Operating instructions

Series ET-xx7

Panel PC ET-4x7
Remote HMI Thin Client ET-5x7
Remote HMI KVM ET-6x7

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1 Preface

These operating Instructions contain all aspects relevant to explosion protection for the ET-xx7 HMIs (Panel PC and Remote HMI series). They also contain information on the connection and installation of these devices.

⚠ All data relevant to explosion protection from the EC-type examination certificate were copied into these operating instructions. In the case of any discrepancies the original EC-type examination certificate applies.

⚠ For the correct operation of all associated components please note, in addition to these operating instructions, all other operating instructions enclosed in this delivery as well as the operating instructions of the additional equipment to be connected.

🕮 All certificates pertaining to the HMIs have been collected in the CE_ET-xx7 document, which is not part of the delivery. You can find this document on our website (www.stahl-hmi) or request it from STAHL HMI Systems GmbH.

🕮 For more information on the HMIs please also refer to the Manual (available as online manual on www.stahl-hmi).

2 Device function

The ET-xx7 HMIs are explosion-protected equipment for installation in hazardous areas and can be operated in zones 1 and 21 with interfaces for zones 0/1/2 and 20/21/22.
The devices are connected to a communication system via the serial interfaces (RS-232, Ethernet) located in their connection box at the rear. The connection box also contains the USB interfaces for the connection of various peripheral devices. Furthermore, the interfaces for keyboard, mouse, video and audio signals are also located here.

2.1 Panel PC ET-4x7

The ET-4x7 HMI Panel PCs are intelligent display and operating devices which can run any software and are thus easy to operate.
The devices are fitted with powerful processors and are thus able to process even large applications on-site. The devices have a back-up and recovery system which can be used to save complete images and load them onto new Panel PCs without requiring specific IT skills. The X13 interface is provided for this purpose.

2.2 Remote HMI Thin Client ET-5x7

The Remote HMIs of the ET-5x7 series can be integrated into modern networks as Thin Clients or with a KVM box via KVM-over-IP. Digital Ethernet technology is used for the data transfer between KVM box and Remote system.
Up to four Remote HMIs can access one KVM box with one software license, thus cost-effectively communicating with several PCs - for example, when monitoring the production process and simultaneously applying Condition Monitoring.
Multi-monitoring with several on-site terminals can as easily be implemented as the application as Thin Client in a server environment with virtual work stations.

2.3 Remote HMI KVM ET-6x7

The KVM Classic transfer technology is used for the point-to-point connection between a PC and an ET-6x7 Remote HMI device.
There are three versions (DVI1, DVI2 and DVI3) of this transfer technology that have slightly different functionality.

3 Type allocation

Since the beginning of 2013, the T-series devices have been allocated new type names according to the following pattern:
To avoid the bother of having to re-write certifications, the names in the certificates remain the same, but the devices receive new names.
In the interest of a clear link between device type and certificate, both device names are listed on the type plate from 01.04.2013 onwards.

3.1 Type marking

Old (certificate)	New
T-Ex-##*-CAT7*-R2	ET-##7*-TX*
T-Ex-##*-CAT7*-R2	ET-##7*-CAT*
T-Ex-##*-MM*-R2	ET-##7*-MM*
T-Ex-##*-SM*-R2	ET-##7*-SM*

* = random alphanumeric or symbolic characters without relevance to explosion protection
\# = random numeric character without relevance to explosion protection

☞ For the exact new device name and model please refer to the type code.

4 Technical Data

Function / Equipment	**ET-467 ET-567 ET-667**	**ET-477 ET-577 ET-677**	**ET-487 ET-587 ET-687**
Display type	TFT Color display 16.7 million colours		
Display size	56 cm (22")	61 cm (24")	61 cm (24"WU)
Resolution in pixels	WSXGA+ 1680 x 1050	Full HD 1920 x 1080	WUXGA 1920 x 1200
Format	16:10	16:9	16:10
Display	Glass		
Touch Screen (optional)	Membrane or glass surface 5-wire analogue resistive		
Backlight	LED background lighting		
Service life (MTBF) of backlight at 20°C	typically 50,000 h		
Brightness	250 cd/m²	300 cd/m²	
Contrast	1000 : 1		
Additional keyboard (optional)	107 keys with integrated trackball / joystick / mouse pad or touch pad		
Power supply	Directly in the integrated Ex-e connection box		
Connections	via screw terminals, green flexible cable up to 2.5 mm² (AWG 16) fixed cable up to 4 mm² (AWG 14)		
Voltage supply	24 VDC (20 - 30 V) or 100 - 240 VAC, 50 - 60 Hz		
Power consumption [A]	at 24 VDC = max. 3 A at 100 - 240 VAC = max. 1 A		
Power	typically 35 W / max. 150 W (typically 119 BTU / max. 510 BTU)		
Recommended fuses	4 AT		
Max. operating voltage Um	250 VAC		
only for ET-4x7 and ET-5x7 Real-time clock Data buffer Battery Capacitor	 Yes Lithium battery and capacitor buffered, maintenance-free > 5 years at least 4 days		

Interfaces	
Ethernet	Either copper or optical fibre
Copper (TX)	10/100BaseTx, 10/100 Mbit, (Ex-e) only for ET-6x7 direct connection Gigabit
Optical fibre (MM/SM)	100BaseFx, 100 Mbit, intrinsically safe (Ex op is) only for ET-6x7 direct connection
(SX)	1000BaseSx, 1000 Mbit, multi-mode, intrinsically safe (Ex op is) (not ET-6x7)
Cable type Optical fibre MM Optical fibre SM	 Multi-mode optical fibre cable (50 µm core cross section and 125 µm external cross section) Single-mode optical fibre cable (9 µm core cross section and 125 µm external cross section)
USB	2x Ex-ia; 1x Ex-e
USB	For keyboard and mouse (Ex-ia)
Serial	RS-232, (Ex-e)
Video In (optional)	FBAS (Ex-e)
Audio	Line In/Out interface (Ex-e) (Line-in only for ET-6x7)
Data cable lengths	
Optical fibre MM	up to 500 m (1,640 ft) via 50/125 µm optical fibre cable, up to 300 m (985 ft) via 62.5/125 µm optical fibre cable
Optical fibre SM	up to 10,000 m (33,000 ft) via 9/125 µm optical fibre cable
Copper (TX)	up to 100 m (330 ft) via CAT7 installation cable AWG 22
for DVI1 CAT	up to 140 m (460 ft) via CAT7 installation cable AWG 22
for DVI2 CAT	up to 500 m (1,640 ft) via CAT7 installation cable AWG 22
for DVI3 CAT	up to 150 m (492 ft) via CAT7 installation cable AWG 22
Enclosure	Stahl
Enclosure protection type	Front IP66, back side IP65
Permitted ambient temperature range	- 30°C … + 60°C
Operating temperature range	
Cold start temperature	- 10°C … + 50°C
Operation	- 20°C … + 60°C
Permanent operation	- 20°C … + 50°C
Short-term operation	- 30°C … + 60°C for a maximum of 5 h
Storage temperature range	- 30°C … + 70°C
Operating temperature range for DVI1	
Cold start temperature	+ 5°C … + 40°C
Operation	+ 5°C … + 40°C
Permanent operation	+ 5°C … + 40°C
Storage temperature range	- 20°C … + 70°C
Heat dissipation	about 40% via the front plate and 60% via the enclosure
Relative humidity	10 to 90% at 40°C, non-condensing
for DVI1	20 to 80% at 40°C, non-condensing
Dimensions [mm] (inch)	
Front (w x h)	660 x 475 (25.98” x 18.70”)
Cut-out (w x h) (+/- 0.5) (0.002")	 615 x 435 (24.21” x 17.13”)
Depth of cut-out	110 (4.33")
Wall thickness	≤ 5 (0.02")
Mounting position:	vertical or horizontal
Weight [kg] (lb)	
HMI device	32.00 (70.55 lb)

4.1 In addtion to ET-4x7 (Panel PC)

Processor	ATOM 1.6 GHz
Working memory [GB]	1 / 2
Data memory [GB]	4 / 16
	128 GB MLC
	128 GB SLC
Type of data memory	
Standard	SSD solid state flash drive
Optional	Extension to Exicom-SHD-xxx hard disk. 100 GB instead of flash memory
Operating system:	Windows XP embedded Windows XP Professional Windows 7 Ultimate
Standard Software	WIN CC flexible, iFix, RSView (for further software solutions, please refer to our homepage)
Global language support	Via Multi-Language interface of Windows XP embedded (25 languages)

5 Conformity to standards

The ET-xx7 HMIs comply with the following standards and directives:

Standard **Directive 94/9/EC** **2. Supplement**	**Classification**
EN 60079-0 : 2009 IEC 60079-0 : 2007	General requirements
IEC/EN 60079-5 : 2007	Powder filling »q«
EN 60079-7 : 2007 IEC 60079-7 : 2006	Increased safety "e"
EN 60079-11 : 2007 IEC 60079-11 : 2006	Intrinsic safety "i"
EN 60079-26 : 2007	Device protection (EPL) "Ga"
EN 60079-28 : 2004 IEC 60079-28 : 2006	Optical radiation
EN 60079-31 : 2009 IEC 60079-31 : 2008	Protected by enclosures "tD" (dust)
EN 61241-11 : 2006 IEC 61241-11 : 2005	Intrinsic safety "i"
Electromagnetic compatibility	
directive 2004/108 EC	
EN 61000-6-2 : 2006	Interference resistance
EN 61000-6-4 : 2007	Interference emission
Low voltage directive	
directive 2006/95 EC	
EN 50178 1997 :	Fitting power plants with electronic equipment
EN 61010-1 : 2001+	General requirements

6 Certificates

The ET-xx7 HMIs are certified for installation in the following areas:
Europe:
According to ATEX Directive 94/9/EC
for installation in zones 1, 2, 21 and 22.
International:
IECEx (International Electrotechnical Commission System for Certification to Standards for Electrical Equipment for Explosive Atmospheres)
Asia:
GOST-R (Russian certificate)
KGS (Korea Gas Safety Corporation)

6.1 ATEX

The ATEX certificate is listed under the following certification number:

Certificate number:	BVS 11 ATEX E 102 X

6.2 IECEx

The IECEx certificate is listed under the following certification number:

Certificate number:	IECEx TUR 11.0075X

All IECEx certificates are listed on the IEC's official website under their certification number. http://iecex.iec.ch/iecex/iecexweb.nsf/welcome?openform.

6.3 GOST-R

The GOST-R certification is listed under the following certification number:

Certificate number:	РОСС DE.ГБ04.В01882

6.3.1 Operating licence

Number:	PPC 00-048723

6.4 KGS

The KGS certification is listed under the following certification number:

Certificate number:	12-GA4BO-0617X

NB:
In order to be able to operate these HMIs in Korea, each device type additionally requires a KCC certificate.
Actually the following devices has such a certificate:
T-Ex-22 (ET-x67), T-Ex-24T (ET-x77 with Touch screen (foil))

7 Marking

Manufacturer	R. STAHL HMI Systems GmbH	
Type code	ET-xx7	
CE classification:	CE 0158	
Testing authority and certificate number:	BVS 11 ATEX E 102 X	
Ex classification:		
ATEX guideline 94/9/EC		II 2(1) G Ex e q [ia op is Ga] IIC T4 Gb II 2(1) D Ex tb IIIC [ia op is Da] IP65 T110°C Db
IECEx		Ex e q [ia op is Ga] IIC T4 Gb Ex tb IIIC [ia op is Da] IP65 T110°C Db
GOST-R		1Ex e q [ia op is Ga] IIC T4 Gb Ex tb IIIC [ia op is Da] IP65 T110°C Db
KGS		Ex e q IIC T4 Ex tb IIIC IP64 T110°C Ex ia IIC T4 Ex ia IIIB T110°C

8 Power supply

8.1 HMIs

Power supply:	24 VDC or 100 – 240 VAC, 50 – 60 Hz	
Max. power consumption:	at 24 VDC	3 A
	at 100 - 240 VAC	1 A

9 Permitted maximum values

9.1 External, non-intrinsically safe circuits

Input voltage “PWR” (X10):

Nominal voltage:	20 ...240 V AC/DC (depending on type)
Power consumption I_{max}	≤ 5 A
Power P_{max}	≤ 150 W
Max. operating voltage U_m	≤ 250 VAC
Short-circuit current I_K	≤ 1500 A

USB (X13):

Rated voltage	5 VAC/VDC (± 10%)
Max. operating voltage U_m	≤ 250 VAC

12 V (X14):

Rated voltage	12 VAC/VDC (± 10%)
Power consumption Imax	≤ 400 mA
Max. operating voltage U_m	≤ 250 VAC

RS-232 "SER" (X97):

Rated voltage	15 VAC/VDC (± 10%)
Max. operating voltage U_m	≤ 250 VAC

Video "CAM" (X101):

Rated voltage	5 VAC/VDC (± 10%)
Max. operating voltage U_m	≤ 250 VAC

Audio "AUD" (X105):

Rated voltage	100 VAC/VDC (± 10%)
Max. operating voltage U_m	≤ 250 VAC

Copper Ethernet (CAT7 1) (X16):

Rated voltage	5 VAC/VDC (± 10%)
Max. operating voltage U_m	≤ 250 VAC

9.2 External inherently safe optical interface

Ethernet optical fiber (FO 1) (X18)
Multi-mode

Wavelength	850 nm
Radiant power	0.22 mW
max. radiant power:	35 mW

Single mode

Wavelength	1310 nm
Radiant power	0.22 mW
max. radiant power:	35 mW

9.3 External intrinsically safe circuits

Keyboard (X11)

The maximum values are:

U_i	=	5.5	V		U_o	=	5.5	V
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	µF		C_o	=	50	µF
L_i	=	negligible	mH		L_o	=	40	µH

Pointer device (X12):

The maximum values are:

U_i	=	5.5	V		U_o	=	5.5	V
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	µF		C_o	=	50	µF
L_i	=	negligible	mH		L_o	=	40	µH

USB1i (X24):

The maximum values are:

U_i	=	5.5	V		U_o	=	5.5	V
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	µF		C_o	=	50	µF
L_i	=	negligible	mH		L_o	=	40	µH

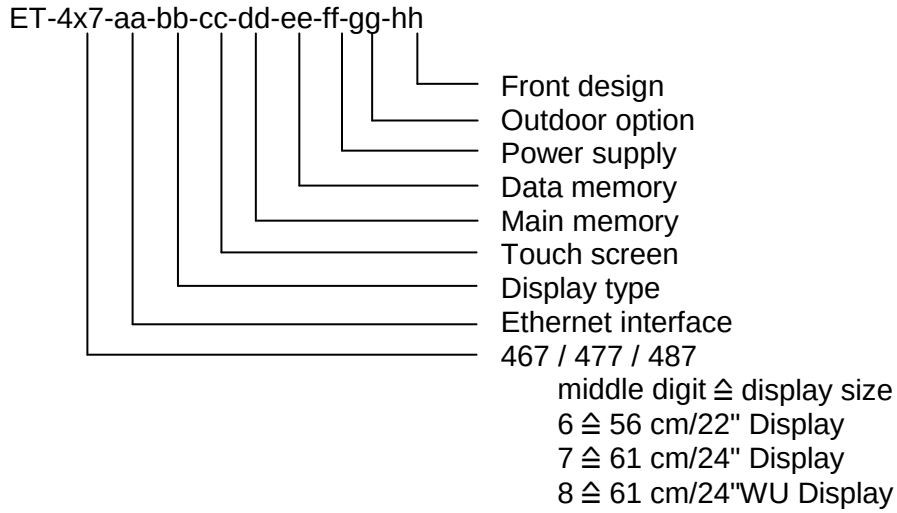
USB2i (X25):

The maximum values are:

U_i	=	5.5	V		U_o	=	5.5	V
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	µF		C_o	=	50	µF
L_i	=	negligible	mH		L_o	=	40	µH

10 Type code

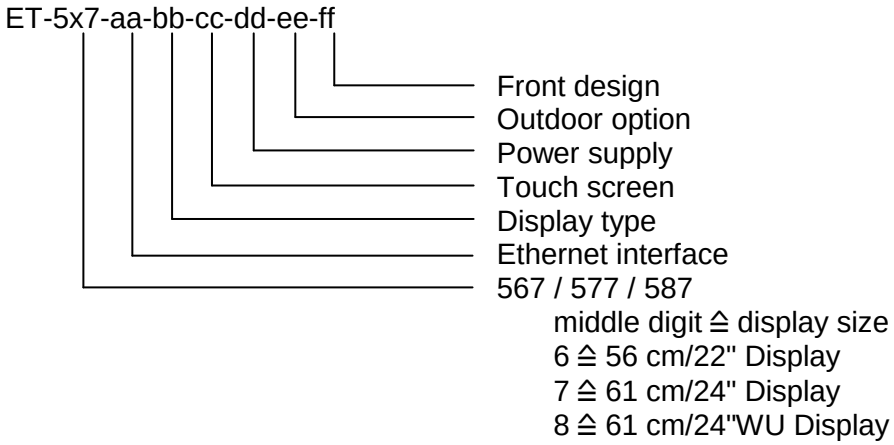
10.1 Panel PC ET-4x7



Product type:

Product key structure	Description
	Type with
ET-4x7-**SX**-bb-cc-dd-ee-ff-gg-hh	Optical fiber Ethernet interface 1000BaseSx (Ex op is), multi-mode
ET-4x7-**TX**-bb-cc-dd-ee-ff-gg-hh	Copper Ethernet interface 10/100BaseTx (Ex-e)
ET-4x7-aa-**TFT**-cc-dd-ee-ff-gg-hh	TFT display (standard)
ET-4x7-aa-bb-**T**-dd-ee-ff-gg-hh	Touch screen (foil)
ET-4x7-aa-bb-**TG**-dd-ee-ff-gg-hh	Touch screen glass
ET-4x7-aa-bb-cc-**R1**-ee-ff-gg-hh	Working memory 1 GB
ET-4x7-aa-bb-cc-**R2**-ee-ff-gg-hh	Working memory 2 GB
ET-4x7-aa-bb-cc-dd-**4GB**-ff-gg-hh	4 GB Solid State Drive
ET-4x7-aa-bb-cc-dd-**16GB**-ff-gg-hh	16 GB Solid State Drive
ET-4x7-aa-bb-cc-dd-**128GBM**-ff-gg-hh	128 GB Solid State Drive MLC
ET-4x7-aa-bb-cc-dd-**128GBS**-ff-gg-hh	128 GB Solid State Drive SLC
ET-4x7-aa-bb-cc-dd-**100GB**-ff-gg-hh	100 GB hard disk (internal)
ET-4x7-aa-bb-cc-dd-ee-**AC**-gg-hh	Power supply 100 - 240 VAC, 50 - 60 Hz
ET-4x7-aa-bb-cc-dd-ee-**DC**-gg-hh	Power supply 24 VDC
ET-4x7-aa-bb-cc-dd-ee-ff-**O30**-hh	Outdoor installation -30°C
ET-4x7-aa-bb-cc-dd-ee-ff-gg-**AL**	Aluminium front plate
ET-4x7-aa-bb-cc-dd-ee-ff-gg-**RM**	Rear-mounted module

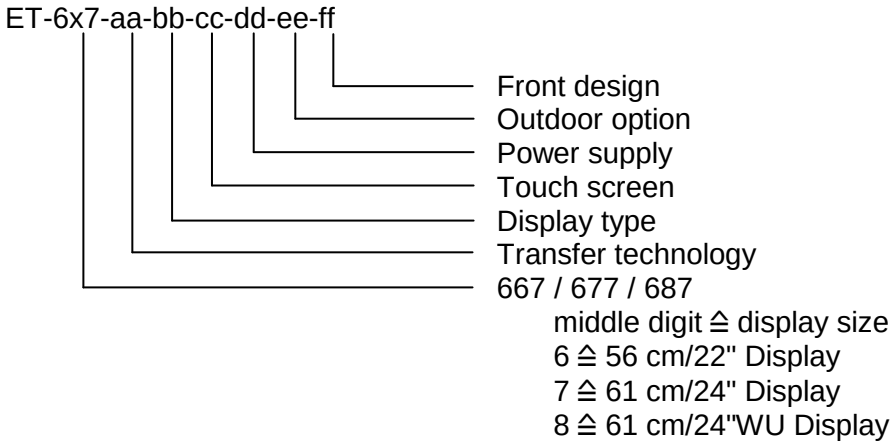
10.2 Remote HMI Thin Client ET-5x7



Product type:

Product key structure	Description
	Type with
ET-5x7-**SX**-bb-cc-dd-ee-ff	Optical fiber Ethernet interface 1000BaseSx (Ex op is), multi-mode
ET-5x7-**TX**-bb-cc-dd-ee-ff	Copper Ethernet interface 10/100BaseTx (Ex-e)
ET-5x7-aa-**TFT**-cc-dd-ee-ff	TFT display (standard)
ET-5x7-aa-bb-**T**-dd-ee-ff	Touch screen (foil)
ET-5x7-aa-bb-**TG**-dd-ee-ff	Touch screen glass
ET-5x7-aa-bb-cc-**AC**-ee-ff	Power supply 100 - 240 VAC, 50 - 60 Hz
ET-5x7-aa-bb-cc-**DC**-ee-ff	Power supply 24 VDC
ET-5x7-aa-bb-cc-dd-**O30**-ff	Outdoor installation -30°C
ET-5x7-aa-bb-cc-dd-ee-**AL**	Aluminium front plate
ET-5x7-aa-bb-cc-dd-ee-**RM**	Rear-mounted module

10.3 Remote HMI KVM ET-6x7



Product type:

Product key structure	Description
	Type with
ET-6x7-**DVI1-CAT**-bb-cc-dd-ee-ff	DVI1 KVM, with direct copper connection Gigabit (Ex-e)
ET-6x7-**DVI1-MM**-bb-cc-dd-ee-ff	DVI1 KVM, with direct optical fibre connection (Ex op is), multi-mode
ET-6x7-**DVI1-SM**-bb-cc-dd-ee-ff	DVI1 KVM, with direct optical fibre connection (Ex op is), single-mode
ET-6x7-**DVI2-CAT**-bb-cc-dd-ee-ff	DVI2 KVM, with direct copper connection Gigabit (Ex-e)
ET-6x7-**DVI3-CAT**-bb-cc-dd-ee-ff	DVI3 KVM, with direct copper connection Gigabit (Ex-e)
ET-6x7-**DVI3-MM-FO**-bb-cc-dd-ee-ff	DVI3 KVM, with direct optical fibre connection (Ex op is), multi-mode
ET-6x7-**DVI3-SM-FO**-bb-cc-dd-ee-ff	DVI3 KVM, with direct optical fibre connection (Ex op is), single-mode
ET-6x7-aa-**TFT**-cc-dd-ee-ff	TFT display (standard)
ET-6x7-aa-bb-**T**-dd-ee-ff	Touch screen (foil)
ET-6x7-aa-bb-**TG**-dd-ee-ff	Touch screen glass
ET-6x7-aa-bb-cc-**AC**-ee-ff	Power supply 100 - 240 VAC, 50 - 60 Hz
ET-6x7-aa-bb-cc-**DC**-ee-ff	Power supply 24 VDC
ET-6x7-aa-bb-cc-dd-**O30**-ff	Outdoor installation -30°C
ET-6x7-aa-bb-cc-dd-ee-**AL**	Aluminium front plate
ET-6x7-aa-bb-cc-dd-ee-**RM**	Rear-mounted module

11 Safety information

11.1 General Safety Information

- All relevant accident prevention regulations and the rules for electric installations have to be observed during installation, maintenace and operations. All persons involved in installation, commission, maintenance and repairs of this device and its accessories must be qualified accordingly and must have familiarised themselves with this manual and any associated documentation.
- In case of non-compliance or contravention of the above explosion-protection is no longer guaranteed and all warranty claims shall be null and void.
- National safety and accident prevention rules apply.
- Use the device for its intended purpose only.
- No changes to the device are permitted. The enclosure may only be opened by R. STAHL HMI Systems GmbH.
- The first four digits of the serial number on the type plate stand for the year of manufacture.

11.2 Warning

Warning !

This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

11.3 Safety information for installation

- The national assembly and installation rules and the generally accepted technical rules must be observed. The device and its accessories must be connected and operated according to applicable standards, directives and installation guidelines. Only qualified personnel or personnel that has been instructed accordingly are allowed to install the device.
- Only appropriate tools must be used for the installation.
- The screws on the lid of the Ex-e connection box must be fastened with a torque of 1 N.
- The cable connections of the connection box must be in line with country-specific regulations and may have to be adapted accordingly. Potential changes to the ambient parameters such as temperature must be taken into account.
- The cable entries in the connection box must have ingress protection IP 66 or may have to be adapted to meet country-specific requirements. The pre-assembled cable entry threads are size M16x1.5 and M20x1.5. The wall of the terminal box where the cable entries are mounted has a thickness of at least 4 mm.
- The cable connections must be tightened fast according to regulations. Unused cable connections must be sealed with appropriate blind plugs. Only permanently laid cables may be connected to the pre-mounted ATEX cable connections.

- The outer cable diameters must correspond to the cable connection specifications. Cable entry M16 for round cable, outside cable cross-section 5...9 mm (0.2"...0.35") Cable entry M20 for round cable, outside cable cross-section 9...13 mm (0.35"...0.51").
- The device must not be opened, maintained or repaired in hazardous atmospheres (sole exception: the Ex-e connection box).
- Before opening the Ex-e connection box, ensure that all Ex-e and Ex-i circuits are fully de-energised and isolated. You must also ensure that the power supply circuit is isolated. The cable diameter must meet the terminal specifications. The Ex-e connection box must be tightly sealed.
- All Ex-e and Ex-i circuits must be completely de-energised before the device is connected. After the Ex-e and Ex-i circuits have been de-energised, wait for at least seven minutes before opening the Ex-e connection box. The Ex-e connection box must not be opened if the device is energised.
- The wire used for earthing must have a minimum cross section of 4mm² ! Make sure that there is equipotential bonding between the devices.
- We recommend you use screened cables with the device. Routing of the data cable may reduce performance. Cables for intrinsically safe wiring have to pass a test voltage of AC 500 V/DC 750 V. Use the values 200 pF/m and 1 µH/m at unknown cable properties.
- If display types ET-xx7-DVI1-MM or ET-xx7-DVI1-SM are used, terminal X16 remains unused.
- To establish a secure earthed connection between device and plant and to prevent inadvertent loosening of the cables, each cable with its screen must be connected to the corresponding earthing bracket located in the Ex-e connection box close to the associated terminal.
- At the place of installation voltage must not exceed 250 V and short-circuit current must not exceed 1500 A.
- A tick close to the X10 terminal indicates the voltage type (AC/DC). For the 24 VDC types the cable cross-sections depend on the cable length of the voltage supply cable, as follows:

Cable length in metres (ft)	Cable cross-section in mm² (AWG)
max. 55 m (180 ft)	1.5 mm² (AWG 16)
max. 90 m (295 ft)	2.5 mm² (AWG 14)
max. 150 m (492 ft)	4 mm² (AWG 12)
max. 225 m (738 ft)	6 mm² (AWG 10)
max. 375 m (1230 ft)	10 mm² (AWG 8)
max. 600 m (1968 ft)	16 mm² (AWG 6)

If the cable's cross section is greater than the maximum possible for the terminals, the cable needs to be routed according to regulations via a smaller cable cross section before being inserted into the connection box (possibly using the Ex-e terminal box).

- When the interface of intrinsically safe devices/partial intrinsically safe devices was or is connected to not intrinsically safe interfaces, the license will become void and it must be operated as a not intrinsically safe device. If the device was operated on an intrinsically safe interface with a lower level of international protection (e.g. a Ex ia device on a Ex ib interface), it must not be operated afterwards in applications for a higher level of international protection (e.g. Ex ia).
- If the device is being used in a dust atmosphere and must be replaced, the device or the enclosure in which it is mounted must be disconnected from the mains first and then, according to regulations, be left to cool down. Before opening the device or its enclosure and whilst they are open, the environment must be kept dust-free so that no dust can intrude into the inside of the enclosure. When mounting new components please ensure that all seals are undamaged and fit tightly.
- Before starting up the device you must ensure that it has been installed according to regulations and that neither the device nor its cables are damaged.

11.3.1 HMI device installation in housings type of protection "e" or "t"

If the HMI devices ET-xx7 are mounted inside a cut out of a suitable housing of protection type Ex-e or Ex-t, its mechanical protection regarding impact and IP code protection up to IP 65 is maintained even after the device has been installed. The internal separation requirements and the temperature assessment of the Ex-e housing must be in accordance with the applicable standards. The clearance of operator panel terminals to other bare conducting parts (excepting ground) inside the Ex-e housing shall be at least 50 mm.

11.4 Safety information for operation

- Operate the device only if it is clean and undamaged. If the device is in any way damaged, do not touch it to avoid injury. In the case of any damage that may compromise ingress protection (e.g. cracks, holes or broken components) the device must be taken out of commission immediately. Before the device is recommissioned the damaged components must be replaced.
- If you want to use the device in category 1D/2D/3D or EPL Da/Db/Dc, dust deposita of a thickness exceeding 5 mm must be removed and you have to ensure that no high-energy loading mechanisms at the operating surface of the unit (e.g. pneumatic particle transport) occur during operation. The device may not be used in environments where propagating brush discharges may occur.
- In general, and particularly when opening and closing enclosures, users must take care not to get injured by getting caught / trapped.
- In case of non-compliance or contravention of the above explosion-protection is no longer guaranteed and all warranty claims shall be null and void.

11.5 Special conditions

Equipotential bonding must be established for the external intrinsically safe circuits of the accessories to be connected, e.g. display, keyboard or pointer device.

12 Assembly and disassembly

12.1 General information

Assembly and disassembly are subject to general technical rules. Additional, specific safety regulations apply to electronic and pneumatic installations. In Germany, for example, these include the BG regulations (Government Safety Association) and the BetrSichVer (Betriebsicherheitsverodnung - Occupational Health and Safety).

12.2 Cut-out ET-xx7

Make a cut-out with the following dimensions:

Width	Height	Depth of cut-out	Material thickness
615 ± 0.5 mm	435 ± 0.5 mm	110 mm	up to 5 mm
24.21" ± 0.002"	17.13" ± 0.002"	4.33"	up to 0.02"

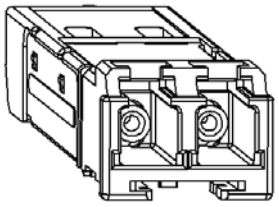
13 Operation

13.1 General information

When operating the devices, particular care shall be taken that:

- the HMI has been properly installed according to instructions,
- the HMI is undamaged,
- the terminal compartment is clean,
- all screws are tightened fast,
- before switching the HMI on, its external PE terminal is properly connected to the equipotential bonding system at its place of use,
- the cover of the terminal compartment is completely closed.

13.2 Connections

Terminal	Pin	Definition / typcial cable colour		Connection
X10 PWR	1	Power supply HMI +24 VDC or 100 - 240 VAC		Power supply of the HMI Ex-e
	2	Power supply HMI 0 VDC or 100 - 240 VAC		
	3	Earth HMI		
X11 KBi	1	+UB	Red	USB interface Ex ia for external keyboard
	2	D-	White	
	3	D+	Green	
	4	GND	Black	
X12 Mi	1	+UB	Red	USB interface Ex ia for mouse
	2	D-	White	
	3	D+	Green	
	4	GND	Black	
X13	1	+UB	Red	USB Ex-e
	2	D-	White	
	3	D+	Green	
	4	GND	Black	
X14	1	+12 V	Red	12 VDC output Ex-e
	2	GND	Black	
X16 CAT7 1 Data	1	TRD0+	White / Orange	Ethernet copper connection * Ex-e
	2	TRD0-	Orange	
	3	TRD1+	White / Green	
	4	TRD1-	Green	
	5	TRD2+	Blue / White	
	6	TRD2-	Blue	
	7	TRD3+	White / Brown	
	8	TRD3-	Brown	
	9	SHLD	Screen	
X18 FO 1 Data		 Tx Rx	optical fibre connection type LC Duplex connector	Ethernet optical fibre interface * Ex op is
X24 USB1i	1	+UB	Red	USB interface Ex ia
	2	D-	White	
	3	D+	Green	
	4	GND	Black	
X25 USB2i	1	+UB	Red	USB interface ** Ex ia
	2	D-	White	
	3	D+	Green	
	4	GND	Black	
X97 SER	1	TxD	Blue / White	Serial Ex-e interface RS-232
	2	RxD	Blue	
	3	RTS	White / Orange	
	4	CTS	Orange	
	5	GND	Black	

X101	1	FBAS	White	Video
CAM	2	GND	Black	Ex-e interface
X105	1	CH1 / line out left	Red	Audio
AUD	2	CH2 / line out right	Black	Ex-e interface
	3	CH3 / line in left	Red	
	4	CH4 / line in right	Black	
	5	GND	Black	

☞ The following applies to all terminals:
0.2 - 2.5 mm² / 24 AWG - 16 AWG for flexible cable
0.2 - 4 mm² / 24 AWG - 14 AWG for rigid cable
Strip cable of 7 mm (0.28 in) insulation
max. one cable per terminal

☞ recommended cable length for terminals X11, X12, X13, X14, X24, X25:
max. 3 m (10 ft)

☞ * Please note that the Ethernet connection is **either** for an optical fibre connection (X16) **or** for a copper connection (X18), depending on the version ordered !
If display types ET-xx7-DVI1-MM or ET-xx7-DVI1-SM (optical fibre versions) are used, terminal X16 remains unused.
In the case of an optical fibre connection the following cable is recommended:
Multi-mode FO cable: 50 µm core cross section and 125 µm external cross section
Single-mode FO cable: 9 µm core cross section and 125 µm external cross section

☞ ** The USBi2 connection (X25) is **NOT** available for devices with touch screen and may **NOT** be connected !

14 Maintenance

Because the transmission of the devices remains reliable and stable over long periods of time, regular adjustments are not required.

Keep the units clean so that the enclosure locks and screws remain accessible. Maintenance may be required for the enclosure seal.

System maintenance should focus on the following:

a. Seal wear
b. Display damage
c. All screws are tightened fast
d. All cables and lines are properly connected and undamaged

15 Troubleshooting

Devices operated in hazardous areas must not be modified. Repairs may only be carried out by qualified, authorized staff specially trained for this purpose.

☞ Repairs may only be carried out by specially trained staff who are familiar with all basic conditions of the applicable user regulations and – if requested – have been authorized by the manufacturer.

15.1 Repairs / hazardous substances

An error description must be enclosed with any units returned to R. STAHL HMI Systems GmbH for repairs.

Remove all material residues. Please pay particular attention to the seal grooves and slits where material residues may be lodged. We have to ask you not to return a unit if you are unable to completely remove any hazardous substances. We shall bill you for any costs arising from insufficiently cleaned units, such as disposal or damage to persons (chemical burns, etc.).

16 Disposal

Disposal of packaging and used parts is subject to regulations valid in whichever country the device has been installed.
The disposal of devices sold after August 13th, 2005, and installed in countries under the jurisdiction of the EU is governed by directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Under this directive, HMIs are listed in category 9 (monitoring and control instruments).

We shall take back our devices according to our General Terms and Conditions.

16.1.1 ROHS directive 2002/95/EC

The prohibition of hazardous substances as detailed in directive 2002/95/EC (ROHS) does not apply to electronic equipment of categories 8 and 9, and is therefore not applicable to the equipment described in these operating instructions.

17 Front panel resistance

This section contains information on the resistance of the HMIs to various environmental factors. These have an impact on the mechanical, thermal and chemical stability of the HMIs.

The resistance to chemicals was tested according to DIN 42115 Part 2, i.e. the stability over 24 hours without visible changes to the HMIs.

17.1 Materials

Application	Material
Front plate	Aluminum
Touch screen	Polyester
Enclosure	Stainless steel
Front panel seal	Polyurethane

17.1.1 Material properties

☞ The selection of chemicals listed here is not exhaustive.

17.1.2 Touch membrane (polyester)

Property	Chemical material class / group	Chemical substances	Test method
Chemical • Chemical resistance	Alcohols	1,3 Butanediol 1,4 Butanediol Cyclohexanol Diacetone alcohol Ethanol Glycol Glycerol Isopropyl alcohol Methanol Neopentyl glycol Octanol 1,2 Propylene glycol Triacetin Dowandol DRM/PM	DIN 42115 DIN 53 461 or ASTM-F-1598-95
	Aldehydes	Acetaldehyde Formaldehyde 37-42%	
	Amines	Ammonia <2%	
	Esters	Amyl acetate Ethylacetate N-Butyl acetate	

Ethers	1.1.1. Trichloroethane Ether Dioxane Diethyl ether 2-Methyltetrahydrofuran (2-ME-THF)
Aromatic hydrocarbons	Benzene Toluene Xylene Paint thinner (white spirit)
Ketones	Acetone Methyl ethyl ketone Cyclohexanone Methyl isobutyl ketone (MIBK) Isophorone
Diluted acids	Formic acid <50% Acetic acid <5% Phosphoric acid <30% Hydrochloric acid <10% Nitric acid <10% Trichloroacetic acid <50% Sulfuric acid <30%
Diluted alkaloids (bases)	Caustic soda <40%
Household chemicals	Ajax Ariel Domestos Downey Fantastic Formula 409 Gumption Jet Dry Lenor Persil Tensides Top Jop Vim Vortex Washing powder Fabric conditioner Whis Windex
Oils	Petrol Drilling muds Braking fluid Decon foam Diesel oil Varnish Keroflux Paraffin oil Castor oil Silicone oil Solvent naphta Mineral turpentine Kerosene

	No specific material class	Acetonitrile Alkali carbonate Dichromates Potassium dichromate Caustic soda <20% Dibutyl phthalate Dioctyl phthalate Iron II chloride ($FeCl_2$) Iron II chloride ($FeCl_3$) Haloalkanes Potassium soap Potassium hydroxide <30% Sodium bisulfate Tetrachloroethylene Salt water Trichloroethylene Water Hydrogen peroxide >25%	
Property	**Resistance**		**Test method**
Mechanic (keyboard) • durability • Action power • MIT folding resistance	>1 million actions max. 50 N >20000 folding operations		Autotype method ASTM D2176
Mechanic (touch screen) • point activation	1 million activations at any single point		3M method
Thermal • Dimensional • Dimension stability	Max. 0.2% at 120° longitudinal Typically 0.1%		Autotype method

18 Declaration of EC conformity

EG-Konformitätserklärung
EC-Declaration of Conformity
Déclaration de Conformité CE

R. STAHL HMI Systems GmbH • Im Gewerbegebiet Pesch 14 • 50767 Köln, Germany
erklärt in alleiniger Verantwortung, *declares in its sole responsibility, déclare sous sa seule responsabilité,*

dass das Produkt *that the product* *que le produit*	T-Ex *T-Ex* *T-Ex*
Typ, *type, type:*	Display Unit T-EX-##*-CAT7* Display Unit T-EX-##*-MM* Display Unit T-EX-##*-SM* Keyboard Trackball Unit T-EX*-KB-TB* Keyboard Mouse Unit T-EX*-KB-M* Keyboard Pad Unit T-EX*-KB-P* Keyboard Joystick Unit T-EX*-KB-J* Transmission Unit T-EX-KVM*-CAT7* Transmission Unit T-EX-KVM*-MM* Transmission Unit T-EX-KVM*-SM* *=any alphanumeric or symbolic character, without relevance for explosion protection #=one numeric character, without relevance for explosion protection
Kennzeichnung, *marking, marquage:*	For Display Unit: II 2(1) G Ex e q [ia op is Ga] IIC T4 Gb II 2(1) D Ex tb IIIC [ia op is Da] IP64 T110°C Db For Keyboard Trackball Unit, for Keyboard Mouse Unit, for Keyboard Pad Unit, for Keyboard Joystick Unit: II 1 G Ex ia IIC T4 Ga II 1 D Ex ia IIIB T110°C Da For Transmission Unit: II (1) G [Ex op is Ga] IIC II (1) D [Ex op is Da] IIIB
mit der EG-Baumusterprüfbescheinigung, *ausgestellt durch Benannte Stelle*: *under EC-Type Examination Certificate, issued by notified body:* *avec Attestation d'examen CE de type, exposé par organisme notifié:*	BVS 11 ATEX E102 X DEKRA EXAM GmbH Dinnendahlstraße 9, 44809 Bochum

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt
which is the subject of this declaration, is in conformity with the following standards or normative documents
auquel cette déclaration se rapporte, est conforme aux normes ou aux documents normatifs suivants

Bestimmungen der Richtlinie *Terms of the directive* *Prescription de la directive*	Nummer sowie Ausgabedatum der Norm *Number and date of issue of the standard* *Numéro ainsi que date d'émission de la norme*
94/9/EG: ATEX-Richtlinie *94/9/EC: ATEX Directive* *94/9/CE: Directive ATEX*	EN 60079-0: 2009 EN 60079-5: 2007 EN 60079-7: 2007 EN 60079-11: 2007 EN 60079-26: 2007 EN 60079-28: 2004 EN 60079-31: 2009 EN 61241-11: 2006

Datei: CE_T-Ex_20110701.docx Vorlage: F058_EG-Konformitätserklärung-HMI_20110325.docx

EG-Konformitätserklärung
EC-Declaration of Conformity
Déclaration de Conformité CE

2004/108/EG:	**EMV-Richtlinie**	EN 61000-6-2: 2006
2004/108/EC:	*EMC Directive*	EN 61000-6-4: 2007
2004/108/CE:	*Directive CEM*	

Köln, 01.07.2011

Ort und Datum
Place and date
Lieu et date

J. Düren
Technical Director

W. Bertges
Quality Manager

Datei: CE_T-Ex_20110701.docx

Vorlage: F058_EG-Konformerklärung-HMI_20110325.docx

19 Release notes

The chapter entitled "Release Notes" contains all the changes made in every version of the operating instructions.

Version 1.02.00

- Original version of the operating instructions
- Changing name from T-Ex to ET-xx7
- DVI3 included

Version 1.02.01

- Formal corrections
- Changings in preface
- Addition of IEC in conformity to standards
- Addition of KGS and KCC in certificates
- Removing of all information to 19" devices
- Changes in type code
- Addition of information to "device installation in housings type of protection "e" or "t""

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