit integrated into the capsules. It enables effective communication up to a distance of 3 kilometres. Two external microphones allow individual adaptation of the ambient noise.

The new radio units can be provided with a headband or neckband; a helmet-mounted version is also available.

- **30 channels**
- **83 DCS and 38 CTCSS codes for targeted transmitting and receiving**
- **Up to 3 km range**
- **Ambient volume can be adjusted over 5 levels**
- **Receiving volume can be adjusted over 5 levels**
- **Squelch can be programmed over 5 levels**
- **TOT (Time Out Timer)**
- **Voice-activated VOX transmission**

Scope of delivery:
- Lite Com Pro
- Headband or helmet adapter
- Battery module ACK05
- Mains adapter FR05
- Instruction manual

Ex-data:
Ex-designation:
Ⓔx II 1 G EEx ia IIC T4
EC-Certificate of Conformity:
NEMKO 07 ATEX 1188

Lite Com Pro is an ear protector with integrated radio unit and electronic level-dependent function. Microphones located on the outside of the headset absorb the ambient noise and relay it to the headphones. The electronics of the ear protector attenuate loud impulse sounds to a safe level, whilst simultaneously facilitating communication with others in the vicinity.
The voice-activated Vox function means you always have both hands free to work.

Lite Com Pro operates at a frequency range of 430 - 470 MHz. The licence-free PMR 446 radio range (at a frequency of 446.000 MHz to 446.100 MHz) can be programmed and used.
A reduction of the transmission power to 10 mW also enables use of the free LPD frequencies in the 433 MHz frequency band.

Up to 30 channels are available and can be decoded in sub-channels. Individual programming of the frequencies means nothing will interfere when communicating with existing ecom radio units.

Technical data:	
Frequency range:	430 - 470 MHz
Sensitivity:	approx. 0,25 µV at 12 dB SINAD
Channel spacing:	12,5 kHz/25 kHz/20 kHz
max. transmission power:	200 mW / 20 mW / 10 mW
Power supply:	NIMH battery pack ACK 05
Ambient temperature:	-20 ° C ... 55 ° C
Operating time:	approx. 12 h. (90 % standby, 5 % TX, 5 % RX)
Weight:	approx. 450 g (mit Akku)

Types and accessories for I.S. ear capsule radio unit Lite Com Pro

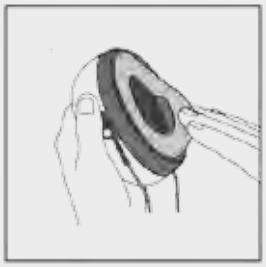
Helmet attachment

Head band

Helmet adaptor

Dynamic microphone
MT7-07

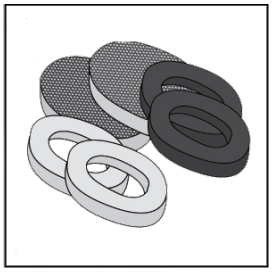
Electret microphone
MT53



Disposable protection
Clean HY100A

Charger set FR05

Spare battery pack ACK05



Hygiene set HY79

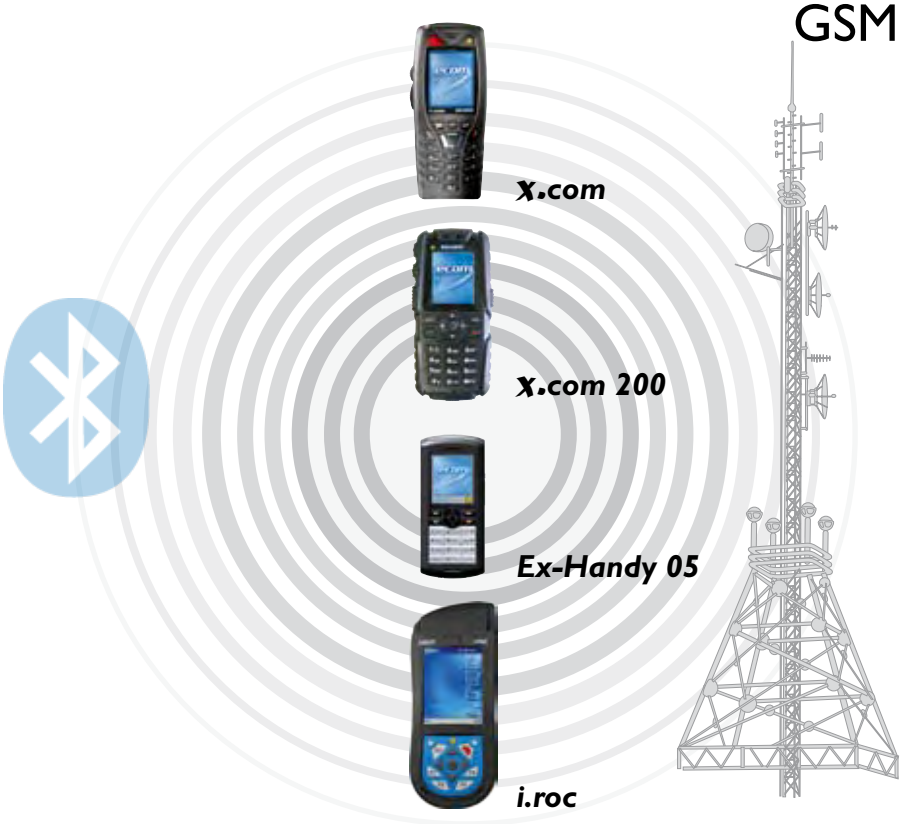
External PTT-taste

Application possibilities of the Ex-TRA Headset

Intrinsically safe Bluetooth™ ear protection headset – EX-TRA BT

Ex-Data:
Ex-designation:
Ex II 2G Ex ia IIC T4
Ex II 2D Ex iaD 21 T130° C
Ex I M1 Ex ia I
EC-Certificate of Conformity:
IBExU 08 ATEX 1111

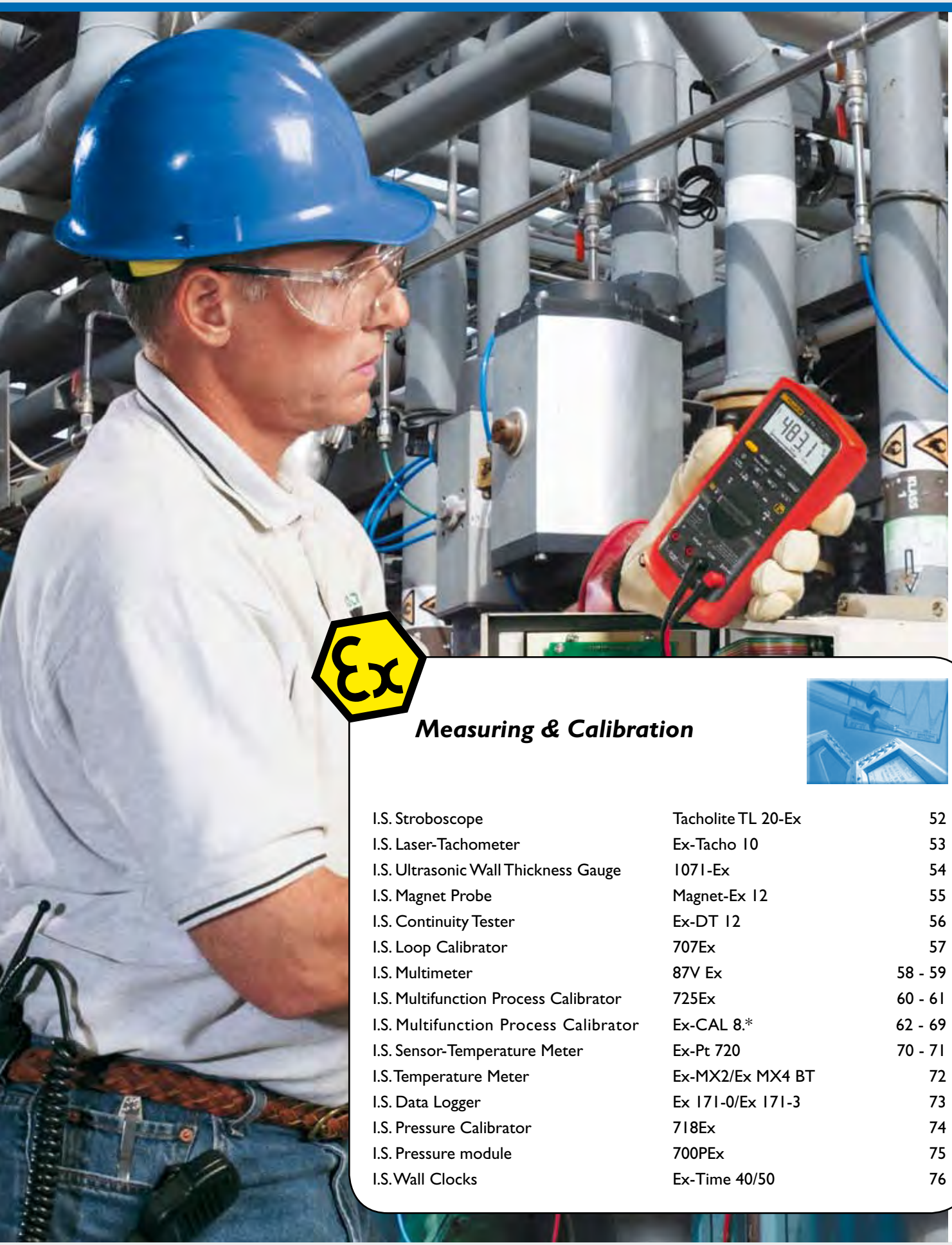
GSM



Intrinsically safe headsets – Ex-TRA 300

Ex-Data:
Ex-designation:
Ex II 2G Ex ia IIC T4
EC-Certificate of Conformity:
ZELM 08 ATEX 0390 X

ANALOGUE RADIO



Measuring & Calibration

Intrinsically-Safe LED Stroboscope Tacholite TL 20-Ex

Observe systems at work without shutting them down! The Tacholite TL 20-Ex is a high-performance digital LED stroboscope for daily use in the ex-area. It is especially useful for observing and inspecting systems that exhibit rapid periodic motion sequences. It is certified for use in ex-hazardous areas classified as zone 1 according to 1999/92/EG (ATEX 137).

- Certified for zone 1
- Simple digital control of flash frequency with cursor keys
- Robust aluminum housing
- Broad field of application up to 21000 U/min or 350 Hz
- Switch from frequency to revolutions with a button

Scope of delivery:
- TL 20-Ex
- Battery
- Operating instructions

Accessories:
- Leather case

Ex-Data:
Ex-designation:
⟨Ex⟩ II 2 G Ex ia IIC T4

EC-Certificate of conformity:
BVS 08 ATEX E 033

The Tacholite TL 20-Ex is a compact, intrinsically-safe LED stroboscope that allows you to inspect your facilities without shutting down the system. It is useful for inspecting maintenance markers on clutches, as well as belt drives and pulleys, roller bearings or compactors. It allows you to see the system at a virtual standstill in order to see what maintenance is necessary. Also making it easier to recognise imbalances and faulty bearings. The TL 20-Ex can also be used to measure engine speed without the need for using reflective markers. As soon as a contrast emerges, engine speed can be determined with high accuracy.

The applications of a stroboscope are nearly endless.

In the field of machine construction, cogwheels and their level of wear or the distribution of coolants and lubricants can be inspected quickly and easily. Of course, clutch slip, drive imbalances and resonance vibrations can also be recognised simply, easily and safely.

There are also electrical engineering applications. For instance, cable feeds to vibrating machines can be checked for wear or damage without turning off the machine.

Likewise, mixing and dosage processes can be monitored via a stroboscope. For instance, it can be used to determine the cause of drop formation during automization processes. This helps you quickly get to the root of problems and make settings adjustments.

Technical Data:	
Ambient temperature:	-20 °C ... +50 °C
Storage temperature:	-30 °C ... +60 °C (without batteries)
Dimensions:	approx. 128 x 84 x 35 mm
Ingress protection:	IP 65
Measurement accuracy:	< 0.01 %
Frequency range:	1Hz – 350 Hz
Speed:	60 – 21000 rpm
Illuminant:	20 LEDs
Ingress protection:	IP 65
Power supply:	9 V battery, type approved
Operating time:	2 h

Intrinsically-Safe Laser Tachometer Ex-Tacho 10

For the accurate and fast measurement of shaft rotation or speed with or without contact.

The Ex-Tacho 10 is ideal for fast laser-accurate measurement of the revolution of a shaft (either with or without contact) and speed (utilising the special adapter) in Zone 1. The simple 3 push-button operation and the large clearly-readable display with over-head facility enables a wide, flexible field of application. This light-weight device provides an easy one handed operation and facilitates the carrying-out of measurements after which it can be stowed away in the tool box or jacket pocket.
Applications are to be found in the process-controled field for the contactless measurement of the revolutions of a shaft at a safe distance using a laser beam. For boiler mixers, the rotor speed can be read-off from the drive shaft at a safe distance and documented. Motor revolutions can be acquired contactlessly in the immediate vicinity without having to open or remove safety fittings such as covers or protective grills. The duration of pulses or the intervals between them can be simply, easily and accurately ascertained. Data can be simply acquired within Ex-protected areas without having to switch machines off because laser-accurate measurements can be made at a safe distance through protective devices thus complying with safety regulations. The transport speed of conveyor belts can be exactly measured using the add-on adapter and thus directly recorded in the documentation.

- **high accuracy**
- **handy size**
- **digital display also for over-head measurement**
- **types of measurement – revolution, speed**
- **measurement range 3 ... 99,999 rpm**

Operation:
- ON button – Auto-Off after 1 min.
- HOLD function for 1 min. after releasing button
- Programming function using 3 buttons
- Statistic functions (min./max./average)

Display:
- 5 digit
- large display
- LOW-batt. display
- pulse recognition
- function mode

Standard delivery:
- Ex-Tacho 10
- batteries
- calibration statement
- adaption wheel
- carrying case
- instruction manual

Ex-Data:
Ex-designation:
Ⓔx II 2 G EEx ia IIC T4

EC-Certificate of conformity:
BAS 02 ATEX 2159 X

Technical data:		
Measuring system:	optical/laser reflection	
Laser class:	2	
Measuring function Rotational speed:	rpm	rps
Measuring function Speed:	m/min yd/min ft/min	m/sec yd/sec ft/sec
Time interval:	sec	
Measurement range:	3 ... 99,999 rpm 0.05 ... 1,666 rps autoselect	
Accuracy (at rate):	0.01 % ±1 digit	
Resolution:	0.001 digit or ± 1 digit fix (selectable) (in autorange)	
Measurement angle:	max. ± 80° to the measurement object	
Measurement distance:	max. 2 m	
Ambient temperature:	-20 °C ... +40 °C	
Storage temperature:	-20 °C ... +40 °C	
Dimensions:	215 (260) x 40 x 40 mm w/o (with) adapter	
Weight:	approx. 360 g (with battery)	
Power supply:	4 x Duracell Procell AAA alkaline	
Battery-Low:	display	
Operating time:	approx. 6 months	

Intrinsically-Safe Ultrasonic Wall Thickness Gauge 1071-Ex

For checking minimum wall thickness of pipes and tanks in Ex-hazardous areas.

With the 1071-Ex measurements of wall thicknesses can be made quickly and accurately in the range of 0.7 to 400 mm.

There are three different probes available to cover this wide measuring range, each of which can be easily and conveniently changed inside the hazardous area.

Due to its compact size and operating time of over 200 hours, this easy to use instrument is essential whenever the continuous supervision of minimum wall thicknesses is required.

For example, it is possible to check the thickness of protective coats or for the erosion of pipe or tank walls even while the plant is operating.

By using the limit value guides, minimum and maximum values can be set and are registered by an audible signal.

The calibration functionality of the instrument means that adjustments can be made to compensate for the type of material being measured, this is done by one of two ways:

1. entering the sound velocity of the corresponding material
2. measuring a material with known thickness and adjusting the instrument to that reference.

These adjusted parameters then stay in the memory even when switching off the instrument. Display resolution and sensitivity are also fully adjustable and as with all the other functions, are easily selected from the straightforward menu.

- **Probes can be changed in Ex-zones**
- **Accuracy ± 0.05 mm**
- **limit value guides and monitoring**
- **adjustable sensitivity**
- **easy to use**
- **energy saving mode**

Standard delivery:
- 1071-Ex
- leather case
- primary cells
- case
- 100 ml of ultrasound couplant gel
- instruction manual

Options & Accessories:
- Standard probe DSE 10,4/6 PB 4
- Handle-collar for standard probe
- Vulcollan films (10 pcs.) for DSE 10,4/6 PB 4
- Low frequency probe DSE 18/25 PB 1,5
- Handle-collar for low frequency probe
- Vulcollan films (10 pcs.) for DSE 18/25 PB 1,5
- Mini probe DSE 4,2/4 PB 8
- Vulcollan films (10 pcs.) for DSE 4,2/4 PB 8
- ECHOTRACE ultrasound couplant gel 500 ml

Ex-data:
Ex designation:
⟨Ex⟩ II 2 (1) G EEx ia IIC T4

EC-Certificate of conformity:
PTB 97 ATEX 2231 X

Technical data:	
Ingress protection:	IP 54
Dimensions:	120 x 65 x 25 mm
Weight:	150 g
Ambient temperature:	-10 °C ... 40 °C
Storage temperature:	-20 °C ... 50 °C (without batteries)
Power supply:	2 x AA to IEC LR6, type approved
Operating time:	200 hours continuous operation 1-2 years stand-by
Instrument:	operation permitted in Zone 1
Probes:	- operation permitted in Zone 0 - can be exchanged in hazardous areas - standard sensor, ambient temperature up to 200 °C for a short time

Intrinsically-Safe Magnet Probe Magnet-Ex 12

For testing solenoid valves, relays, transformers and flow-meters in Ex-hazardous areas.

Magnet-Ex 12 is a pencil sized magnet probe, designed to detect magnetic fields in hazardous areas. Within seconds it is possible to detect whether or not a solenoid valve is electrically activated.

Connection to electronic circuitry or opening of terminal boxes is rendered unnecessary.

The highly sensitive probe point of the Magnet-Ex 12 only needs to be brought near the coil of a solenoid valve, if a magnetic field is detected, the test tip illuminates red. In the same manner tests can be carried out on flowmeters or any other equipment that is working magnetically, even when located in hazardous areas.

The Magnet-Ex 12 comes with an integral test magnet that is securely fitted in such a way that it cannot be easily lost. Using this magnet, tests can be carried out to establish the working state of both unit and batteries.

- **highly sensitive probe point**
- **no contact with test object required**
- **resistant to dirt**
- **optical indication**
- **Built-in test magnet for testing Magnet-Ex 12 and for battery check**

Standard delivery:
- Magnet-Ex 12
- batteries
- instruction manual

Ex-Data:
Ex-designation:
Ⓔx II 2 G EEx ia IIC T4

EC-Certificate of conformity:
PTB 01 ATEX 2018

After any check the Magnet-Ex 12 will automatically switch off if it is no longer being used. This ensures a long battery life.

The clip attached to the instrument's side secures it from accidental loss and allows the maintenance engineer to easily carry it at all times.

Technical data:	
Detectable magnetic fields:	alternating, direct and permanent fields
Detection:	no contact with test object required
Indication:	optical, built-in LED
Power supply:	2 x LR03 (AAA) according to IEC, type approved
Ambient temperature:	-20 °C ... +50 °C
Storage temperature:	-40 °C ... +60 °C
Ingress protection	IP 54
Casing material:	metal/plastic probe point
Dimensions:	150 x Ø18 mm
Weight:	60 g (batteries included)

Intrinsically-Safe Continuity Tester Ex-DT 12

Continuity tester with acoustic and optical indication for fast testing of electrical continuity in Ex-hazardous areas.

- Testing of
  - wiring and electrical contacts
  - resistance
  - capacitance
  - inductance
- Establishing semiconductor functionality

Standard delivery:
- Ex-DT 12
- protective caps
- batteries
- Instruction manual

Accessories:
- Protective caps
- Spare battery

Ex-data:
Ex-designation:
Ⓔx II 2 G Ex ia IIC T4

EC-Certificate of conformity:
TÜV 03 ATEX 2120

The Ex-DT 12 Intrinsically-Safe continuity tester is a handy and robust testing device for use in Ex-hazardous areas. The electronics are housed in the test probe, which means that both hands are free to be able to carry out the test operation.

The combination of optical and acoustic indication allows usage even in noisy environments.

Technical data:	
Ambient temperature:	-20 °C ... +50 °C
Resistance:	10 Ω - 450kΩ
Inductivity test:	10 mH – 1H
Capacity test:	0.5 µF – 1000 µF
Diode test:	2 diode sections
Max. external inductivity:	1H
Max. external capacity:	1000 µF
Max. error output flow I_O:	5 mA
Max. error output voltage U_O:	3.3 V
Max. external voltage resistance outside of ex-zone:	U_m = 420 V_{eff}
Operating time:	approx. 20 h (continuous)
Visual readout:	4 x LED (in test probe)
Acoustic readout:	loudspeaker
Test probe dimensions (Minus pol):	50 x 180 mm (ø x l)
Overall length:	1.40 m (test probe to test probe)
Weight:	approx. 200 g (including batteries)
Power supply:	2 x LR03 to IEC, type approved

Intrinsically-Safe Loop Calibrator 707Ex

The fast, one-handed tool for loop checks in Ex zones.

The 707Ex is a loop calibrator for use in ex-hazardous areas classified as Zone 1 and 2.

- **Large display and simple, quick-click push rotary button for easy one-handed operation.**
- **Simultaneous mA and % readout for quick, easy, interpretation of readings.**
- **mA accuracy of 0.015 %**
- **1 µA resolution for mA source, simulate and measure.**
- **Push button with 25 % steps for fast, easy linearity checks.**
- **0-100 % "span check" for fast con firmation of zero and span.**
- **Internal loop supply, so you can power and read a transmitter at the same time.**
- **Measures up to 28 V dc.**
- **0-20 mA or 4-20 mA default start up modes.**

- **HART®® compatible resistance is connected in series with the loop supply for compatibility with HART®® communicators.**

Standard delivery:
- 707Ex
- Ex-Holster
- Safety designed test leads
- Alligator test clips
- Battery
- CD-ROM
- Calibration Certificate
- Instruction manual

Accessories:
- DKD calibration
- Calibration Certificate

Ex-data:
Ex-designation:
Ⓔx II 2 G EEx ia IIC T4

EC-Certificate of conformity:
ZELM 02 ATEX 0120 X

FM APPROVED
N.I. Class 1 Div. 2 Groups A-D

Also available as a standard ‚non-Ex' unit.

Technical data:	
Maximum voltage:	28 Volt
Storage temperature:	-30 to 60 °C
Ambient temperature:	-10 to 50 °C
Relative humidity:	95 % (0 to 30 °C); 75 % (30 to 40 °C); 45 % (40 °C to 50 °C)
Dimensions (HxWxD):	164 x 75 x 47 mm (with holster)
Weight:	350 g (with holster)
Power supply:	1x 6LR61, type approved
Operating time:	18 hours typical, at 12 mA

Technical data: (Summary specifications (18 °C to 28 °C. one year))

Function	Range	Resolution	Accuracy
Voltage measure	0 to 28 V	0.001 V	±(0.015 % Rdg + 2 digits)
mA measure	0 to 24 mA	0.001 mA	±(0.015 % Rdg + 2 digits)
mA source[1]	0 to 24 mA	0.001 mA	±(0.015 % Rdg + 2 digits)
mA simulate[2]	0 to 24 mA	0.001 mA	±(0.015 % Rdg + 2 digits)
Loop supply	24 V	n/a	24 V ± 1 V dc, no load

Temperature Coefficient, -10 to 18 °C, 28 to 55 °C: ± 0.005 % of range per °C;
[1] Max load, 700 Ohms at 20 mA
[2] Max applied voltage for simulation, 28 V

Intrinsically-Safe Multimeter 87V Ex

For reliable safety inside the Ex-hazardous area: the multimeter 87V Ex. With the robust holster the unit is well protected – even in the toughest conditions.

The 87V Ex is a True RMS Multimeter with electrical safety specifications CAT III 1000 V/CAT IV 600 V according to EN 61010-1.

Measuring technology inside the Ex-hazardous area is always a critical subject. This digital multimeter from ecom instruments GmbH offers a safe, compact solution, as the 87V Ex allows safe measurements both inside and outside (maximum of 10 A/1000 V) the Ex-hazardous area. The multimeter is certified to ATEX (Directive 94/9/EC) for use in Ex-zones 1 and 2. An additional safety feature is the CAT III 1000 V and CAT IV 600 V approval according to EN 61010 -1.

Designed specifically for industrial applications
This multimeter has been designed using state-of-the-art technology and offers all the functions required in industry. The flexible Ex-holster ensures a safe grip of the measuring device at working. The 87V Ex contains helpful functions such as Min/Max/Avg display and automatic switching between measuring ranges. Rapid changes in the signal can be measured using a bar indicator.
Thanks to its switchable filter (low-pass filter), the multimeter is ideally suited for carrying out precise voltage and frequency measurements on motor drives. Temperature measurements can be made using the accompanying type k thermocouple. The display can be set to either °C or °F.

Special features include an automatic switch-off function to save battery power, Input Alert™ function (giving a warning in the case of incorrect test socket allocation). The display background lighting makes it easier to work in poorly lit conditions.

Flexibility
The option of working on non-intrinsically-safe circuits of up to 1000 V and 10 A can help to reduce the number of devices needed.
Note: existing safety regulations must be observed in any process.
Both fuses (400 mA and 10 A) can be changed by the user outside of the Ex-hazardous area.

- CAT III 1000 V/CAT IV 600 V
- Min/Max/Avg function
- $4^1/_2$″ digit display with bar indicator
- Temperature measurement using thermocouple, type K
- Measurements up to 1000 V/10 A (outside the Ex-hazardous area)
- Background lighting

Standard delivery:
- 87V Ex
- Ex-holster
- Battery
- Measuring leads
- Alligator clips
- Thermocouple, type K
- CD-ROM
- Operating instructions

Optional Accessories:
- Carry case
- Factory calibration certificate
- DKD calibration certificate
- Ex-holster
- Measuring leads
- Alligator clips
- Thermocouple, type K
- Fuses (400 mA and 10 A)

Ex-data:
Ex-designation:
⟨Ex⟩ II 2 G EEx ia IIC T4

EC-Certificate of Conformity:
ZELM 05 ATEX 0274

Technical Data:	
Ambient temperature:	-20 °C ... +50 °C
Reference humidity range:	0 % ... 80 % (0 °C ... 35 °C)
Power supply:	1 x 6LR61 (9 V block battery); type-tested
Operating time:	Approx. 400 hours (without background lighting)
Dimensions:	201 x 95 x 52 mm (with holster)
Weight:	Approx. 650 g (with holster)

Intrinsically-Safe Multimeter 87V Ex

Specification:		
DC voltage	Range Resolution Accuracy Input impendance Overload protection	600 mV ... 1000 V 0.1 mV ... 1 V ±0.05 ... ±0.1 % + 1 digit 10 MΩ; <100 pF 1000 V rms
AC voltage	Range Resolution Accuracy Input impendance Overload protection	600 mV ... 1000 V 0.1 mV ... 1 V ±0.7 ... +2 % + 2 ... 20 digit 10 MΩ;<100 pF 1000 V rms
Direct current	Range Resolution Accuracy	600µA ... 10 A 0.1 µA ... 10 mA ±0.2 + 2 ... 4 digit
Alternating current	Range Resolution Accuracy	600µA ... 10 A 0.1 µA ... 10 mA ±1 % + 2 digit
Resistance	Range Resolution Accuracy Overload protection	600 Ω ... 50 MΩ 0.1 Ω ... 0.01 MΩ ±0.2 ... ±1 % + 1 ... 3 digit 1000 V rms
Conductivity	Range Resolution	60.00 nS 0.01nS
Continuity	Threshold value Overload protection	n/a 1000 V rms
Diode test	Test voltage Resolution Accuracy	3 V 0.001 V ±2 % + 1 digit
Frequency	Range Resolution Accuracy	199.99 Hz ... 199.99 kHz 0.01 Hz ... 0.01 kHz ±0.005 % + 1 digit
Duty cycle	Range	0.0 ... 99.9 %
Capacity	Range Resolution Accuracy	10 nF ... 9999 µF 0.01 nF ... 1 µF ±1 % + 2 digit
Temperature	Range Resolution Accuracy (without errors by the thermocouple)	-200 °C ... 1090 °C 0.1 °C 1 % + 10 digit
80 BK temperature sensor	Range Accuracy	-40 °C ... 260 °C 2.2 °C oder 2 % (the larger value applies)

Remarks
Measurement inside the Ex-hazardous area:
Ui ≤ 65 V, Ii ≤ 5A

Measurements outside the Ex-hazardous area:
Ui ≤ 1000 V, Ii ≤ 10 A

Error: % of measured value + digits

Intrinsically-Safe Multifunction Process Calibrator 725Ex

Simply powerful intrinsically-safe calibration tool

Also available as a standard ‚non-Ex' unit.

The 725Ex Intrinsically-Safe Multifunction Process Calibrator is powerful yet easy-to-use. Combined with the 700PEx Pressure Modules, the calibrator is able to calibrate almost any process instrument likely to need service in an ex-hazardous area.

The device is a powerful, multifunction calibration solution that offers:

- **Source or simulate volts dc, mA, RTDs, thermocouples, frequency and ohms**
- **Two channel simultaneous source and measure capability for calibration of transmitters**
- **Store frequently-used test setups for later use**
- **Pressure measurement to 3,000 psi/200 bar using any of the 8 intrinsically safe 700PEx Pressure Modules**
- **Pressure switch test function to capture set, reset and deadband values**

Standard delivery:

- 725Ex
- Test leads
- Test clips
- one pair of stackable test leads
- factory calibration certificate
- batteries
- CD-ROM
- instruction manual

Accessories:

- Intrinsically-safe pressure modules of the 700PEx series
- factory calibration certificate
- DKD calibration

Ex-data:
Ex-designation:
⟨Ex⟩ II 1 G EEx ia IIB 171 °C

EC-Certificate of conformity:
Kema 04 ATEX 1303 X

I.S. Class 1 Div 1 Groups B-D AEx ia IIB 171°C

Technical data:	
Maximum Voltage:	30 V
Storage temperature:	-40 °C to 71 °C
Ambient temperature:	-10 °C to 55 °C
Relative humidity:	90 % (10 to30 °C); 75 % (30 to 40 °C); 45 % (40 to 50 °C); 35 % (50 to 55 °C)
Dimensions (HxWxD):	200 x 96 x 47 mm
Weight:	650 g
Power supply:	4x AA, type approved
Operating time:	25 hours typical

Intrinsically-Safe Multifunction Process Calibrator 725Ex

Summary Specifications: (18 °C to 28 °C for one year)				
Function Measure or Source	Range	Resolution	Accuracy	Notes
Voltage	0 to 100 mV 0 to 10 V (Source) 0 to 30 V (Measure)	0.01 mV 0.001 V 0.001 V	0.02 % Rdg + 2 digits	Max. Load 1 mA
mA	0 to 24	0.001 mA	0.02 % Rdg + 2 digits	Max. Load 500 Ω @ 20 mA
mV (TC terminals)	-10.00 mV to +75.00 mV	0.01 mV	± (0.025 % or range + 1 digits)	
Resistance	15 Ω to 3200 Ω (Source) 0 Ω to 3200 Ω (Measure)	0.1 Ω to 1 Ω 0.1 Ω to 1 Ω	0.10 Ω to 1.0 Ω 0.10 Ω to 1.0 Ω	
Frequency	2.0 to 1000.0 CPM 1 to 1000 Hz 1 to 10.0 kHz	0.1 CPM 1 Hz 0.1 kHz	± (0.05 % + 1 digit) ± (0.05 % + 1 digit) ± (0.05 - 0.25 % + 1 digit)	For frequency source waveform is 5 V p-p squarewave, -0.1 V offset
Loop supply	12 V	N/A	10 %	
Temperature coefficient: -10 °C to 18 °C, 28 °C to 55 °C, ±0.005 % of range per °C				

Thermocouple accuracy specifications:			
RTD Type	Range	Accuracy	
		Measure (4 wire)	Source
Ni 120	-80 °C to 260 °C	0.2 °C	0.2 °C
Pt 100 - 385	-200 °C to 800 °C	0.33 °C	0.33 °C
Pt 100 - 3926	-200 °C to 630 °C	0.3 °C	0.3 °C
Pt 100 - 3916	-200 °C to 630 °C	0.3 °C	0.3 °C
Pt 200 - 385	-200 °C to 250 °C 250 °C to 630 °C	0.2 °C 0.8 °C	0.2 °C 0.8 °C
Pt 500 - 385	-200 °C to 500 °C 500 °C to 630 °C	0.3 °C 0.4 °C	0.3 °C 0.4 °C
Pt 1000 - 385	-200 °C to 100 °C 100 °C to 630 °C	0.2 °C 0.3 °C	0.2 °C 0.2 °C
Resolution			
RTD	0.1 °C, 0.1 °F		

Features:		
Simultaneous Function Capability	Channel A	Channel B
24.000 mA DC	M	M or S
24.000 mA DC	M	
100.00 mV DC		M or S
30.000 V DC Measure	M	
20.000 V DC Measure 10.000 V DC Source		M or S
Source: 15 to 3200 Ω, Measure: 0 to 3200 Ω		M or S
Thermocouple J, K, E, R, S, B, L, U, N		M or S
RTD Ni120; Pt100 (392); Pt100 (JIS); Pt100, 200, 500,1000 (385)		M or S
Pressure (using 700PEx modules)	M	M used as S
Frequency; Squarewave, 1 CPM to 10 kHz; fixed amplitude 5 V p-p		M or S
M = Measure S = Source/Simulate		

Thermocouple accuracy specifications:		
Thermocouple	Measure or	source
J	-200 to 0 °C 0 to 1200 °C	1.0 °C 0.7 °C
K	-200 to 0 °C 0 to 1370 °C	1.2 °C 0.8 °C
T	-200 to 0 °C 0 to 400 °C	1.2 °C 0.8 °C
E	-200 to 0 °C 0 to 950 °C	0.9 °C 0.7 °C
R	-20 to 0 °C 0 to 500 °C 500 to 1750 °C	2.5 °C 1.8 °C 1.4 °C
S	-20 to 0 °C 0 to 500 °C 500 to 1750 °C	2.5 °C 1.8 °C 1.5 °C
B	600 to 800 °C 800 to 1000 °C 1000 to 1800 °C	2.2 °C 1.8 °C 1.4 °C
L	-200 to 0 °C 0 to 900 °C	0.85 °C 0.7 °C
U	-200 to 0 °C 0 to 400 °C	1.1 °C 0.75 °C
N	200 to 0 °C 0 to 1300 °C	1.5 °C 0.9 °C
Resolution		
J, K, T, E, L, N, U B, R, S		0.1 °C, 0.1 °F 1 °C, 1 °F
Notes		
Accuracy specifications include 0.2 °C cold junction uncertainty.		

*Intrinsically-Safe Multifunction Process Calibrator Ex-CAL 8.**

The Ex-CAL 8.* is an all-round calibrator for use in explosive areas in Zone 0. Its wide range of features make it a top class, multi-functional process calibrator.

The documenting process calibrators in the Ex-CAL 8.* series are rugged tools for calibration tasks and troubleshooting measuement in practically all control processes. They enable simultaneous measuring and sourcing of temperature, direct current, DC voltage, frequency, resistance and pressure (measuring only) with an accuracy of up to +0.006% rdg, and are ideally suited for transmitter calibration directly in the field. The Push & Lock clamping system provides direct connection for the transmitter plugs or cables, which speeds up the measuring process thanks to faster and easier connection of the transmitter. The lightweight, ergonomic and rugged design as well as the large graphic display make working with the Ex-CAL simple, clear and fast.

You can facilitate operating procedures by using the CalpMan calibration software. The calibration tasks to be executed can be created in advance on a PC and transferred to the calibrator. The created calibration task can be started from the Ex-CAL directly on-site and the results stored on the calibrator „As found" and „As left". After transferring the data to the PC the deviations can be viewed in a tabular or graphical format and printed as a certificate with your own logo.

- **Accuracy up to ±0.006% rdg**
- **Push & Lock, TC and 4 mm Industrial Plug Connection**
- **Internal/External Pressure Modules**
- **Programmable Tasks**
- **Documentation function**
- **Multi-channel data logging**
- **Simultaneous Measure and Simulation for TRX Calibration•**
- **Large Graphic Backlighted Display**

Standard delivery:
- Battery
- Battery charger
- Measuring cable
- Rubber holster
- Instruction manual
- Calibration certificate

Optional Accessories:
- Leather holster
- Rubber holster
- External pressure modules
- Internal pressure modules
- LogMan data-logging software
- LinMan linearisation software
- CalpMan calibration software
- Factory calibration
- DKD calibration

Ex-data:
Ex-designation:
Ⓔx EX II 1G Ex ia IIC T4
EC-Certificate of conformity:
CEC 08 ATEX 042

Technical data:	
Ambient temperature	-20 °C ... +50 °C
Storage temperature:	0 °C... +60 °C (without battery)
Power supply:	Ni-MH battery
Protection rating:	IP54 (with holster)
Dimensions:	290 x 98 x 57 mm
Weight:	approx. 1.2 kg
Relative humidity:	max. 95 % RH (non condensing)

Measure or Source	Range	Resolution	Accuracy Ex-CAL 8.10 basic	Accuracy Ex-CAL 8.20 plus	Accuracy Ex-CAL 8.30 XP
Tc J	-210 to 1200°C *-350 to 2200°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Tc K	*-270 to 1370°C* *-454 to 2500°F*	*0.01°C* *0.01°F*	*±(0.02% rdg. + 0.1°C)* *±(0.02% rdg. + 0.2°F)*	*±(0.01% rdg. + 0.1°C)* *±(0.01% rdg. + 0.2°F)*	*±(0.01% rdg. + 0.1°C)* *±(0.01% rdg. + 0.2°F)*
Tc T	-270 to 400°C *-454 to 760°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Tc R	-50 to 1760°C *-60 to 3200°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.2°C) *±(0.02% rdg. + 0.4°F)*	±(0.01% rdg. + 0.2°C) *±(0.01% rdg. + 0.4°F)*	±(0.01% rdg. + 0.2°C) *±(0.01% rdg. + 0.4°F)*
Tc S	-50 to 1760°C *-60 to 3200°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.2°C) *±(0.02% rdg. + 0.4°F)*	±(0.01% rdg. + 0.2°C) *±(0.01% rdg. + 0.4°F)*	±(0.01% rdg. + 0.2°C) *±(0.01% rdg. + 0.4°F)*
Tc B	50 to 1820°C *140 to 3310°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.3°C) *±(0.02% rdg. + 0.6°F)*	±(0.01% rdg. + 0.3°C) *±(0.01% rdg. + 0.6°F)*	±(0.01% rdg. + 0.3°C) *±(0.01% rdg. + 0.6°F)*
Tc C	0 to 2300°C *32 to 4170°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.2°C) *±(0.02% rdg. + 0.4°F)*	±(0.01% rdg. + 0.2°C) *±(0.01% rdg. + 0.4°F)*	±(0.01% rdg. + 0.2°C) *±(0.01% rdg. + 0.4°F)*
Tc G	0 to 2300°C *32 to 4170°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.3°C) *±(0.02% rdg. + 0.6°F)*	±(0.01% rdg. + 0.3°C) *±(0.01% rdg. + 0.6°F)*	±(0.01% rdg. + 0.3°C) *±(0.01% rdg. + 0.6°F)*
Tc D	0 to 2300°C *32 to 4170°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.3°C) *±(0.02% rdg. + 0.6°F)*	±(0.01% rdg. + 0.3°C) *±(0.01% rdg. + 0.6°F)*	±(0.01% rdg. + 0.3°C) *±(0.01% rdg. + 0.6°F)*
Tc U	-200 to 400°C *-330 to 760°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Tc L	-200 to 760°C *-330 to 1400°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Tc N	-270 to 1300°C *-450 to 2380°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Tc E	-270 to 1000°C *-450 to 1840°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Tc F	0 to 1400°C *32 to 2560°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Pt100 IEC OIML, α=.3926	-200 to 850°C *-330 to 1570°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.05°C) *±(0.02% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*
Pt100 α=.3902	-200 to 650°C *-330 to 1210°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.05°C) *±(0.02% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*
Pt100 JIS SAMA	-200 to 650°C *-330 to 1210°F*	0.01°C* *0.01°F*	±(0.02% rdg. + 0.05°C) *±(0.02% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*
Pt200	-200 to 850°C *-330 to 1570°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.15°C) *±(0.02% rdg. + 0.27°F)*	±(0.01% rdg. + 0.15°C) *±(0.01% rdg. + 0.27°F)*	±(0.01% rdg. + 0.15°C) *±(0.01% rdg. + 0.27°F)*
Pt200	-200 to 850°C *-330 to 1570°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
Pt1000 IEC OIML	-200 to 850°C *-330 to 1570°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.1°C) *±(0.02% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*	±(0.01% rdg. + 0.1°C) *±(0.01% rdg. + 0.2°F)*
CU10	-70 to 150°C *-100 to 310°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.4°C) *±(0.02% rdg. + 0.7°F)*	±(0.01% rdg. + 0.4°C) *±(0.01% rdg. + 0.7°F)*	±(0.01% rdg. + 0.4°C) *±(0.01% rdg. + 0.7°F)*
CU100	-180 to 150°C *-300 to 310°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.05°C) *±(0.02% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*
NI100	*-60 to 180°C* *-80 to 360°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.05°C) *±(0.02% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*
NI120	*0 to 150°C* *32 to 310°F*	0.1°C* *0.1°F*	±(0.02% rdg. + 0.05°C) *±(0.02% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*	±(0.01% rdg. + 0.05°C) *±(0.01% rdg. + 0.09°F)*
mV	-20 to 200mV	1µV	±(0.02% rdg. + 3 µV)	±(0.01 rdg. + 3 µV)	±(0.06 rdg. + 3 µV)
V	-0.2 to 2V (11V -2 to 20V source)	10µV 100µV	±(0.02% rdg. + 10 µV) ±(0.02% rdg. + 100 µV)	±(0.01% rdg. + 10 µV) ±(0.01% rdg. + 100 µV)	±(0.006% rdg. + 10 µV) ±(0.006% rdg. + 100 µV)
mA **mA (IN CH1)**	0 to 21mA -5 to 50mA	0.1µA 0.1µA	±(0.02% rdg. + 0.4 µA) ±(0.02% rdg. + 0.4 µA)	±(0.01% rdg. + 0.4 µA) ±(0.01% rdg. + 0.4 µA)	±(0.01% rdg. + 0.4 µA) ±(0.01% rdg. + 0.4 µA)
Ω(IN)	0 to 500Ω 0 to 5000Ω	10mΩ 100mΩ	±(0.02% rdg. + 12mΩ) ±(0.02% rdg. + 120mΩ)	±(0.01% rdg. + 12mΩ) ±(0.01% rdg. + 120mΩ)	±(0.008% rdg. + 12mΩ) ±(0.008% rdg. + 120mΩ)
Ω (OUT)	0 to 500Ω 0 to 5000Ω	20mΩ 200mΩ	±(0.02% rdg. + 20mΩ) ±(0.02% rdg. + 200mΩ)	±(0.01% rdg. + 20mΩ) ±(0.01% rdg. + 200mΩ)	±(0.008% rdg. + 20mΩ) ±(0.008% rdg. + 200mΩ)
Frequency	1 to 200 Hz 1 to 2 kHz 1 to 20 kHz	0.001Hz 0.01 Hz 0.1 Hz	±(0.005% rdg. + 0.001Hz) ±(0.005% rdg. + 0.01Hz) ±(0.005% rdg. + 0.1Hz)	±(0.005% rdg. + 0.001Hz) ±(0.005% rdg. + 0.01Hz) ±(0.005% rdg. + 0.1Hz)	±(0.005% rdg. + 0.001Hz) ±(0.005% rdg. + 0.01Hz) ±(0.005% rdg. + 0.1Hz)
Pulse	0 to 10^6	1 count			

NOTES:
The relative accuracies shown above are stated for 360 days and the operative conditions are from 18 to 28°C.

ecom traceability cHART® and uncertainty can be supplied on request.
* Resolution is 0.1°C with temperature lower than -200°C.

Introduction

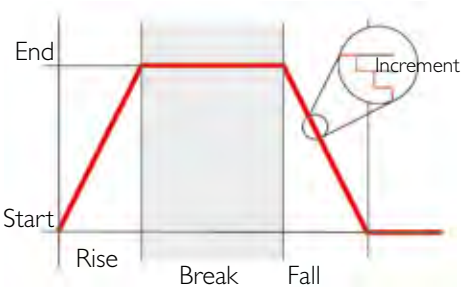
The Ex-CAL 8.* (Documenting Process Calibrator) Series are rugged hand tools for calibration maintenance and trouble shooting of virtually all the control process instrumentation.

The Ex-CAL 8.* series features:

- Calibrate temperature, pressure, current dc, voltage dc, frequency and resistance
- Dual channel display for simultaneous measure/source
- Measure and source 14 type of thermocouple and 10 RTD's
- 12 V loop power supply
- Connection for internal and external pressure module up to 700 bar
- Pressure switch test and leak test
- Hold, zero, scale, Minimun, Maximum and Average
- Automatic Ramp/Step with programmable Time, Step and Soak
- HART® ability for Smart Transmitters
- Dual channel input and extended accuracy on Ex-CAL 8.30 models
- Supports customized RTD's curve for enhanced temperature measurement
- Documenting capabilities using CalPMan software Package
- Scalable 4-20 mA measure/source into effective engineering unit

Programmable generator

- Autoramp and Autostep capability with Start, End, and Step programmable parameters
- Single and continuous cycle with Start, End, Rises, Soaks, and Falls programmable parameters
- the signal value setting uses a unique in-line single-digit setting mode or a direct numeric entry
- direct keypad access to 10 programmable memory stored values



Transmitter simulation program

The instrument can be used as a temporary signal converter replacement. Any input signal (electric or pressure) can be converted into a 4-20 mA output. The galvanic insulation between the input and output channels also allow the use of this feature on the process.

Built-in calculator

A special calculator function is integrated in Ex-CAL 8.*. You can read the value from the input channel, operate on it, and then write the result on the output channel. All standard maths functions are included.

Multichannel Data logging

The calibrator can be used as a multichannel datalogger for electrical and pressure signals. The graphic mode allows you to display the trend; the Replay function allows you to generate the electrical signal using the data stored. The LogMan PC software allows the data storage on the hard-disk.

TASK

The Ex-CAL 8.* can store and recall up to 10 complete instrument configurations. By pressing 2 keys only you can store or recall the configuration of either the channels and the display (including input and output values too). In this way the work in the field is simpler and quicker.

Pressure modules (INT & EXT)

Single or dual range internal pressure modules can be configured to provide a lot of combinations for gauge, absolute and differential pressure measurements. External interchangeable pressure modules can be connected to extend the pressure range up to 700 bar. The calibrator includes 23 selectable pressure units.

Transmitter Calibration

The Ex-CAL 8.* can be configured to easily manage the check and the calibration of any pressure and temperature transmitter. The wide display lets you simultaneously display the input and output values and to select the right units for the transmitter under test.

The current or voltage reading can be scaled/converted in % of span or in the measuring unit to simplify the verification operations. The measuring circuit is also able to power the loop for a direct connection with the transmitter under test.

With the optional communication HART® module it is also possible to verify and calibrate smart transmitters. All the Ex-CAL 8.* capabilities let the calibrator be useful for all the checks and calibration activities.

Switch test

Temperature, signal and pressure switches can be tested using this advanced procedure. The calibrator will hold the display reading when the contact changes status.

Leak Test

This procedure allows you to measure the pressure fall in a programmable time interval.

CalpMan

CalpMan has been designed to be used in industries, where there are both laboratories and maintenance in field needs. The CalpMan is a Windows™ 2000/XP software designed to plan, manage and document all the calibrations and the certifications of the process instrumentation. The software can manage the automatic procedures of the Ex-CAL 8.* calibrators.

CalpMan

The main features are:

- Easy to use;
- Compliant with ISO9001 requirements;
- Standards and instruments expired date management;
- Automatic procedure run
- Built-in communication with documenting calibrators
- Traceable and editable calibration documents
- Database backup/Restore ability

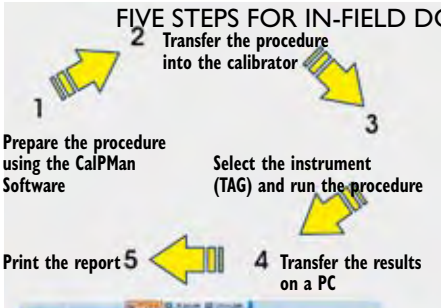
LogMan

Windows™ software to download logged data from internal memory to PC. Data can be saved on disks, loaded from disks, exported in Excel format files.

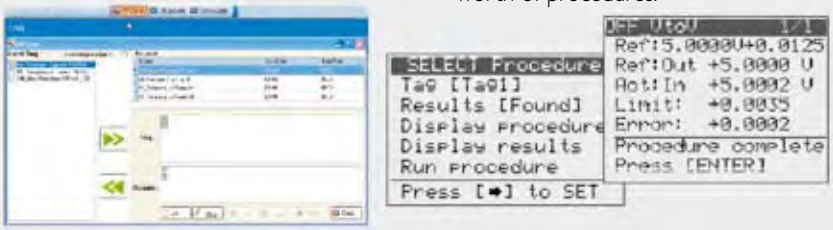
LinMan

Windows™ software to setup the instrument with TC, RTD special linearization. The program allows highly accurate temperature measurement with a calibrated Pt100/TC loading the coefficients of the Calibration Report.

FIVE STEPS FOR IN-FIELD DOCUMENTING CALIBRATION



The Ex-CAL 8.* is a documenting calibrator able to load calibration procedures using the CalPMan software. It can run them and store the results automatically, calculate the errors, highlight the out of range points, and download data on a PC to store them and to generate different reports. The calibrator's internal memory can store a whole week's worth of procedures.



External Interchangeable Pressure Modules

Connection for remote "SMART" pressure modules. Calibration matrix and range are stored on the sensor. Gauge and Absolute models available. Accuracy ±0.025% F.S.

Two Internal Pressure Sensors

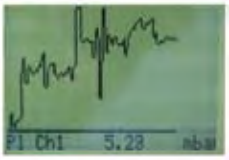
Single or Dual AISI316 built-in pressure sensors (up to 20bar). Gauge and Absolute models available. Barometric reference sensor capability. Accuracy ±0.025% F.S.

Keypad

19 key sealed rubber keypad for direct access to the main functions of the instrument.

LCD Graphic Display

Large display with text and graphic capabilities. The rugged LCD is protected by a polycarbonate window from scratches and impacts.



Direct Up/Down Keys

5 dedicated keys for directly increase/ decrease the value of the output signal.

Powerful Documenting Capability

Only ONE KEY to enter in Calibration Procedure Mode. Select the TAG and run the calibration procedure. All procedure data are loaded from the PC and the Calibration report can be downloaded to the PC with the CalpMan software.

Battery Charger

2 Channels

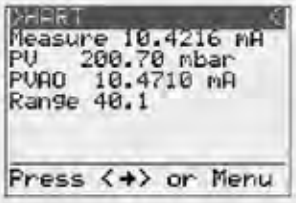
Dual simultaneous IN/OUT channels, mV, V, mA (active and passive loop), TCs, 3/4w RTDs, Frequency, Pulse. High accuracy, high repeatability and low drift.

Four operative mode: measure, simulate, measure/simulate and measure/measure (Ex-CAL 8.30 only)

RS232 interface

Mini-DINTC Connector

Isothermic binding post for TC's with Rj compensation



Integrated HART® Ability

The Ex-CAL 8.* has a built-in option for HART® calibration and maintenance. No external adapter is required. It supports a wide instruction set:

Universal Commands available for all process instruments like the model and the manufacturer reading, the primary variable (PV) and the output current reading.

Advanced Commands available on many (but not for all) instruments like the multiple variables and the damping reading, and the run of the Loop Test.

Specific Commands available on few instruments (verify the updated list on the website) like the sensor trim. The transmitter upgrade can be run in a simple and quick way using the PC software and the RS232/USB serial cable.

Capabilities	Ex-CAL 8.10	Ex-CAL 8.20	Ex-CAL 8.30
mA, V, T/C's, RTDs, Hz,	•	•	•
Measure / Source	•	•	•
Basic Accuracy (rdg)	±0.02%	±0.01%	±0.006%
Dual Channel Display	•	•	•
Dual Input			•
INT pressure module		•	•
EXT pressure module	•	•	•
Loop power (12V)	•	•	•
HART® ability	•	•	•
Documenting capability	•	•	•

Report of Calibration

Each Ex-CAL 8.* is factory calibrated and certified against ecom Standards, which are periodically certified by an internationally recognised laboratory to ensure traceability, and shipped with a Report of Calibration stating the nominal and actual values and the deviation errors.

EMC Conformity

The instrument fulfils the prevision of the directive 89/336/CEE Electromagnetic Compatibility.

„Push & Lock" binding posts

The multi-connection binding posts are an exclusive feature designed to connect the calibrator in a simpler and faster way. The 3 different connection system available are:

- Standard 4 mm industrial plugs
- Mini isothermic TC's connectors
- Push & Lock system for wires

Specifications

Measure or Source Voltage

Input impedance:
>10 MΩ for ranges up to 2000 mV f.s.
>500 kΩ for ranges up to 20 V f.s.
Output impedance (emf output):
less than 0.5 Ω with a maximum current of 0.5 mA
Output noise (at 300 Hz):
<2 µVpp for ranges up to 200 mV f.s.,
<10 µVpp for ranges up to 2000 mV f.s.
<80 µVpp for ranges up to 20 V f.s.

Measure or Source Current

Input impedance: <20 Ω 1 mA
Maximum load resistance:
600 Ω 21 mA
Loop Supply: 12V ± 5 %

Measure or Source Resistance and RTDs

Connections: 2, 3 and 4 wires
Source resistance effects:
±1 µV error for 1000 Ω source resistance
Rtd and Ω simulation excitation current:
from 0.100 to 2 mA without incremental error
Rtd and Ω measurement excitation current:
0.2 mA
Rtd cable compensation:
up to 100 mΩ (for each wire)
Rtd cable compensation error (Pt100):
±0.005°C/ Ω of total wire
Maximum load resistance: 600 Ω at 20 mA

Measure or Source Thermocouples

Engineering unit: °C/°F/K selectable
Resolution: 0.01°C / 0.01°F
Temperature scale: ITS90 and IPTS68 selectables
Reference junction compensation:
internal automatic from -10 °C to +55 °C
external adjustable from -50 °C to +100 °C
remote with external Pt100 from -10°C to +100 °C (only on Ex-CAL 8.30)
Rj compensation drift: ± 0.002°C/°C
(from -10 °C to +45 °C) - Class A Pt100
Input impedance (Tc ranges): >10 Ω

Frequency

Input impedance: >500KΩ

Pressure

Pressure media: AISI 316 SS compatible fluids (water, gas, and oil)
Temperature compensation:
Automatic with built-in calibration matrix.
Engineering units: mbar, bar, Pa, hPa, kPa, MPa, kg/cm^2, kg/m^2, psi, mmH_2O, cmH_2O, mH_2O, Torr, atm, lb/ft^2, inH_2O, ftH_2O, mmHg, $cmHg$, mHg, inHg, programmable.

Accuracy: the above accuracies are stated for 365 days and includes non linearity, histeresis, and repeatability. The average temperature coefficient, inside the temperature compensated range, is ±0.002% of rdg/°C
(w.t.r. +23°C/+73°F).

Compensation temperature range:
+0 to +45°C (+32°F +113°F)

Internal sensors
Accuracy: ±0.025% F.S.
Ranges: see table on ordering code
Resolution: see table on ordering code
Overpressure: 125% F.S.
Port: (female) 1/8" BSP

External modules
Accuracy: ±0.025% F.S.
Ranges: see table on ordering code
Resolution: see table on ordering code
Overpressure: 125% F.S.
Port: (male) 1/4" BSP
Connection wire lenght: 2 meters

Advanced Functions

Calculation functions: hold, max, min, offset, zero, average
In/Out data memory: 10 data with manual or automatic recall
Convert function: displays the electrical equivalent of the engineering unit
Scale factor: setting with zero and span programmable within -399999 and +999999
Square root: in combination with scale factor

General Specifications

Calibration: self learning technique with automatic procedure
Channel 1-Channel 2 insulation: 250 Vdc
Common mode rejection:
140 dB at ac operation
Normal mode rejection: 60 dB at 50/60 Hz

Measurement sampling time: 250 ms
Digital interface: full bidirectional RS232
Power supply: external charger and rechargeable Ni-MH battery

Battery life (typical):
8 h on Tc and mV input/output (backlight Off)
3 h with 20 mA simulation (backlight Off)
Recharging time (typical): 10 h at 90% and 12 h at 99% with instrument switched off.

Line operation: 100V - 120 V - 230V - 240 Vac with the external battery charger
(outside potentially explosive areas)

Line transformer insulation: 2500 Vac
Operating environment temperature range: from -20°C to +50°C

Storage temperature range: from 0 °C to +60 °C (excluding batteries)

Humidity: max 95%RH non condensing

Case: Injection molded ATEX approved material

Sealing: IP54

Weights: nett 1.4 Kg gross 2.5 Kg

Dimensions: 290 x 98 x 57 mm

*Accessories for intrinsically-safe Multifunction Process Calibrator Ex-CAL 8.**

EXTERNAL PRESSURE MODULES - AISI 316SS - ±0.025% F.S.

GAUGE

-100 to 100 mbar (1.5 PSI) res. 0.001mbar
-500 to 500 mbar (7 PSI) res. 0.01mbar
-0.95 to 1 bar (15 PSI) res. 0.01mbar
-0.95 to 2 bar (30 PSI) res. 0.01mbar
-0.95 to 7bar (100 PSI) res. 0.1mbar
-0.95 to 20 bar (300 PSI) res. 0.1mbar
-0.95 to 35 bar (500 PSI) res. 1mbar
0 to 70 bar (1000 PSI) res. 1mbar
0 to 150 bar (2000 PSI) res. 1mbar
0 to 350 bar (5000 PSI) res. 10mbart
0 to 700 bar (10000 PSI) res. 10mbar

ABSOLUTE

0 to 2 bar (30 PSI) res. 0.01mbar
0 to 20 bar (300 PSI) res. 0.1mbar

Rubber holster

Leather holster

SOFTWARE

RS232 cable, USB cable
LogMan-Data Logging software
LinMan-Linearization software
CalpMan - Calibration software

Intrinsically-Safe Sensor-Temperature Measuring Unit Ex-Pt 720

For accurate and easy measurement of temperature in Ex-hazardous areas up to Zone 0.

- high accuracy
- handy size
- measurement from Zone 1 into Zone 0
- large digital display

Operation:
- ON/OFF button, HOLD button
- °C/°F changeover
- Auto-Off after 10 min. (excl. HOLD)

Display:
- 3 digit
- large display
- LOW-batt. display
- sensor break detection

Standard delivery:
- Ex-Pt 720
- carrying strap
- battery
- instruction manual

Accessories:
- leather case
- immersion/insertion sensor
- surface sensor
- immersion probe for tank measurements

Special probes on request

Ex-Data:
Ex-designation:
Ⓔx II 2 (1) G Ex ia IIC T4

EC-Certificate of conformity:
TÜV 01 ATEX 1757 X
FM APPROVED
I.S. Class I Division 1 Groups A-D T4
Class 1 Zone 0 AEx ia IIC T4

The simple operation enables flexible handling during measuring and ease of use.
The large clearly-readable display enable a smooth reading of the measured value, which can be displayed in °C or °F. With the HOLD-function the measured value can be „frozen" and inscribed in a diagram. An automatic switch-off prevents for unnecessary battery discharge.

There are 4 different standard probes available. For customized solutions all standard probes can be also offered as special probes (different length and diameter).

Technical data:	
Measuring sensor:	Pt 100/4 wire
Measurement range (general):	-50 °C ... 400 °C (in Ex-hazardous areas depending on temperature class)
Accuracy: (+/- 1 Digit)	-50 °C ... +199.9 °C +/- 0.2 °C +200 °C ... +400 °C +/- 0.2 % of rdg.
Resolution:	-50 °C ... +199.9 °C 0.1 °C +200 °C ... +400 °C 1 °C
System accuracy with immersion/ insertion sensor (+/- 1 digit)	-50 °C ... +99.9 °C +/- 0.6 °C +100 °C ... +400 °C +/- 0.5 % of rdg.
Ambient temperature:	-10 °C ... +50 °C
Storage temperature:	-20 °C ... +70 °C
Unit dimensions:	190 x 57 x 42 mm
Weight:	approx. 200 g with battery
Power supply:	1 x IEC 6LR61 (9 V battery block), type approved
Operating time:	approx. 100h
Protective rating:	IP 54

Standard probes Ex-Pt 720

Immersion/insertion probe

Accuracy:	Class A
Ex-Zones:	2, 1
Probe dimensions:	110 mm x 4 mm (w x ø)
Sensor dimensions:	30 mm x 3.2 mm (w x ø)
Response time (99 %):	12 sec

Surface probe

Accuracy:	Class B
Ex-Zones:	2, 1
Probe dimensions:	110 mm x 4 mm (w x ø)
Sensor dimensions:	9 mm (ø)
Response time (99 %):	40 sec

Stainless-steel probe

Accuracy:	Class A
Ex-Zones:	2, 1, 0
Probe dimensions:	125 mm x 4 mm (w x ø)
Sensor dimensions:	15 x 3 mm (w x ø)
Response time (99 %):	10 sec

Immersion probe for tank measurements

Accuracy:	Class A
Ex-Zones:	2, 1, 0
Probe dimensions:	approx. 235 mm x 25 mm (w x ø)
Weight:	400 g (without cable)
Response time (99 %):	10 sec
Cable:	approx. 25 m

Special probes Ex-Pt 720

Immersion/insertion probe

Accuracy:	Class A
Ex-Zones:	2, 1
Probe dimensions:	>50 mm x >4 mm (w x ø)
Sensor dimensions:	>30 mm x >3.2 mm (w x ø)
Response time (99 %):	12 sec

Stainless-steel insertion probe

Accuracy:	Class A
Ex-Zones:	2, 1, 0
Probe dimensions:	>50 mm x >4 mm (w x ø)
Sensor dimensions:	>15 x >3 mm (w x ø)
Response time (99 %):	10 sec

Surface probe

Accuracy:	Class B
Ex-Zones:	2, 1
Probe dimensions:	>50 mm x >4 mm (w x ø)
Sensor dimensions:	>9 mm (ø)
Response time (99 %):	40 sec

Immersion probe for tank measurements

Accuracy:	Class A
Ex-Zones:	2, 1, 0
Probe dimensions:	235 mm x 25 mm (w x ø)
Weight:	approx. 400 g (without cable)
Response time (99 %):	10 sec
Cable:	1 ... 50 m

Intrinsically safe Non-Contact Temperature Meters Ex-MX2/Ex-MX4 BT

For non-contact temperature measurement and monitoring of temperature processes in Ex-hazardous areas.

Ex-MX4 BT

The Ex-MX2 and Ex-MX4 BT are the first choice for monitoring temperatures on objects which are difficult to access or for moving materials. The precise and robust measuring instruments measure the temperature without contact, even in Zone 0.

Operation could not be easier: sight on the object, press the measurement button and read the measured value. The sighted measuring area can be very clearly recognised using the 3-point measuring area marking, and the device can be adjusted and matched to the most diverse materials using the emissivity setting (in 0.01 increments). An exact measurement result is obtained in this way. The device has a ‚High' (the Ex-MX4 BT also a ‚Low') alarm function which signals the exceeding or falling below of a pre-set value threshold.

Only Ex-MX4 BT:
The values determined can be stored internally (space for 100 measuring spots) and called up on the display afterwards by pressing a button.

Using the integrated Bluetooth function, the data can be transmitted to an intrinsically safe PDA directly in the ex-hazardous area and/or to a PC with integrated Bluetooth interface outside the ex-hazardous area.

The user can select settings such as minimum and maximum value display and difference and average value calculation using the menu buttons.

If the emissivity of a material is unknown, it can be determined using the included measuring sensor. However, this function is only allowed outside the ex-hazardous area!

- **quick response time: 250 ms**
- **3-point measuring area**
- **measure from Zone 1 into Zone 0**

Only Ex-MX4 BT:
- **data can be transmitted to a PC using the integrated Bluetooth interface**
- **up to 100 measured values can be stored**

Standard delivery:
- Ex-MX2/Ex-MX4 BT
- batteries
- leather case
- wrist strap
- carrying case
- operating instructions
- software (only Ex-MX4 BT)
- temperature probe type K (only Ex-MX4 BT)

Optional accessories:
- calibration certificate

Ex-Data:
Ex-designation:
Ⓔx II 2 G EEx ia IIC T4

EC-Certificate of conformity:
TÜV 00 ATEX 1597 X

Technical data:	
Measurement range:	-30 °C ... +900 °C
Accuracy: (25 °C)	± 0.75 % of the measured value or ± 0.75 K, whichever is greater (± 2 K for measurement objects below -5 °C)
System failure: (at 25 °C ± 25 K)	< 0.05 K/K or < 0.05 %/K, whichever is greater ± 1 K for measurement objects below -5 °C
Reproducibility:	± 0.5 % of the measured value or ± 0.5 K, whichever is greater ± 1K for measurement objects below -5 °C
Response time:	250 ms
Display:	0.1 °C (with temperature)
Emissivity:	0.10...1.50 (0.01 incremental)
Optical resolution:	60:1
Ambient temperature:	0 °C ... +50 °C (max. +45 °C with laser)
Storage temperature:	-20 °C ...+50 °C (without batteries)
Relative humidity:	10-95 % r. H.
Power supply:	2 x LR6 (AA) in compliance with IEC; type approved
Dimensions:	200 x 170 x 50 mm
Weight:	approx. 600 g
Spectral range:	8 - 14 µm
Laser:	Laser class 2
Bluetooth chip:	Class II chip (only Ex-MX4 BT)
Bluetooth power:	1 mW Tx power (only Ex-MX4 BT)
Bluetooth range:	up to 10 m (only Ex-MX4 BT)

Intrinsically-Safe Data Logger Ex 171-0/Ex 171-3

For the recording, processing and documentation of temperature and humidity levels in Ex-hazardous areas.

The data logger series Ex 171-0/171-3 is used for the measuring and storing of temperature and humidity levels in ex-hazardous areas. The robustly designed metal casing that houses the equipment ensures constantly high measurable accuracy over a wide temperature range even under extremely harsh industrial conditions. With its precise measuring and documentation capabilities the Ex171 series has wide ranging applications in the petro-chemical and pharmaceutical manufacturing industries. Particularly in pharmaceutical production, the parameters of temperature and humidity are of critical and vital importance as they effect product quality both during and after the production process. With sensitive products, for example, possible damage can occur due to incorrect storage. This type of situation can be easily monitored and interrogated with the use of the EX171 series of data loggers. Complete data analysis and data integration with other programmes is carried out through the use of menu driven Windows software. Once outside of the hazardous area, data can then be easily transferred into a PC by means of the straightforward serial interface.

Standard delivery:

- Ex 171-0 incl. internal temperature probe
- battery
- startmagnet
- calibration certificate
- instruction manual

- Ex 171-3 incl. internal temperature probe
- humidity probe
- battery
- startmagnet
- calibration-certificate
- instruction manual

Accessories:

- Comsoft 3 (without Interface), 4 languages (German; English; French; Italian)
- Comsoft 3 Version 21CFR11
- Interface for Comsoft 3

Ex-data:
Ex designation:
Ⓔx II 2 G EEx ia IIC T4

EC-Certificate of conformity:
TÜV 00 ATEX 1586

- **Memory capacity: Up to a maximum of 55,000 measurements** (20,000 at version 171-3)
- **Real-time storage capability**
- **RS 232 serial interface**
- **Robust housing**
- **Simple, straightforward & easy to use**

Technical data:	Ex 171-0	Ex 171-3	
Measurements:	Temperature	Temperature	Relative Humidity
Reading recorder:	Internal NTC-probe	Internal NTC-probe	Internal capacitor Humidity sensor
Measurement range:	-35 °C ... +70 °C	-10 °C ... +50 °C	0 ... 100 % r. H.
Resolution:	0.1 °C	0.1 °C	0.1 % r. H.
Accuracy:	± 0.5 °C ≤ +40 °C ± 0.6 °C › +40 °C	± 0.4 °C	± 2 %rH (± 1 Digit) at 2 ... 98 % r. H.
Measuring interval:	2 sec. .. 24 h	2 sec ... 24 h	
Memory:	55,000	20,000	
Protection rating:	IP68	IP65	
Power supply:	Lithium battery size AA	Lithium battery size AA	
Housing:	Anodised aluminium	Anodised aluminium	
Dimensions:	131 x 68 x 26 mm	131 x 68 x 72 mm	
Ambient temperature:	-35 °C ... +70 °C	-10 °C ... +50 °C	
Storage temperature:	-40 °C ... +85 °C	-40 °C ... +85 °C	

Intrinsically-Safe Pressure Calibrator 718Ex

Pump Up the Pressure!

The 718Ex is a powerful intrinsically-safe, self contained pressure calibrator for usage in ex-hazardous areas. The calibrator offers:

- **Built-in pressure/vacuum hand pump, with vernier and bleed valve**
- **Pressure measurement to 0.05 % of full span, using an internal pressure sensor**
- **Pressure measurement to 200 bar using any of the 8 intrinsically-safe 700PEx Pressure Modules**
- **Wide range of selectable measurement units for pressure**
- **Pressure switch test function**
- **Min/Max hold functions**

Standard delivery:
- 718Ex
- Ex-holster
- Test leads
- Test clips
- Batteries
- CD-ROM
- Factory calibration certificate
- Instruction manual

Accessories:
- DKD calibration
- Intrinsically safe pressure modules of the 700PEx series

Ex-data:
Ex-designation:
Ⓔx II 1 G EEx ia IIC T4

CE-Certificate of conformity:
Kema 04 ATEX 1061 X

I.S. Class 1 Div. 1 Groups A-D, T4

Also available as a standard ‚non-Ex' unit.

Technical specifications:	
Power supply:	1x 6LR61, type approved
Operating time:	4 to20 hours, depending on functions used
Pressure input:	1/8 in. NPT pressure fitting
Pressure module input:	LEMO connector
Ambient temperature:	-10 °C to 55 °C
Storage temperature:	-40 °C to 60 °C
Relative humidity: (% RH operating without condensation)	95 % (10 to 30 °C); 75 % (30 to 40 °C); 45 % (40 to 50 °C); 35 % (50 to 55 °C)
Dimensions (HxWxD):	216 x 94 x 66 mm (with holster)
Weight:	992 g (with holster)

Measure current	Model	Range	Resolution	Accuracy
	718Ex- 30G or 100G or 300G	0 - 24 mA	0.001 mA	0.02 % rdg ± 2 digits
Temp Coeff. -10 to 18 °C , 28 to 55 °C: ± 0.005 % of range per °C				

Source pressure	Model	Range
Using built in pump	718Ex-30G/718Ex -100G/718Ex 300G	-830 mbar to 2 bar/-830 mbar to 7 bar/-830 mbar to 20 bar

Specifications (Summary Specifications (18 °C to 28 °C, one year))

Measure pressure	Model	Range	Resolution	Accuracy	Over pressure	Media
Using internal pressure module	718Ex-30G	-830 mbar to 2 bar	0.0001 bar	0.05 % FS.	3x FS	Non corrosive gases
	718Ex-100G	-830 mbar to 7 bar	0.001 bar	0.05 % FS.	2x FS	Non corrosive gases
	718Ex-300G	-830 mbar to 20 bar	0.001 bar	0.05 % FS.	25 bar	Non corrosive gases
With external pressure modules	718Ex 30G or 100G	up to 200 bar	Depending pressure module (see detailed specification)			
Temp Coeff. -10 to 18 °C, 28 to 55 °C: ± 0.01 % of range per °C Supported pressure units PSI, in. H_2O (4 °C), in. H_2O (20 °C), kPa, cm H_2O (4 °C), cm H_2O (20 °C), bar, mbar, kg/cm^2, mmHg, inch Hg						

Intrinsically-Safe Pressure Module 700PEx

Choice of gauge, differential and absolute modules.

To measure a wide range of pressure in an explosive endangered area the range of pressure modules is extended with 8 ATEX compliant models. These models are compatible with the 718Ex intrinsically-safe pressure calibrator and the intrinsically-safe multifunction process calibrator 725Ex.

- **Ranges from 2.5 mbar to 200 bar**
- **Very high accuracy up to 0.025 %**
- **Compatible with 718Ex and 725Ex**
- **Rugged cases protect the modules in harsh environments**

Standard delivery:
- 700PEx
- Factory calibration certificate
- Adapter
- Instruction manual

Ex-data:
Ex-designation:
Ⓔx II 1 G EEx ia IIC T4

EC-Certificate of conformity:
Kema 04 ATEX 1102 X

I.S. Class 1 Div. 1 Groups A-D, T4

Technical data:	
Pressure module output :	LEMO connector
Ambient temperature:	0 °C to 50 °C
Storage temperature:	-40 to 60 °C
Relative humidity: (% RH operating without condensation)	95 % (10 to 30 °C); 75 % (30 to 40 °C); 45 % (40 to 50 °C); 35 % (50 to 55 °C)
Weight:	approx. 300 g
Dimensions:	110 x 90 x 45 mm

Also available as a standard ‚non-Ex' unit.

Pressure Module Specifications							
Model	Range (approx.)	Resolution	Reference Uncertainty (23 ± 3 °C)	High Side media	Low Side media	Fitting material	Max. over-pressure[2]
Differential							
700P01Ex	25 mbar	0.01 mbar	0.2 %	dry[1]	dry	316 SS	3x
700P24Ex	1000 mbar	0.1 mbar	0.03 %	316 SS	dry	316 SS	3x
Gauge							
700P05Ex	2 bar	0.1 mbar	0.03 %	316 SS	N/A	316 SS	3x
700P06Ex	7 bar	0.7 mbar	0.03 %	316 SS	N/A	316 SS	3x
700P27Ex	20 bar	1 mbar	0.03 %	316 SS	N/A	316 SS	3x
700P09Ex	100 bar	10 mbar	0.03 %	316 SS	N/A	316 SS	2x
Absolute							
700PA4Ex	1000 mbar	0.1 mbar	0.05 %	316 SS	N/A	316 SS	3x
High							
700P29Ex	200 bar	0.01 bar	0.05 %	C276	N/A	C276	2x

[1] "Dry" indicates dry air or non-corrosive gas as compatible media.
"316 SS" indicates media compatible with Type 316 Stainless Steel.
"C276" indicates media compatible with Hastelloy C276.
[2] Maximum overpressure specification includes common mode pressure.

I.S. Wall Clocks Ex-Time 40/50

These instrinsically-safe wall clocks, Ex-Time 40 and 50, are driven by a Quartz accurate movement, powered by a LR 14 type battery. When necessary, e. g. for summer to winter time, adjustments can be quickly and simply made.

- **Quartz movement**
- **Robust metal casing**
- **Available in two different sizes**

Standard delivery:
- Ex-Time 40/50
- Battery
- Operating instructions

Accessories:
- Spare battery type

Ex-data:
Ex-designation:
Ⓔx II 2 G EEx ia IIC T4

EC-Certificate of conformity:
PTB 02 ATEX 2197 X

FM APPROVED
I.S. Class I Division 1 Groups A;B;C;D T4

Technical data:	Ex-Time 40	Ex-Time 50
Ambient temperature:	0 °C ... +50 °C	0 °C ... +50 °C
Operating time:	1 year	1 year
Clock Movement:	Quartz	Quartz
Accuracy:	+15/-5 Seconds	+15/-5 Seconds
Power Supply:	1 x LR 14 (according to IEC)	1 x LR 14 (according to IEC)
Weight:	approx. 2.0 kg	approx. 3.5 kg
Dimensions:	400 x 60 mm	500 x 70 mm

Measuring & Calibration Ruggedised versions

Laser Distance Meters 411D, 416D

Professional-grade laser distance measuring tools that are fast, easy to use, and fit in your pocket.

	411D	416D
Reduction of estimation errors, saving both time and money	•	•
Instant measurement with one-button operation	•	•
Easy targeting with bright laser	•	•
Quick calculation of area (square footage) and volume	•	•
Easy addition and subtraction of measurements	•	•
Improved battery life from automatic shut-off feature	•	•
Pythagoras calculation for determining distance indirectly from two other measurements	•	•
Ability to view more with large, 3-line display with backlight		•
Ability to measure up to 60 m (200 feet)		•
Storage of the last 10 measurements for quick recall of distance		•
MIN/MAX function		•
Enhanced Pythagoras calculation for determining distance indirectly from three other measurements		•
Audible feedback of on and off modes		•
Strong environment protection with IP54 (water spray & dust proof) sealing		•

Standard delivery:

- 411D, 416D
- Two AAA batteries
- Users manual
- Nylon carrying case

The Fluke laser distance meters bring you the most advanced measuring technology. These meters are fast, accurate, durable, and easy to use - just point and shoot. Their straightforward design and easy, one-button operation mean you spend less time measuring. Unlike ultrasonic distance meters with laser pointers, the Fluke 411D and 416D use a precision narrow laser beam that can avoid the common errors caused by extraneous objects near measurement targets.
These compact and handy Fluke distance meters are designed for indoor, and limited outdoor applications. Addition, subtraction, area, and volume calculations could not be simpler. The extra bright laser is clearly visible so you can see your targeting point even if an object is hard-to-reach or distant. The Fluke 411D and 416D have a large LCD screen and buttons positioned for onehanded measurements.

Technical data:		
	411D	416D
Range (for extended distances, use a target plate)	30 m	60 m
Accuracy	± 3 mm	± 1,5 mm
Measurement units	00,000 m	00,000 m
Measurement storage	-	10 locations
Backlight	-	•
Automatic power off	After 180 seconds	After 180 seconds
Battery Life	up to 3000 readings	up to 5000 readings
Operating temperature	0 °C to 40 °C	0 °C to 40 °C
Storage temperature	-25°C to 70°C	-25°C to 70°C
Size (HxWxD)	123 mm x 50 mm x 26 mm	135 mm x 46 mm x 31 mm
Weight	150 g	110 g

789 ProcessMeter

Double your working power!

Combining the two tools frequently used by every instrumentation technician, the 789 Process Meter will be at home in every instrumentation technician's toolbox. The Process Meter combine a DMM and a Loop Calibrator in one rugged, handheld tool.

With its built-in 24 V loop supply it reduces the need for taking a separate power supply when doing off-line transmitter testing.

Safety Conformance
All inputs are protected to EN61010-1 CAT III 1000 V, CSA, UL and TÜV.

Standard delivery:
- 789 ProcessMeter
- Hard point test lead set
- Alligator clips
- 4 AA alkaline batteries
- Instruction manual

- DMM and Loop Calibrator in one tool
- Precision 1000 V, 440 mA True RMS Digital Multimeter
- DC current source and Loop Calibrator
- 24 V Loop power supply
- Min/Max/Average/Hold/Relative Modes
- Diode Test and Continuity Beeper
- Manual Step (25 %, 100 %, Coarse, Fine) plus Auto Step and Auto Ramp
- Simultaneous mA and % of scale read out
- Externally accessible battery / fuses
- HART mode setting with loop power and a built-in 250 Ω resistor
- 0 % and 100 % buttons to toggle between 4 and 20 mA sourcing for a quick span check

Technical data:		
Ambient temperature:	-20 °C to +50 °C	
Storage temperature:	-40 °C to +60 °C	
Voltage measurements		
Range:	0-1000 V AC or DC	
Resolution:	0.1 mV to 1.0 V	
Accuracy:	0.1 % of reading + 1 digit (V DC)	
Current measurements		
Range:	0 - 1 A	0 - 30 mA
Resolution:	1 mA	0.001 mA
Accuracy:	0.2 % + 2 digits	0.05 % + 2 digits
Current sourcing		
Range:	0 - 20 mA or 4 - 20 mA (max. 24 mA)	
Accuracy:	0.05 % of span	
Max drive capability:	1200 Ω	
Loop power:	24 V	
Resistance measurement:	To 40 MΩ, 0.2 % + 1 digit	
Frequency:	To 19.999 kHz, 0.005 % + 1 digit	
Continuity:	Beeps for resistance < 100 Ω	
Span Check:	Yes	
Power supply:	4 AA alkaline batteries	
Operating time:	140 hours typical (Measure) 10 hours (Source: 20 mA)	
Dimensions (HxWxD):	203 x 100 x 50 mm	
Weight:	600 g	

MA 400 Loop Calibrator

- Very high accuracy ±0.015 % of reading
- Very high resolution 0.001 mA
- % Error function – eliminates manual error calculation
- Extended adjustment range - digital knob and user-selectable decade output allow both large and incremental (0.001 mA step) output changes
- Built-in 250 Ohm resistor facilitates calibration of devices
- Automatic Step and Ramp functions
- Simulates, powers, and measures two-wire transmitters

Standard delivery:
- MA 400
- Carrying case
- Test leads
- 9 V battery
- NIST Certificate
- Instruction manual

Accessories:
- Rechargeable battery
- AC adapter
- Protective case

The ecom MA 400 Precision Loop Calibrator provides significantly extended performance when compared to any competitive calibrator. With an accuracy of 0.015 % of reading and 0.001 mA resolution, the MA 400 has the highest accuracy in its class. Unique features, such as a "% Error" function, which eliminates manual error calculation and allows the display of the actual versus ideal error at any calibration point, put the MA 400 way beyond similar instruments.

The calibrators can simulate, power, and measure two-wire transmitters. With automatic Step and Ramp functions, the MA 400 enables remote calibration of 4-20 mA devices.

Technical data: (25°C unless otherwise noted)	
Input	
Current Range	0.000 to 24.000 mA (-25.00 to + 125.00 %)
Voltage (Reading)	0 to 28 VDC,
Input Protection	up to 250 VAC fuseless
Output	
Source/Simulate Range	0.000 to 24.000 mA -25.00 to + 125.00 %
Drive Capability	1200 Ohm without HART 950 Ohm with HART
Loop power	24 VDC
Range Select	Decade Incremental to 0.001 mA steps
Resolution	1 µA
Accuracy	±0.015 % of reading ±2 µA
Ambient temperature	-10 °C to +55°C
Storage temperature	-20 °C to +70 °C
Power supply	1x 9 V, (AC adapter optional)
Dimensions	150 x 80 x 40 mm
Weight	340 g

mA-Process Clamp Meter 771

The Fluke 771 is the latest innovative approach to measuring mA loop signals without breaking the loop.

With the Fluke 771 you no longer need to lift a wire from a terminal (break the loop) to measure 4-20 mA which has a direct impact on your maintenance time. With the Fluke 771 there is no need to call a control room to override the control of a process loop when breaking the loop and you save time when testing analog I/O on a PLC if you do not need to check measurements on a console. In addition, the Fluke 771 can have another impact on your overall cost by eliminating catastrophic plant outage caused by accidentally opening a critical loop.

- Measure mA signals for PLC and control system analog I/O
- Measure 4-20 mA output signals from transmitters without breaking the loop
- Best in class 0.2% accuracy
- Resolution and sensitivity to 0.01 mA
- Hold function captures and displays changing measurements
- Dual backlit display with both mA measurement and percent of 4-20 ma span
- Measurement Spotlight illuminates hard to see wires in dark enclosures
- Detachable clamp with extension cable for measurements in tight locations
- Measure 10-50 mA signals in older control systems using the 99.9 mA range
- Automatic battery savings features

- Power,
  15 minutes automatic power down
- Backlight, 2 minutes, automatic off
- Spotlight, 2 minutes, automatic off

Standard delivery:
- 771
- Soft carrying case
- Instruction manual

Technical data:	
Measuring and troubleshooting 4-20-mA-signals	
Range	-20,99 to +20,99 mA
Resolution	0,01 mA
Accuracy	0,2% or reading + 5 counts
Measuring and troubleshooting 10-50 mA-signals	
Range	-21,0 to -99,9 mA +21,0 to +99,9 mA
Resolution	0,1 mA
General	
Accuracy	1% or reading + 5 counts
Operating Temperature:	-10 to 55 °C
Storage Temperature:	-25 to 70 °C
Operating Humidity:	< 95% at < 30 °C < 75% at 30 to 55 °C
Dimension (HxWxD):	212 mm x 59 mm x 38 mm
Weight:	260 g
Temperature Coefficients:	0,01%/°C
Battery:	2 x AA 1.5 V Alkaline, IEC LR6
Battery Life:	20 hours typical
Safety	EMI, RFI, EMC - Meets EN61326-1

MCAL 4200 Multi-Function Calibrator

- Measure and source T/Cs (13 types), RTDs (13 types), Ohms, current, voltage, frequency; source pulse trains
- Isolated mA/V read-back circuit for complete transmitter calibration
- Pressure module communication port compatible with 700 Series and ecom pressure modules
- Built-in 24 V supply can drive 4 – 20 mA loops up to 1000 Ohms
- Direct entry of custom RTD coefficients (R0, A, B, C)
- All source modes can be programmed with dedicated setpoints to speed calibration and linearity tests
- Highest accuracy in class to 0.015 % of reading

Standard delivery:
- MCAL 4200
- Carrying case
- Test leads
- 4-AA alkaline batteries
- NIST Certificate
- Instruction manual

Accessories:
- Protective case

The ecom MCAL 4200 Multi-Function Calibrator provides a feature set unmatched in high accuracy, hand-held calibrators in its price range. The calibrator provides measurement and source functions for thermocouples, RTDs, current, voltage, frequency and source pulse trains.

A communication port compatible with 700 Series and ecom pressure modules is provided, as is an isolated mA/V read-back circuit. Arrow keys, direct numeric keypad entry, and three software-driven function buttons, plus a large backlit, menu-driven graphics display combine to provide a highly intuitive, simple yet powerful operator interface. Built-in 250 Ohm resistor for HART compatibility, also with smart transmitters and PLCs, full fuseless protection, and a serial communications port for full control with ASCII commands, are just some of the additional features that make the MCAL 4200 the single, most indispensable tool available for virtually any calibration task.

Technical data: (23 °C ±5 °C unless otherwise noted)		
Voltage Read and Source		
Source		0.000 to 20.000 VDC
Read	Isolated	0.000 to 30.000 VDC
	Non-isolated	0.000 to 20.000 VDC
Thermocouple mV		
Read and Source		-10.000 to +75.000 mV
Current (mA)		
Source and Read		0.000 to 24.000 mA
Frequency (1 to 20 V selectable amplitude)		
CPM Source and Read		2.0 to 600.0 CPM
Hz Source and Read		1.0 to 1000.0 Hz
kHz Source and Read		1.0 to 10.00 kHz
Pulse (Source only; 1 to 20 V selectable amplitude)		
Pulses		1 to 30.000.0
		2 CPM to 10 kHz
Ohms	Source	5.0 to 4000 Ohm
	Read	0.00 to 4000.0 Ohm
Thermocouple Read and Source		J, K, T, E, R, S, B, C, XK, BP, L, U, N
RTD Read and Source		Ni 120, Pt 100, Pt 200, Pt 500, Pt 1000, Cu 10, YSI 400, Cu 50, Cu 100, Pt 385-10, Pt 385-50
Ambient temperature		-10 °C to +50 °C
Storage Temperature		-20 °C to +70 °C
Stability		±0.005 % of reading/°C outside of 23 °C ±5°C
Power supply		4x AA; alkaline or optional rechargeable
Dimensions		221 x 106 x 58 mm
Weight		863 g
Accuracy	Voltage	±0.015 % of reading, ±2 mV
	Thermocouple mV	±0.02 % of reading, ±10 µV
Thermocouple Errors		0.2 °C ... 1.2 °C (depends on thermocouple)
RTD Read and Source		0.1 °C ... 1.4°C (depends on RTD)
Read and Source		
Current (mA)		±0.015 % of reading, ±2 µA
400 Ohm Range		±0.025 % of reading, ±0.05 Ω
4000 Ohm Range		±0.025 % of reading, ±0.5 Ω

740B Series Documenting Process Calibrators

Calibrators as versatile as you need them to be.

The 740 series Documenting Process Calibrators are rugged, handheld tools for the calibration and troubleshooting of process control instrumentation. These calibrators:

- Calibrate temperature, pressure, voltage, current, resistance, and frequency
- Simultaneously measure and source
- Automatically capture calibration results
- Document procedures and results to meet ISO 9000, EPA, FDA, OSHA, and other government requirements
- Measure / simulate eleven types of thermocouples and eight RTDs
- Store up to 8,000 readings in data logging mode (743B +744 only)
- PC interface (743B +744 only)
- Operates in English, French, German, Italian, and Spanish
- Four types of built-in automated calibration procedures; linear transmitter, square root devices, one and two-point limit switches
- User entered values allow users to capture readings measured or sourced by other devices
- Custom units permit capturing data in measurement units not directly supported by the calibrator, e.g. ppm or rpm. Optional shunt supports mA/mA applications
- Built in calculator (four functions plus SQRT) permits readings to be recalled from the measurement function, or to store calculation results to a source function
- Handling of fast pulsed RTD trans mitters and PLCs, with pulses as short as 1 ms.

Safety Conformance
All inputs are protected to EN61010-1 CAT II 300 V. CSA listed.

741B: A complete documenting calibrator
The 741B is the economical choice for plants that don't use PCs or that require traditional paper forms. It has storage capacity for a day's calibration and measurement data. When you're back at the shop, recall the data on-screen to fill out calibration forms.

743B: More memory, plus a PC interface and data logging
The 743B has all the capabilities of the 741B plus a PC interface that lets you download procedures, lists, and instructions created with software–or upload data for printing, archiving, and analysis. With its expanded memory, the 743B can hold a full week of calibrations and procedures.

744: Get HART-ability
The 744 offers all of the capabilities of the 743B, plus the ability to calibrate, maintain, and troubleshoot HART instrumentation with just one tool.
This rugged, reliable tool offers:
- Integrated HART communication functions, permitting you to monitor, control, and calibrate HART instrumentation.
- NiMH battery with 3500 mA hour life and battery indicator.

Instrumentation Management Software
The 743B and 744 are compatible with Fluke 700SW DPC/TRACK software and with software from Blue Mountain, Cornerstone, Fisher-Rosemont, Honey-well, Yokogawa, Prime Technologies and On Time Support.

Standard delivery:
- 741B / 743B / 744
- Industrial test leads (2 sets)
- Test clips (2 sets)
- Test probes (1 set)
- Battery pack
- Battery charger
- NIST Traceable calibration certificate
- Serial port cable (only 743B / 744)
- DPC/TRACK Sample Version with free PC communication utility soft ware (only 743B / 744).
- Instruction manual

Accessories:
- Pressure modules

740B Series Documenting Process Calibrators

Technical data:		
Voltage DC Measure: Source:	 110.000 mV .... 300 V 110.000 mV .... 15.0000 V	 0.025 % .... 0.05 % + 0.015 % .... 0.005 % 0.01 % + 0.005 %
Voltage AC (20 Hz .... 5 kHz) Measure:	 1.1000 .... 300 V	 0.5 % .... 10 % + 5 20
Current DC Measure: Source:	 30.000 mA / 110.00 mA 22.000 mA (Source) / 22.000 mA (simulieren)	 0.01 % + 0.015 % 0.01 % + 0.015 % / 0.02 % + 0.03 %*
Resistance Measure: Source:	 11.000 Ω .... 11.000 kΩ 11.000 Ω .... 11.000 kΩ	 0.05 % .... 0.1 % + 50 mΩ .... 10 Ω 0.01 % .... 0.03 % + 20 mΩ .... 5 Ω
Frequency Measure: Source:	 1.00 Hz .... 50.00 kHz 0.00 Hz .... 50.000 kHz	 0.05 Hz .... 50 Hz 0.01 Hz .... 5 Hz
Pressure	Accuracy from 0.025 % of range using any of 29 pressure modules. Modules available for differential, gauge, vacuum, absolute, dual and high pressure.	
RTDs Measure accuracy: Source accuracy:	 Cu 10, Pt 100, Pt 200, Pt 500, Pt 1000, CU 120 0.3°C .... 1,0°C For 2- and 3-wire measurement, add 0.4 °C Cu 10, Pt 100, Pt 200, Pt 500, Pt 1000, CU 120 0,1°C .... 1°C For 2- and 3-wire simulation, add 0.4 °C	
Thermocouples Measure accuracy: Source accuracy:	E, N, J, L, KL T, U, B, R, S, C 0.3°C .... 2°C 0.2°C .... 0.8°C Accuracy with external cold junction, for internal junction add 0.2 °C	
Ramp functions Source functions: Rate:	 Voltage, current, resistance, frequency, temperature 4 steps / second	
Loop power function Voltage: Maximum current: Maximum input voltage:	 Selectable, 24 V or 28 V 22 mA, short circuit protected 30 V DC	
Step functions Source functions: Manual step: Autostep:	 Voltage, current, resistance, frequency, temperature Selectable step, change with arrow buttons Fully programmable for function, start delay, stepvalue, time per step, repeat	
Ambient temperature:	-10 °C to +50 °C (except frequency and AC), -20 °C to +50 °C (except frequency and AC)	
Storage temperature:	-20 °C to +60 °C	
Dust / water resistance:	Meets IP 52, IEC 529	
Dimensions:	236 x 130 x 61 mm	
Weight:	1.4 kg	
Power supply:	NiCd: 7.2 V, 1.7 Ah (Nimh 744 only)	
Operating time:	~8 hours typical	
Side port connections:	Pressure module connector, connection for optional battery eliminator	
Data storage capacity:	1 day of calibration results	
* (% of reading + % of full scale)		

PTC 400 Temperature Calibrator

The PTC 400 Temperature Calibrator is an ideal device to handle all of your temperature calibration needs in a truly rugged, low-cost package. It combines virtually all widely used thermocouples and RTDs in one device.

This is especially true when calibrating "smart" or pulsed RTD transmitters, where many other calibrators fail to work or operate at reduced accuracy specs. The PTC 400 handles those applications with ease.

- **Calibrate thermocouples and RTDs**
- **Direct keyboard entry or scroll control of output**
- **User-defined setpoints**
- **High accuracy ±0.4°C J T/C and ±0.3°C 4W PT385 RTD; all errors included**
- **Ten (10) T/C types and eight (8) RTD types including PT 385 (1,000 Ohm) and Cu (10 Ohm)**
- **Store up to nine (9) setpoints for each output function**
- **RS232 interface**

Standard delivery:

- PTC 400
- Carrying case
- Test leads
- 4 AA alkaline batteries
- NIST-traceable certificate
- Instruction manual

Accessories:

- Protective case

Technical data: (23 °C ±5 °C unless otherwise noted)	
Range	
T/C	J, K, T, E, R, S, N, B, L, U including -10 to 75 mV range
RTD	Pt 385 (100, 200, 500, 1000 Ohm) Pt 392, JIS, Ni 120, Cu 10, YSI 400
Ohm	0.0 to 400.0Ω 400 to 3.200Ω
mV	-10 to +75
RTD IEX-Range	0.01 to 3 mA
RTD-Frequency Response	10 ms; works with all pulsed transmitters
Thermocouple Read and Source	
Kind	J, K, T, E, R, S, B, L, U, N
Accuracy	0.4°C ... 2.4°C (depends on thermocouple)
Accuracy mV Read/Source	0.014 % ±2 digits
RTD Read and source	
Kind	NI 120 (672), Pt 100 (385), Pt 100 (3926), Pt 100 (3916), Pt 200 (385), Pt 500 (385), Pt 1000 (385), Cu 10, YSI 400
Accuracy	0.2 °C ... 2.2 °C (depends on RTD)
Ambient temperature	-10 °C to +50 °C
Storage Temperature	-20 °C to +60 °C
Power supply	4 AA Alkaline cells
Operating time	30 hrs.
Dimensions	221 x 106 x 58 mm
Weight	850 g

Handheld Infrared Thermometers 63, 66, 68

For troubleshooting and predictive/preventive maintenance

With so many interconnected systems and delicate load balances in industrial plants these days, any number of things can go wrong. By instituting regular predictive and preventive maintenance, you can spot trouble before it happens and greatly reduce the chances of system failure.

The trick is finding a way to efficiently monitor all of those systems. That's where infrared thermometers come in handy.

Changes in heat often indicate failure, and infrared thermometers make it easy to take frequent, quick temperature measurements.

- **High-resolution optics**
- **High accuracy: 1 %**
- **Backlit display**
- **12-point data logging (only 66/68)**
- **Selectable MAX, MIN, DIF and AVG functions that display values instantly with Hi/Lo Alarm (only 66/68)**
- **Adjustable emissivity for more accurate temperature measure ments (only 66/68)**

Standard delivery:
- 63 / 66 / 68
- Instruction manual
- Battery

Technical data:			
	63	66	68
Range:	-32°C .... +535°C	-32°C .... +600°C	-32°C .... 760°C
Emissivity:	Fixed at 0.95	Digitally adjustable (from 0.1 to 1.0)	Digitally adjustable (from 0.1 to 1.0)
Accuracy (at Ta: 23 .... 25°C):			
-32°C .... -26°C	± 3°C	± 3°C	± 3°C
-26°C .... -18°C	± 2.5°C	± 2.5°C	± 2.5°C
-18°C .... +23°C	± 2°C	± 2°C	± 2°C
+23°C .... +510°C	± 1 % of reading or ± 1°C - whichever is greater		
> 510°C	± 1.5 % of reading	± 1 % of reading or ± 1°C - whichever is greater	
Resolution:	0.2°C	0.1°C	0.1°C
Response time:	500 ms	500 ms	500 ms
Ambient temperature:	0 .... +50°C	0 .... +50°C	0 .... +50°C
Storage temperature:	0 .... +50°C	0 .... +50°C	0 .... +50°C
Weight:	320 g	320 g	320 g
Dimensions:	200 x 160 x 55 mm	200 x 160 x 55 mm	200 x 160 x 55 mm
Power supply:	9 V alkaline battery or NiCd	9 V alkaline battery or NiCd	9 V alkaline battery or NiCd
Repeatability:	± 0.5 % of reading or ± 1°C - whichever is greater		

Thermal Imagers Ti10/Ti25

The ultimate tools for troubleshooting and maintenance.

The Fluke Ti10/Ti25 are the perfect tools to add to your problem solving arsenal. Built for tough work environments, these highperformance, fully radiometric imagers are ideal for troubleshooting electrical systems, electromechanical equipment, process equipment, HVAC/R equipment and others.

- Enhanced problem detection and analysis capabilities with patent-pending IR-Fusion®Technology
- Optimized for field use in harsh work environments
- Engineered and tested to withstand a 2 meter drop
- Withstands dust and water – tested to an IP54 rating
- Innovative protective lens cover protects the lens when not in use color LCD display
- Delivers the clear, crisp images needed to find problems fast
- Identify even small temperature differences that could indicate problems with excellent thermal sensitivity (NETD)
- Even the smallest details become visible with the large, widescreen full
- Intuitive, three-button menu is easy to use … simply navigate with the push of a thumb
- No need to carry pen and paper - record findings by speaking into the camera – comments are saved with the image (Ti25 only)

- Store more than 3.000 screen images (.bmp format) or 1.200 IR-Fusion images on included 2 GB SD memory card

Standard delivery:
- SmartView™ software
- 2 GB SD card
- SD card reader
- Rugged hard carrying case
- Soft carrying case
- Hand strap
- Rechargeable battery
- AC charger/power supply
- Instruction manual

	Ti10	Ti25
Detector type	160 x 120 Pixel	160 x 120 Pixel
IR-Fusion	•	•
Field of View (FOV)	23° x 17°	23° x 17°
Thermal sensitivity	≤ 0,2 °C	≤ 0,1 °C
Temperature range	up to 250 °C	up to 350 °C
Digital display	3,6“ LCD	3,6“ LCD
Choice of palettes	4	6
Voice annotation		•
Software	SmartView	SmartView
Storage capacity	>3.000 IR images	>3.000 IR images

Technical data:		
	Ti10	Ti25
Thermal imaging performance		
Field of view (FOV)	23 ° horizontal x 17 ° vertical	23 ° horizontal x 17 ° vertical
Min focus distance	15 cm	15 cm
Thermal sensitivity (NETD)	≤ 0,2 °C at 30 °C	≤ 0,1 °C at 30 °C
Minimum span (Auto/Manual)	10 °C / 5 °C	5 °C / 2,5 °C
Focus	Manual	
Detector type	160 x 120 Focal Plane Array, uncooled microbolometer	
Visual imagng performance		
Min focus distance	46 cm	46 cm
On camera operating modes	Full Picture-in-Picture and full screen IR	Picture-in-Picture and full screen IR plus Blending
Visible light camera	640 x 480 Pixel, full color	640 x 480 Pixel, full color
Temperature measurement		
Temperature range	-20 °C to 250 °C	-20 °C to 350 °C
Accuracy	± 5 °C or 5 %	± 2 °C or 2 %
Measurement modes	Center point	„Center point and hot and cold markers“
On screen emissivity correction		•
Image presentation		
Digital display	9.1 cm (3.6“) landscape color VGA (640x480) LCD“	
LCD backlight	Selectable bright or auto	
Palettes	Ironbow, blue-red, high contrast, grey	Ironbow, blue-red, high contrast, amber,hot metal, grey
Image and data storage		
Storage medium	2GB SD Card (3000 .bmp IR images/1200 .IS2 IR-Fusion images)	
File formats supported	JPEG, BMP, GIF, PNG, TIFF, WMF, EXIF, EMF	
Voice memo recorder		•
Controls and adjustments		
Set-up controls	Date/time, °C/°F, language	Date/time, °C/°F, language, emissivity, hot spot and cold spot on imageSD card reader
Language selection	Eng, ger, fre, spa, por, ita, swe, fin, rus, cze, pol, tur	
Image controls	Smooth auto scaling and manual scaling	
On-screen Indicators	Battery status, real time clock and center point temperature, range and span indication and high and low alarm settings	
Battery life	3 to 4 hours continuous operation	
3 to 4 hours continuous operation	IP 54	
Dimension (H x B x T)	267 x 127 x 152 mm	
Weight	1,2 kg	

IR-Fusion® Technology: Infrared and visual images fused together in one image

See things both ways - Infrared and visual (visible light) images fused together communicating critical information faster and easier – traditional infrared images are no longer enough. Patent-pending IR-Fusion®Technology, only available from Fluke, simultaneously captures a digital photo and the infrared image and fuses them together taking the mystery out of IR image analysis.
Imaging enhanced with IR-fusion help identify and report suspect or faulty components enabling repairs to be done as well as prove that the problem was corrected.

Multiple viewing modes
Identify problems quickly using different on-screen models – the user selects the mode that works best for each situation. While some viewing modes are not included in every model, all are available for viewing and analysis in the included free SmartView™ software.

CP 400 / 420 Pressure Calibrator

The CP 400 / 420 Dual Sensor Pressure Calibrator provides unmatched pressure measurement flexibility with 0.025 % FS accuracy on both internal, isolated, stainless steel pressure sensors (one with CP400).

An external pressure module connection supports all ecom pressure modules for even greater measurement capability. A Pt100 RTD input is provided for temperature measurements accurate to 0.1 °C. In addition, the CP 400 / 420 measures 4-20 mA loop current and up to 30 VDC.

An internal 24 V Loop Power Supply can power a transmitter under test. The CP 400/420 supports up to three simultaneous measurements in any combination, including three pressure measurements. With simultaneous display of two pressure and an RTD temperature measurement, the CP 400 / 420 is ideal for gas flow calibration (custody transfer) applications.

The CP 400 / 420 is available in two standard configurations – 1 bar/100 bar or 2 bar/200 bar ranges – or customized with any two ranges selected from 300 mbar, 1, 2, 7, 20, 70, 200, 350 or 700 bar.

- **Two isolated, stainless steel, pressure sensors with 0.025 % F.S. accuracy (one for CP 400)**
- **Temperature-compensation ensures accuracy in field applications**
- **External pressure module connection supports all ecom pressure modules (25 ranges) for even more measurement capability**
- **Pt100 RTD input for temperature measurement, accurate to 0.1 °C**
- **Measure 4-20 mA input**
- **Internal 24 V Loop Power Supply can power a transmitter under test**
- **Measure up to 30 V DC**
- **% Error and damping functions**
- **Large graphic style LCD with backlight**

- **Display can be configured to display up to 3 inputs simultaneously (i.e. pressure 1, pressure 2, and RTD or any combination of inputs)**
- **Switch test function**
- **Up to five frequently used setups to be stored; last setup automatically recalled on power-up**

Standard delivery:
- CP 400 / 420
- Soft case
- Batteries
- NIST-traceable certificate
- Test leads
- Carrying case
- Instruction manual

Accessories:
- Pressure Module Adapter
- Pressure Modules

Technical data:	
Ranges	
Available Pressure (select any two)	300 mbar, 1 bar, 2 bar, 7 bar, 20 bar, 70 bar, 200 bar, 350 bar, 700 bar
mA	0 to 24.000 mA
Volts	0 to 30.000 VDC
RTD	-40 °C to 105°C
Engineering Units	psi, bar, mbar, kPa, kgcm^2, cmH_2O@4°C, cmH_2O@20°C, mmH_2O@ 20°C, inH_2O@4°C, inH_2O@20°C, inH_2O@60 °F, mmHg@0°C, inHg@0°C, ftH_2O@4°C, ftH_2O@20°C, ftH_2O@60 °F
Accuracy	
Pressure 1 bar to 200 bar 300 mbar, 350 bar, 700 bar	±0.025 % F.S.; for all ranges ±0.035 % F.S.
mA	±0.015 % of rdg ±0.002 mA
Volts	±0.015 % of rdg ±0.002 V
RTD (ohms)	±0.015 % of rdg ±0.02 ohm; or ±0.1°C @ 0°C for Pt100
Temperature Effect No effect on accuracy on all functions from 15°C to 35°C; Add ±0.002 % F.S./°C for temps outside of 15°C to 35°C	
Ambient temperature:	-10 °C to +50 °C
Storage Temperature:	-20 °C to +60 °C
Power supply:	4 standard AA cells
Operating time:	>35 hours, typical usage
Dimensions:	211 x 99 x 46 mm
Weight:	567 g
Connectors/Ports	Pressure - two, 1/8" NPT BetaPort-P pressure module; RTD

CP 440 Digital Pressure Test Gauge

- Very high accuracy of ±0.05 % F. S.; temperature compensated
- Temperature compensated accuracy over 0 to 50 °C
- Eight (8) standard pressure ranges
- Displays in 18 standard or fully custom engineering units
- Displays ambient temperature in °C or °F
- Large, back-lit, 5-1/2 digit display and 20 segment bar graph
- Rugged stainless steel case meets NEMA 4/IP65
- Password-protected "through the key pad" calibration
- MIN/MAX recall
- Adjustable TARE zeros large system offsets

- User-configurable sample rate maximizes measurement perfor mance and battery life
- User-configurable damping smooths readings from pulsating/ plant air sources
- Auto Shut-off for extended battery life
- Low battery indicator

Standard delivery:
- CP 440
- Batteries
- Instruction manual

Accessories:
- Rubber Boot
- External 24 VDC Power Input

The CP 440 Digital Pressure Test Gauge takes the concept of an analog Test Gauge, and brings it to a new level.
The CP 440 combines the accuracy of digital technology with the simplicity of an analog gauge, and achieves performance, ease- of-use, and a feature set unmatched in the pressure measurement world. Setup of the CP 440 is fast and straight-forward, through a menu-driven display, with minimal text, and intuitive functions, that is simple enough to allow the gauge to be used anywhere in the world, without the need for multilingual displays.

Technical data: (0 °C to +50 °C, unless otherwise noted)	
Input Ranges:	1 bar, 2 bar, 7 bar, 30 bar, 70 bar, 200 bar, 300 bar, 700 bar
Accuracy:	±0.05 % FS Positive Pressure ±0.25 % FS Vacuum/30 bar and below
Temperature Compensation:	0 °C bis +50 °C to rated accuracy
Standard Engineering Units:	PSI, Bar, Kg/cm^2, inH_2O (4°C, 20°C or 60 °F), ft H_2O (4°C, 20°C or 60 °F), cmH_2O (4°C und 20°C), mH_2O (4°C und 20°C), Kpa, mBAR, inHg, mmHg, TORR
Media Compatibility:	liquids and gases compatible with 316 stainless steel
Ambient temperature:	-10 °C to +55°C
Storage Temperature:	-20 °C o +70 °C
Dimensions:	127 x 111 x 38 mm
Input-Port:	1/4" male-NPT
Display:	5 Digits Bar Graph – 0 to 100 % in 20 segments
Power supply:	3 size AA alkaline batteries
Operating time:	1,500 hours without backlight; 2,000 hours at slow sample rate
Weight:	approx. 500 g

Torches/Flashlights

Intrinsically-Safe LED pocket torch Lite-Ex LED 8

The Lite-Ex LED 8 is a compact, robust and easily operated LED pocket torch for close range lighting in Ex-hazardous areas of Zones 2 and 1 according to Directive 1999/92/EC (ATEX 137).

- Operating time >100 hours
- Robust metal housing
- LED life expectancy up to 100,000 operating hours
- Safety clip prevents unintentional switch-on
- Easy to use thanks to its small size

Scope of delivery:
- Lite-Ex LED 8
- Batteries

Accessories:
- Spare white light emitting diode
- Spare battery LR 44

Technical data:	
Ambient temperature:	-20 ... +50 °C
Storage temperature:	-20 ... +50 °C
Power supply:	3 x LR 44 as per IEC (type approved batteries)
Protection rating:	IP 54
Dimensions:	approx. 66 x 14 mm (L x ø)
Weight:	approx. 35 g (with batteries)

Ex-data:
Ex designation:
Ⓔx II 2 G EEx ia IIC T4
EC-Certificate of conformity:
TÜV 01 ATEX 1692

Intrinsically-Safe mini pocket torch Ex-Penlight

Provides a spotlight in the Ex-area when carrying out testing work in restricted places.

The Ex-Penlight with its handy ballpoint pen shape is ideal for close range lighting in the Ex-hazardous area. Whether it is a poorly lit distribution box or conduit box in a dark corner, with this Ex-safe mini pocket torch you can bring everything into the right light. It can be comfortably carried in a jacket or shirt pocket and its clip ensures secure retention.

- robust and reliable
- ballpoint pen format, fits in a jacket pocket
- simple, practical, one hand operation
- secure retaining clip

Scope of delivery:
- Ex-Penlight
- Batteries

Accessories:
- Spare light bulb Type 222

Technical data:	
Ambient temperature:	-20 ... +40 °C
Light source:	Filament Bulb type 222
Power supply:	2 x LR03 (type-approved batteries)
Protection rating:	IP 54
Operating life:	approx. 4 hours
Dimensions:	147 x 11.6 mm
Weight:	approx. 60 g

Ex-data:
Ex designation:
Ⓔx II 2 G EEx e ia IIC T4
EC-Certificate of conformity:
TÜV 99 ATEX 1512

Intrinsically-Safe Laser-Pointer Ex-Point 02A

The Ex-Point 02A laser beam pointer is a handy sized device ideal for highlighting objects whilst in an Ex-hazardous area.

Inaccessible and moving parts on plant and machinery can be identified safely during inspections without interruption of the process or endangering personnel. Operation is by simply pressing a button to produce a bright illuminated point visible over a long distance.

- **Robust metal housing**
- **Dust-Ex zones 22 and 21**
- **Laser class 2**
- **Lightweight**
- **with retaining clip**

Standard delivery:
- Ex-Point 02A
- batteries 2 x LR03 (AAA)

Accessories:
- replacement battery LR03

Ex-data:
Ex designation:
⟨Ex⟩ II 2 G EEx ia IIC T4
⟨Ex⟩ II 2 D Ex iaD 21 T130 °C
EC-Certificate of conformity:
ZELM 03 ATEX 0137

Technical data:	
Wavelength:	630 - 670nm
Output:	<1mW
Laser class:	2
Ambient temperature:	-10 °C ... +40 °C
Power supply:	2 x LR03 (AAA) (type-approved batteries)
Operating time:	approx. 80h (continuous operation)
Dimensions:	approx. 140 x 12 mm
Weight:	approx. 60 g (with batteries)

Intrinsically-Safe LED – Headlamp Lite-Ex KL 10

The Lite-Ex KL 10 is an extremely light and very bright LED headlamp for use in ex-areas. Certified for use in areas classified as zone 1 and 2 in accordance with norm 1999/92/EG (ATEX137).

- Only 90 g with batteries!
- 0.5 W power LED with 2 brightness settings
- Swivel-mounted lamp head
- Certified for use in Ex-areas in zones 1 and 2
- Comfortable 3-point fitting system

Scope of delivery:
- Lite-Ex KL 10
- Leather case
- Batteries
- Headband
- Operating instructions

Ex-data:
Ex designation:
⟨Ex⟩ II 2 G Ex ia IIC T4
EC-Certificate of conformity:
TÜV 07 ATEX 553464 X

The Lite-Ex KL 10 is equipped with a 0.5W power LED and a 2-part elasticated strap which guarantees a comfortable and secure fit either onto a helmet or direct onto the head. A snug, excellent fit is guaranteed by the middle strap.

Notable for its highly compact and lightweight design (only 90 g with batteries and strap) the lamp needs only 2 microcell LR03 batteries - making it an ideal device for anyone who needs to be ‚handsfree' without having to carry a lot of equipment. And when not in use - the Lite-Ex KL10 is so compact that it can be quickly and easily put in a pocket.

Technical data:	
Operating time:	> 4 hours (continuous operation)
Dimensions:	approx. 45 mm x 70 mm
Weight:	approx. 90 g (with batteries)
Protection rating:	IP 67
Power supply:	2x LR03 (Micro, AAA) (type-approved batteries)
CE identification:	CE0102

Intrinsically-Safe LED pocket torch Lite-Ex LED 30

The Lite-Ex LED 30 is a compact, robust and easily operated LED-Torch, certified in accordance with ATEX for use in Ex-hazardous areas classified as Zone 2,1 and 0 as well as 22 and 21 .

Compact and easy to handle, the Lite-Ex LED 30 is ideal for inspection lighting in Ex-hazardous areas.

- **Operating time 80 hours**
- **Robust metal housing**
- **3-LED`s with reflectors**
- **LED life expectancy up to 100.000 operating hours**
- **Certified for use in Dust Ex-Zones 22 and 21**

Standard delivery:
- Lite-Ex LED 30
- Batteries
- Nylon case
- Wrist strap

Accessories:
- Spare battery LR 1
- Leather holster

Ex-data:
Ex-designation:
⟨Ex⟩ II 1 G EEx ia IIC T4
⟨Ex⟩ II 2 D T90 °C IP 52
EC-Certificate of conformity:
ZELM 02 ATEX 0104

Technical data:	
Ambient temperature:	-20 °C ... +50 °C
Storage temperature:	-20 °C ... +60 °C
Operating time:	80 h
Power supply:	3x LR 1 as per IEC (type-approved batteries)
Weight:	approx. 160 g (with batteries)
Protection rating:	IP 52
Dimensions:	140 x 26 mm (L x ø)

Intrinsically-Safe Torches Lite-Ex 15, 20, 23, 25

Lite-Ex ...
...non-sparking aircraft aluminium!

The ultimate range of intrinsically-safe torches - with handy features such as adjustable beam focus, anti-roll device and integrated spare bulb. Housed in a solid metal casing that has integral rubber rings to provide a sure grip in hazardous areas.

Standard accessories:
- Lite-Ex with integrated spare bulb
- Batteries

Accessories:

Lite-Ex 25
- Leather carry case, spare lens
- Spare bulb type AC2C/2D/BB

Lite-Ex 23
- Leather carry case, spare lens
- Spare bulb type AC2C/2D/BB

Lite-Ex 20
- Leather carry case, spare lens
- Spare bulb type AC2300/BB

Lite-Ex 15
- Leather carry case, spare lens
- Spare bulb type AC2640/BB

Technical data:				
	Lite-Ex 25	Lite-Ex 23	Lite-Ex 20	Lite-Ex 15
Ambient temperature:	-20 °C...+40°	-20 °C...+40°	-20 °C...+40°	-20 °C...+40°
Power supply:	2 x LR 20	2 x LR 14	2 x LR 6	2 x LR 6
Bulb:	AMPERCELL AC2C/2D/BB	AMPERCELL AC2C/2D/BB	AMPERCELL AC2300/BB	AMPERCELL AC2640/BB
Operating time:	up to 17 h	up to 9 h	up to 5 h	up to 4,5 h
Protection rating:	IP 54	IP 54	IP 54	IP 54
Weight:	approx. 740 g	approx. 420 g	approx. 152 g	approx. 120 g

Ex-data:
Ex designation:
⟨Ex⟩ II 2 G EEx e ia IIC T4
EC-Certificate of conformity:
TÜV 99 ATEX 1409

Intrinsically-Safe Rubber Cased Torch Lite-Ex HD 10

The Lite-Ex HD 10 is a robust, rubber cased torch certified for use in Ex-areas classified to zone 1 in accordance with norm 1999/92/EG (ATEX 137).

The robust rubber casing makes the Lite-Ex HD 10 an ideal torch for working in the Ex-area. Comfortable to hold, non-slip and with an ‚anti-roll' shape, this torch can be put in toolboxes or carried around without getting damaged. The excellent luminosity is produced by two AA (AA/LR6) batteries.

- **Long-lasting bulb**
- **Robust, impact-resistant casing**
- **Practical hand strap**
- **Certified for use in Zone 1 Ex-areas**

Scope of delivery:
- Lite-Ex HD 10
- Batteries
- Operating instructions

Accessories:
- Leather Case
- Replacement bulb

Ex-data:
Ex designation:
⟨Ex⟩ II 2 G EEx ia e IIC T4
EC-Certificate of conformity:
TÜV 00 ATEX 1556

Technical data:	
Ambient temperature:	-20 °C ... +40 °C
Power supply:	2 x LR6/AA (type-approved batteries)
Bulb:	KPR102-Sonca/KPR104-Philips/2127 OSRAM
Operating time:	approx. 3.5 h
Dimensions:	approx.165 x 44 mm
Weight:	approx. 200 g

Intrinsically-Safe LED torch Lite-Ex PL 30

The Lite-Ex PL 30 LED high performance torch is especially designed to withstand daily use in industrial environments and with the new ‚ring-switch' mechanism, operation is made quickly and easily.

The ecom Lite-Ex PL 30 LED torch gives unrivalled high performance.

The 3-watt LED unit is powered by 3 x LR14 batteries, providing many hours of use. The anti-static polymer housing of the unit is ergonomically designed to be comfortably and securely held.

The high IP protection rating of IP 65 provides protection against the permeation of dust and jet water. This thereby enables use in harsh conditions.

Switching on the torch could not be easier - simply twist the ‚ring-switch'. This innovative switch mechanism means that even when wearing gloves the user can easily operate the torch and because it is a ‚non-contact' mechanism the need for repair is reduced - saving time and money.

- **Ex-zone 0/20**
- **1x high performance LED (3-watt)**
- **4000 Lux**
- **Robust housing**
- **High protection rating of IP 65**

Standard delivery:
- Lite-Ex PL 30
- c/w batteries

Accessories:
- Spare batteries

Ex-data:
Ex-designation:
⟨Ex⟩ II 1 G EEx ia IIC tT4
⟨Ex⟩ II 1 D T130 °C IP 65
EC-Certificate of conformity:
ZELM 05 ATEX 0272 X

Technical data:	
Ambient temperature:	-20 °C ... +50 °C
Light source:	1x 3 Watt LED
Power supply:	3x LR 14 (type-approved batteries)
Weight:	approx. 530 g
Protection rating:	IP 65
Dimensions:	approx. 55/42 x 220 mm

Intrinsically safe SHL 100-Ex hand lamp

Rugged and functional, the SHL 100-Ex handlamp has been specifically designed for use in industrial environments with potentially explosive areas (Zone 1) in accordance with Directive 1999/92/EC (ATEX 137).

The SHL100-Ex is an ideal cost effective solution for a rugged, explosion protected rechargeable Handlamp. With the innovative single-handed beam focus and switching from ‚spot' to ‚flood' light, a pivoting lamp head, emergency light function and filament fracture monitoring - all of this goes to providing a safe and indispensable unit.

The rugged plastic housing and durable bulb make the SHL 100-Ex particularly low-maintenance. Should the bulbs and the explosion protected rechargeable battery pack need to be replaced, then this can be done by the user - which further reduces any maintenance costs.

The SHL 100-Ex charger is suitable for all conventional voltages from 12 and 24 V DC to 110 and 230 V AC. Its compact dimensions allowing it to be installed in the minimal of space.

Scope of delivery
- SHL 100-Ex
- Rechargeable battery
- Diffusing, colourless disc filter
- Battery charger
- Mains cable
- 12/24 V DC connecting cable
- Operating instructions

Optional accessories
- Belt clip
- Disc filter (red, green, orange, blue)
- Engraving plate black or brass
- Spare main bulb
- Spare energy-efficient bulb
- Spare explosion-protected lead-gel rechargeable battery
- Spare explosion-protected fuse

Ex-data:
Ex-designation:
⟨Ex⟩ II 2 G EEx ib IIC T4
EC-Certificate of conformity:
BVS 07 ATEX E 005

- **Certified for use in Zone 1**
- **Powerful xenon bulb**
- **10,000 Lux (1 mtr) with sharply focused beam**
- **Can be focused to either spot or flood light**
- **Filament fracture monitoring for the main bulb**
- **Automatic switch to the energy-efficient bulb in the event of the filament breaking***
- **Emergency light function (in conjunction with the charger)**
- **Microprocessor-controlled charging technology with battery capacity display**

Technical data:	
Ambient temperature:	-20 ... +50 °C
Storage temperature:	-20 ... +50 °C
Charging temperature:	> 0 °C
Operating time:	3.5 h with charged batteries
Dimensions:	110 x 90 x 296 mm
Weight:	approx. 2.0 kg
CE symbol:	CE 0102
Power supply:	Explosion-protected lead-gel rechargeable battery, maintenance free, 3,5 Ah, discharge protection
Charger:	12/24 V DC / 230 V AC Charging time approx. 12 h
Dimensions, charger	113 mm x 112 mm x 150 mm

Intrinsically Safe Handlamp type SHL 300-Ex

The SHL 300-Ex is a robust Handlamp specifically designed for industrial environments and the firefighting services. Certified for use in potentially explosive areas of Zones 0 and 1 or 20 and 21 in accordance with Directive 1999/92/EC (ATEX 137).

- Zone 0, 1 and 20, 21 certified
- approx. 9000 Lux illumination power – generated by 3 high-power LEDs
- LED service life of approx. 50.000 h
- Robust, anti-static housing – rated to IP 65
- Pivoting head
- Optimum distribution of weight – ergonomic and comfortable to carry
- Battery capacity display – 5 section indicator
- Emergency light function with high brightness
- Flash mode

Standard delivery:
- SHL 300-Ex
- Battery (factory fitted into device)
- Operating instructions
- Carrying strap

Accessories:
- Set of coloured diffusing filters – white, red, green, yellow and blue.
- Charging station for mains voltage operation
- Charging station for vehicle / car voltage operation
- Carrying strap

In developing this device, the user was given primary consideration - for ease of carrying and single handed operation whilst providing exceptional high illumination power.

The special design of the SHL 300-Ex means that it is both ergonomic and functional. The handle, the weight distribution ratio, combined with the careful arrangement of switches and displays all go to provide an optimised device.

As a rechargeable LED Handlamp certified for use in Zone 0 / 20, the SHL 300-Ex is truly a unique, world class product that can be easily carried and safely operated in all manner of locations.
Additionally, the SHL 300-Ex is also highly suitable for use by the fire-fighting services as it fulfils the stringent requirements of the fire-fighting equipment standard - DIN 14642 - for explosion-protected Handlamps.

Utilising 3 high-power 3-watt LEDs not only gave rise to the brightest handheld spotlight of its kind, it also achieved an extremely high operational reliability. This is due, in part, to the LEDs having a service life of around 50.000 hours, but also, to the 'intelligent controller' that assures a high illumination power even in the event of single LED failure.

Ex-Data:
Ex-designation:
⟨Ex⟩ II 1G Ex ia IIC T4
⟨Ex⟩ II 1D Ex tD A20 IP65 T108 °C
EC-Certificate of conformity:
ZELM 06 ATEX 0313 X

You can depend on the SHL 300-Ex in every situation, because along with the spotlight there is also the integrated emergency and flashing light functions and the optional diffusing and coloured filters – which are fitted easily into the pivoting head.

The charging station is also designed for easy use and single handed operation. There are no locking mechanisms to have to deal with – simply insert the SHL 300-Ex into the charging station and it is securely engaged. The charging station – available for either mains or vehicle operation - can be fixed in place both horizontally and vertically.

Technical Data:	
Ambient temperature:	-20 ... +50 °C
Storage temperature:	-30 ... +60 °C
Operating time with charged battery:	approx. 5 h (100 % light output) approx. 10 h (50 % light output)
Dimensions:	approx. 140 mm x 190 mm x 300 mm
Weight:	approx. 2.2 kg
Protection rating:	IP65
Solvent resistance:	Acetone
ESD protection:	Anti-static housing
CE designation:	CE 0102
Power supply:	ecom-Ex battery pack min. 600 charging cycles with over-discharge and short-circuit protection
Lamp:	3 high-power LEDs

Explosion-protected Inspection Lamp ISL 200-Ex/400-Ex

The ISL 200-Ex and the ISL 400-Ex are robust, cable-connected inspection lamps for industrial use in explosion-prone areas for zones 1 and 21 according to norm 1999/92/EG (ATEX 137). The inspection lamps are especially notable for their bright and extremely long-lasting illumination.

The ISL 200-Ex and 400-Ex are especially suited to time-intensive maintenance and repair work. The units emit a uniform, bright light which greatly improves the working environment whilst helping to reduce fatigue in explosion-prone areas. The optional attachment clamps allow you to mount the lamp within reach at your office or workshop. You can also attach and orientate the ISL by utilising the integrated revolving hook or by using the optional magnetic fasteners.

The long-lasting cold cathode tubes are known primarily for their use in background lighting for flat screens, and have a very long lifetime. They surpass the longevity of traditional luminescent tubes by far. Since the tubes are also economical in terms of space, the ISL lamps provide more luminosity than ever in a compact, light and robust case.

The lamps are delivered with a 5 m cable end - which gives you the flexibility to connect the ex-plug of your choice.

The ISL 200-Ex and ISL 400-Ex set new standards in the field of repair and inspection lamps.

- **Certified for use in zones 1 and 21**
- **Compact design thanks to a bright, long-lasting cold cathode light**
- **Robust, impact-resistant case**
- **Available with 2 or 4 lamps**
- **Available with optional protective-basket**
- **Rotating attachment hook**

Scope of delivery

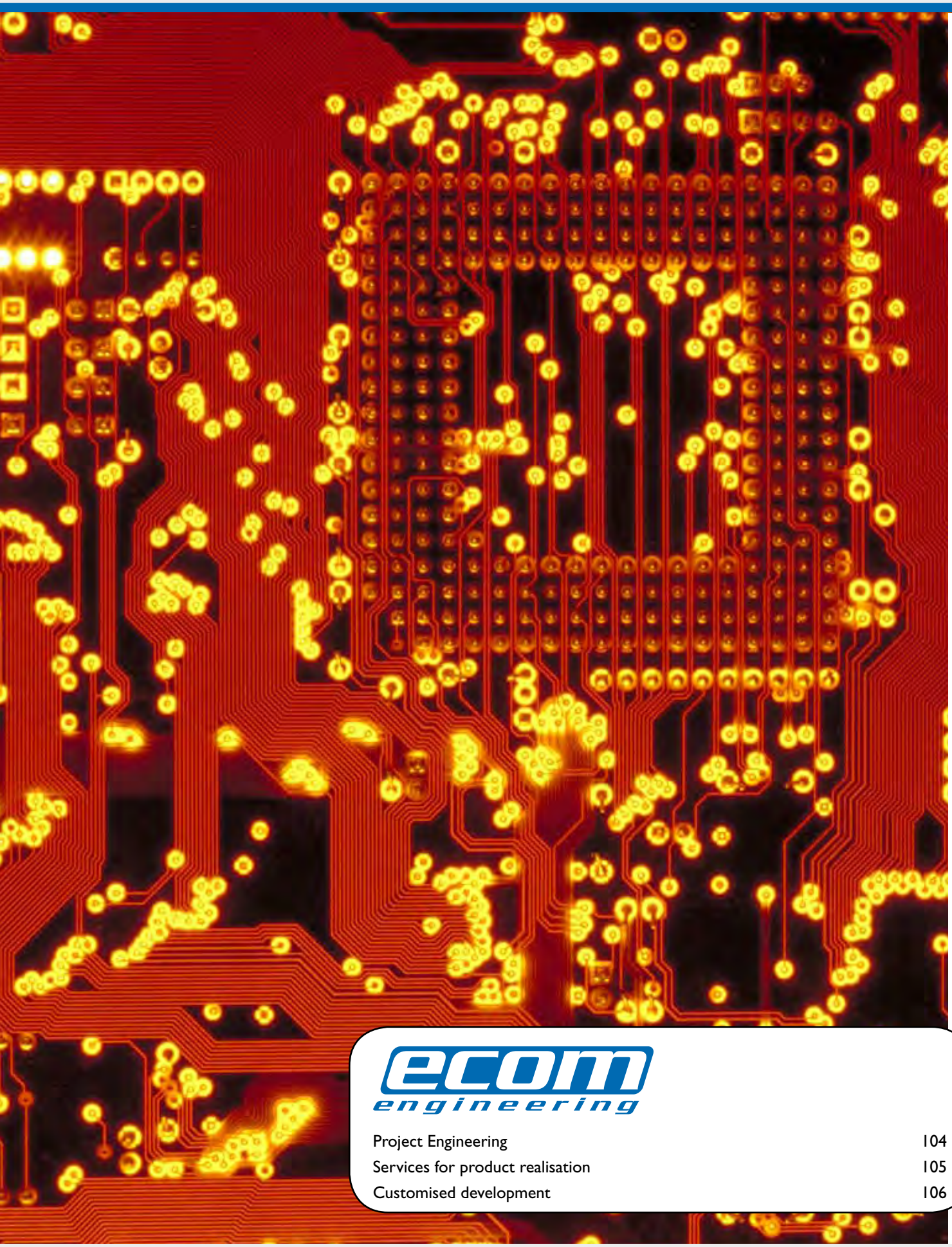
- ISL 200-Ex (2 cold cathode tubes)
- ISL 400-Ex (4 cold cathode tubes)
- 5 meter cable (attached), no plug
- Instruction manual

Optional accessories

- Wall-mounting clips
- Magnetic clips

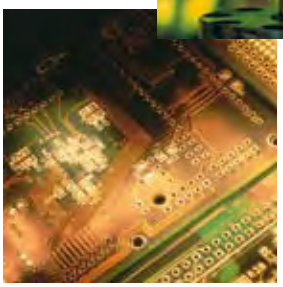
Ex-data:
Ex designation:
⟨Ex⟩ II 2 G Ex d IIC T4
⟨Ex⟩ II 2 D Ex tD A21 IP6x T 105 °C bis 120 °C
EC-Certificate of conformity:
PTB 07 ATEX 1045

Technical data:		ISL 200-Ex	ISL 400-Ex
Ambient temperature:	110 - 230 V AC 24 - 48 V AC/DC	-20 °C ...+50 °C -20 °C ...+50 °C	-20 °C ...+40 °C -20 °C ...+45 °C
Voltage range:		110 V AC ... 254 V AC 24 V ... 48 V AC/DC	
Lamps:		2x CCFL	4x CCFL
Light intensity:		130 Lux in 1 m displacement	205 Lux in 1 m displacement
Weight (without cable):		approx. 850 g	approx. 900 g
Dimension:		approx. 595 x 60 mm	
Protection rating:		IP 66/67	



ecom engineering

Project Engineering



ecom engineering has the solution!

Evaluating innovations and developing new products and technology has led to the processes – fast and focused on the market. That is our benchmark.
The increasing complexity of measurement and calibration technology, Mobile Computing, torches and telecommunication technology has lead to the development of engineering methods that tailor to a greater extent the objectives and demands of users.

The project engineering team of ***ecom engineering*** focuses on the planning, control and surveillance of challenging technological projects. We provide our clients with an efficient tool to critically optimise time, resources and costs.

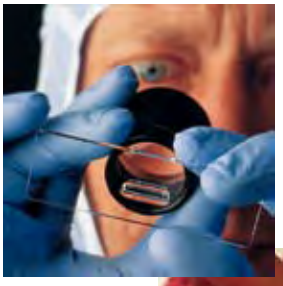
Within the scope of project control, problems can be avoided by risk evaluation and action monitoring from the start and possibilities for optimising can be organised beforehand. During all sequences of the development the ecom client will find our specialists to be a highly qualified coordination and contact partner. Thus the ecom team effectively reduces interface problems in complex international projects.

We develop innovative products for our clients and in co-operation with them. Therefore we are the ideal strategic and system-compatible outsourcing partner for high and middle end engineering: fast reactions, highly flexible and with high performance on any level, from the most detailed task to complex solutions for systems.

Our clients then have the advantage of customer-oriented project execution during the whole development process, from project definition to the start of production. The consequent viewing and observance of the whole process as well as the support with differentiated measures accelerates and optimises every single step between idea and realisation.

ecom engineering, established in 2002 with 22 development engineers and technicians, offers:

- complete technological consultancy
- modification of standard products
- tailored, customised solutions



Services for product realisation

ecom engineering provides services for product realisation:

Do you want to develop hardware?

ecom engineering can assist you on all levels of development:

- Requirement specifications
- System design and technical specifications
- Development
- Test
- Introduction of production

Consulting

Do you have an idea for a product and want to check the technical possibilities for realising it?

Do you have an outline specification and want to develop a detailed specification? Do you need technical clarification?

We can help with this and other aspects. Please contact us

Project management

Do you want us to take the whole responsibility for the project?

Do you want a contact partner who has the system overview over all technologies?

We have many years of experience and have the ability and determination to drive complex projects through in time - yet cost efficently.

Client specific development

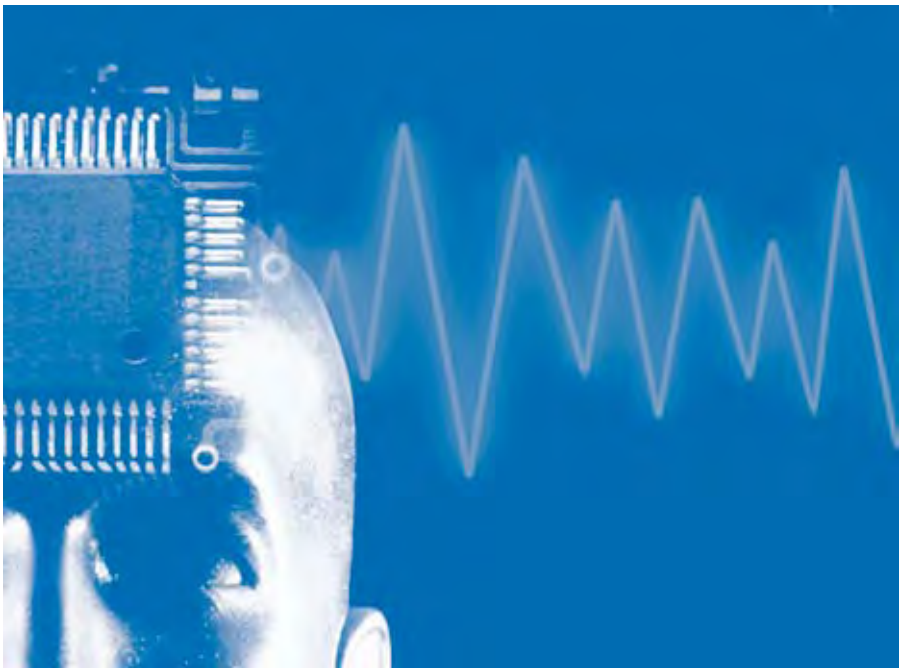
the objective of *ecom engineering* is to offer products and services of outstanding quality and with highest benefits for our customers.

We want satisfied customers with long-lasting trust in our products and services. Our range of services is an all-round package, including consulting, engineering, production and service. For us, the opinion of our clients is the crucial quality benchmark.

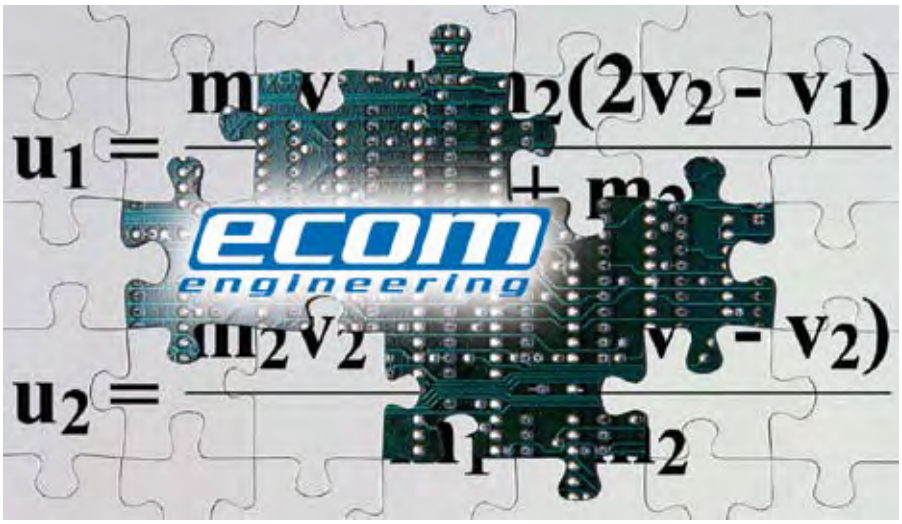
Essential factors for achieving optimum satisfaction of our customers are the identification and accomplishment of requirements for the product or the service. These requirements are defined by the customer's task and by effective laws and regulations.
Identifying and accomplishing these requirements are therefore an essential obligation for all members of our staff, and are a primary objective.

During customised development ecom engineering covers all phases:

- Providing requirement specifications
- Development of hardware
  - Development of connections
  - Circuit board layout
  - Construction of apparatus
- Development of software
- Conducting EMC-checks in order to obtain CE label
- Documentation



With high-tech and innovative technologies we are developing groundbreaking solutions for mobile computing, communication, torches and measuring and calibrating technology. Our intelligent products have put us in a leading position all over the world. It is our aim to always have a head start of a few steps for the benefit of our partners.



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Contents

General Conditions of Delivery and Payment

ecom instruments mobile experts

1. Exclusive Validity of these Conditions
Any and all deliveries - including any and all future deliveries - shall exclusively be governed by these General Conditions of Delivery and Payment. Purchasing Conditions of the Customer's are herewith explicitly rejected to the extent they are in conflict with these conditions.

2. Conclusion and Contents of Contract
2.1. Offers made by ecom are to be understood as non-binding. A binding contract shall be deemed to be concluded only upon ecom`s written confirmation of an order placed by the Customer

2.2. Any amendments and/or supplements to a contract shall likewise become effective only if made respectively confirmed in writing.

2.3. Rights deriving to the Customer from this contract must not be assigned without ecom´s prior written consent.

3. Prices
3.1. Prices are quoted net ex works, exclusive of packing and of VAT.
3.2. Unless otherwise explicitly agreed upon, title in tools used by ecom shall fully accrue to respectively remain with it, even if the Customer bears part or all of their costs.

4. Delivery
4.1. If a delay in delivery is caused by reasons of force majeure, the period of delivery is automatically extended appropriately. If such delay exceeds one month, ecom shall, by giving the Customer pertinent written notice, be entitled to rescind the contract.

4.2. If ecom is in delay with its delivery, the Customer shall be entitled to set ecom an additional time period to effect such delivery which must be reasonable under the circumstances. If ecom then fails to perform such delivery within the additional period described, the Customer shall be entitled, by giving ecom pertinent written notice, to rescind the contract.

5. Notice of Defects, Warranty, Liability
5.1. Notice of obvious defects, in particular of defects in the packaging and/or due to transportation as well as those concerning the quantity or the identity of the delivered products or of other obvious defects must be given in writing within one week from the date of delivery. With regard to hidden defects this period shall run from the day of their respective recognizability.

5.2. Both for defective deliveries and otherwise, ecom shall, to the exclusion of all other liability, be liable only as follows:

5.2.1. If a product turns out to be defective and is properly notified as such to ecom, ecom shall, at its option, either repair such defect or replace the affected component/product ("supplementary performance"). Title in any replaced components/products shall automatically pass to ecom. When two attempts at such supplementary performance have failed, the Customer shall be entitled, at its option, to either reduce the agreed-upon price or to rescind the contract.

5.2.2. In addition, if all conditions for such liability otherwise required by the law are satisfied, ecom shall be liable for the following damages:
All damages caused by an either intentional or at least grossly negligent breach of a contractual duty either by ecom itself or by a person engaged by ecom to perform all or part of such duties on ecom's behalf. Further, all damages resulting from bodily injury as well as all costs incurred through the above-mentioned supplementary performance, so in particular all costs of transportation, travelling, labour and material. This liability does not include any extra costs resulting from the transfer of the defective product from its original point of destination to its present location.

5.3. For customers acting in a non-private ("business") capacity, the period of all warranty/liability claims set out under 5.2, above, shall be 12 months from delivery, respectively from approval, for all other customers 24 months. For any product and/components delivered or repaired on a warranty basis, the warranty period shall be three months, but shall in no case expire before the original period of warranty.

6. The Need of Continued Creditworthiness of the Customer
The continued absolute creditworthiness of the Customer is an indispensable precondition for delivery. If, after the conclusion of the contract, ecom obtains information which warrant reasonable doubts in this respect, it shall be entitled to demand, at its discretion, either advance payment or an appropriate collateral or, if a consideration other than payment in cash had been agreed upon, payment in cash. Alternatively, it may terminate the contract, at its discretion, in whole or in part and/or demand performance plus damages.

7. Retention of Title
7.1. Ecom shall retain full title in every product delivered until that product has been fully paid.

7.2. In return, the Customer is authorized to use such products as an input/component for the manufacture of a new product even before full payment is made. However, such manufacturing/assembly shall be deemed to be carried out by the Customer on behalf and in the name of ecom. With regard to such input/component, the Customer herewith assigns to ecom all rights he thereby obtains in such new product to the extent these rights are to be considered as consideration for the loss/destruction of the pertinent input/component. The Customer shall take proper care of and maintain such new product for ecom.

8. Conditions of Payment
8.1. Invoices shall be payable within 30 days of receipt of the products, net, without discount.

8.2. The Customer may declare set-offs only with claims that are either uncontested or have become res judicata.

8.3. In case of a substantial deterioration in the financial situation of the Customer, the Supplier shall have the right to demand immediate payment of all claims he has against the Customer.

9. Final Provisions
9.1. If any provision contained in these conditions is or becomes invalid or ineffective, the remainder of these conditions shall not be affected thereby.

9.2. The place of performance for all obligations deriving from this contract shall be the address of the works from which the pertinent delivery shall be respectively has been made.

9.3. This contract as well as the entire business relationship between the Parties shall exclusively be governed by German Law.

9.4. All disputes arising out of or in connection with this contract shall exclusively be decided by the competent court in Stuttgart/Germany. Notwithstanding this provision, ecom shall alternatively have the right to sue the Customer at the court locally competent for the Customer's principal place of business or for the place for which the delivery in question is destined.

ecom instruments GmbH, Assamstadt

September 1st, 2007

Repair report sheet

RE _____

for internal use

ecom instruments mobile experts

Dear Customer,

It is ecom's goal to perform maintenance, repairs and overhaul to your best satisfaction within a timely manner at reasonable costs. Therfore we kindly ask you for your assistance in completing this report form sheet as completely as possible. The more details you can insert into this questionnaire, the better and faster ecom is able to provide you satisfying service.

It is mandatory to complete the fields indicated with (*).

Your *ecom instruments* - Team

Customer: Customer-No.: _____ Company:* _____

Address:* _____ Country/Zip-Code:* _____

Department: _____ City:* _____

Contact person: Mr. ☐ Mrs. ☐ _____

Phone: * _____ Fax: _____

E-Mail: _____

Save your data! There will be no liability by ecom instruments GmbH for lost data during the service procedure!

General information of malfunction: Device type: * _____

Serial number: * _____

Occurrence: ☐ Sporadically ☐ Regularly ☐ Continuously

Description: * (environment, usage)

_____

_____

_____

Reproducibility: ☐ No ☐ Yes how? _____

_____

Electrical:

☐ Keyboard ☐ Display ☐ Contacts

☐ Display fault ☐ Signal quality ☐ Accuracy

☐ Other: _____

Mechanical:

☐ Housing ☐ Accumulator ☐ Antenna ☐ Display

☐ Contacts ☐ Connections ☐ Key functions / switch

Contaminations:

Device is contaminated with dangerous substance(s) ☐ No ☐ Yes Whereby: _____

Our Warranty- and Liability Terms are vaild.

Date: _____ **Signature:** _____

0723QF22A02

Service form

ecom instruments
mobile experts

Dear Customer,
When returning the product please enclose this completed service form and a copy of the **invoice** or **delivery note**.
Please note that we will have to return the product to you if these documents are missing.
Unfortunately we are unable to accept any returns which are not prepaid.

Delivery address: ecom instruments GmbH · Industriestraße 2 · 97959 Assamstadt, Germany

Company:*	
Cu-number:*	
Department / factory:	
Contact person:*	
Tel:*	Fax:*
e-mail:*	
ecom delivery note no.:*	
ecom order no.:*	Return date:*

Fields designated by a * must be completed.

Art.no./designation*	Quantity	Classification**	Reason***	Description

**Classification: 1 = Complaint 2 = Repair (see repair advice note on page 112), 3 = Inspection, 4 = Return, 5 = Other

***Reason: 6 = Delayed delivery, 7 = Incorrect order, 8 = Incorrect delivery, 9 = Under-delivery, 10 = Double delivery, 11 = Transport damage (see www.ecom-ex.com)

Your service request:	® Exchange	® Credit note	® Subsequent delivery	® Rework
Your comments:				

To be completed by ecom:	® Accommodation	® Free of charge	® Settled	® New order
	® Credit note € _____	® Warranty € _____	® Cost € _____	® Other

Information Request Form

From:

Company .....

Name .....

Position / Dept. .....

Address .....

Post Code / City .....

Telephone / Fax .....

E-Mail .....

You can find the contact details for ecom worldwide on page 108-109.

I am interested in:

☐ A Quotation ☐ Please contact me by telephone

☐ Brochures about .....

Mobile Computing

☐ *i.roc* x20 -Ex ☐ RFID ☐ Barcode

☐ Accessories *i.roc* x20 -Ex ☐ Hart Modem MCT 202

Communication

☐ I. S. Mobile Phones ☐ I. S. Two-Way-Radios ☐ I. S. Headsets

☐ I. S. TETRA Two-Way-Radio ☐ I. S. Ear capsule radio unit

Torches

☐ I. S. LED Torches ☐ I. S. Handlamp ☐ I. S. Torches

☐ I. S. Inspection Lamp ☐ I. S. Mini Pocket Torch

☐ I. S. Laser-Pointer ☐ I. S. Headlamp

Measuring & Calibration

☐ I. S. Multimeter ☐ I. S. Data Logger ☐ I. S. Temperature Meters

☐ I. S. Ultrasonic Wall Thickness Gauge ☐ I. S. Laser-Tachometer ☐ I. S. Magnet Probe

☐ I. S. Continuity Tester ☐ I. S. Stroboscope ☐ I. S. Wall Clocks

☐ I. S. Pressure Calibrators ☐ I. S. Multifunction Process Calibrator

☐ I. S. Pressure Modules ☐ I. S. Loop Calibrators

Measuring & Calibration

☐ Multi-Function Calibrator ☐ Temperature Calibrator ☐ Loop Calibrators

☐ Pressure Calibrators ☐ Pressure Test Gauge ☐ Pressure Modules

☐ ProcessMeter ☐ Documenting Process Calibrators ☐ Infrared Thermometers

☐ Process Clamp Meter ☐ Laser Distance Meters ☐ Thermal Imagers

If you do not wish to receive future mailing or information please tick ☐ and return - thank you.

ecom instruments
mobile experts

General information

Product catalogue, valid from April 2009.
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