



Operating Instructions Device platform MANTA

MT-xx7

**SERIES 400 Panel PC
SERIES 500 Thin Clients
SERIES 600 KVM Systems**

R. STAHL HMI Systems GmbH

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HW-Rev.	MT-5x7:	01.01.00
HW-Rev.	MT-6x7:	01.01.00
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Specific markings

The markings in these operating instructions refer to specific features that must be noted.

In detail, these are:







 DANGER	This sign alerts users to hazards that will result in death or serious injury if ignored !
 WARNING	This sign alerts users to hazards that may result in death or serious injury if ignored !
 CAUTION	This sign alerts users to hazards that may damage machinery or equipment or result in injury if ignored !
 ATTENTION	Information highlighted by this symbol indicates measures for the prevention of damage to machinery or equipment !
 NOTICE	Information highlighted by this symbol indicates important information of which particular note should be taken !
 DOCUMENTATION	Information highlighted by this symbol refers to a different chapter or section in this manual or other documentation or a web-page !


Table of contents


	Description	Page
	Publisher	2
	Specific markings	3
	Table of contents	4
1	Preface	6
2	Device function	6
2.1	Processor types	6
2.2	MT-4x7 (SERIES 400 Panel PC)	7
2.3	MT-5x7 (SERIES 500 Thin Client)	7
2.4	MT-6x7 (SERIES 600 KVM Systems)	7
3	Technical data	8
3.1	Resolution at MT-6x7 (KVM Systems) with DVI3	10
3.2	Additionally for MT-4x7 (Panel PC)	11
3.2.1	All devices up to hardware revision 01.01.00	11
3.2.2	All devices starting from hardware revision 01.01.01	11
3.3	Additionally for MT-5x7 (Thin Clients)	11
3.3.1	All devices up to hardware revision 01.01.00	11
3.3.2	All devices starting from hardware revision 01.01.01	11
4	Conformity to standards	12
5	Certificates	12
5.1	ATEX	13
5.2	IECEX	13
5.3	TR	13
5.4	CNEX	13
5.5	DNV / GL	13
6	Marking	14
7	Power supply	15
7.1	HMI devices	15
8	Permitted maximum values	15
8.1	External, non-intrinsically safe circuits	15
8.2	External inherently safe optical interface	16
8.3	External intrinsically safe circuits	16
9	Type code	17
9.1	MT-4x7 (Panel PC)	17
9.2	MT-4x7-*-BT (Panel PC)	18
9.3	MT-5x7 (Thin Client)	19
9.4	MT-5x7-*-BT (Thin Client)	20
9.5	MT-6x7 (KVM Systems)	21
10	Safety information	22
10.1	General Safety Information	22
10.2	Installation safety information	22
10.2.1	Only for HMI devices with DVI3	24
10.3	Safety information for operation	24
10.4	Special conditions	24
11	Assembly and disassembly	25

11.1	General information	25
11.2	Cut-out MT-xx7	25
11.3	Tightening torque	25
12	Operation	25
12.1	General information	25
12.2	Connections	26
13	Data loss	27
14	Maintenance	28
15	Troubleshooting	28
15.1	Repairs / hazardous substances	28
16	Disposal	28
16.1	RoHS directive 2011/65/EC	28
17	Declaration of EC conformity	29
18	Release notes	30

1 Preface

These Operating Instructions contain all aspects relevant to explosion protection for the MT-xx7 devices - device platform MANTA - (SERIES 400 Open HMI - Panel PC's, SERIES 500 Thin Clients and SERIES 600 KVM Systems). They also contain information on the connection and installation (etc.) of these devices.

 NOTICE	All data relevant to explosion protection from the EC-type examination certificate were copied into these operating instructions.
	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 !

 DOCUMENTATION	<p>Please also note that all certificates of the HMI devices can be found in a separate document (CE_MT-xx7). You can find this document in the internet at www.stahl-hmi.de or request it from R. STAHL HMI Systems GmbH.</p>
	For more information on the HMIs please also refer to the Manual (available as online manual on www.stahl-hmi.de).

2 Device function

The MT-xx7 HMI devices are explosion-protected equipment for installation in hazardous areas and can be operated in zones 2 and 22 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 Processor types

All devices of 400 and 500 SERIES are fitted with modern, powerful processors. Depending on the type of application, different processor types are used for the HMI devices (see Technical Data).

Starting in 2016, a new Intel® Atom™ processor type of the Bay Trail (BT) platform will gradually replace all previous processor types in the HMI devices. This new processor type processes data four times as fast as the previous processors.

2.2 MT-4x7 (SERIES 400 Panel PC)

The MT-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.

2.3 MT-5x7 (SERIES 500 Thin Client)

The MT-5x7 devices of the 500 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 MT-5x7 devices 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.

2.4 MT-6x7 (SERIES 600 KVM Systems)

The KVM Classic transfer technology is used for the point-to-point connection between a PC and an MT-6x7 device.

There are three versions (DVI1, DVI2 and DVI3) of this transfer technology that have slightly different functionality.

3 Technical data

Function / Equipment	MT-467 MT-567 MT-667	MT-477 MT-577T MT-677	MT-487 MT-587 MT-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		
Operating force Foil touch Glass touch	typ. 0.8 N typ. 1.8 N / max. 2.5 N		
Backlight	LED background lighting		
Service life (MTBF) of backlight at 20 °C / -4 °F	Typically 50,000 h		
Brightness	250 cd/m ²	300 cd/m ²	
Contrast	1000 : 1		
Additional keyboard (optional)	107 keys with integrated trackball / joystick / mouse pad or touch pad		
Power supply	Directly in the integrated connection box		
Rated operational voltage AC	230 V		
Voltage range AC	100 - 240 V		
Frequency range	50 - 60 Hz		
Rated operational voltage DC	24 V		
Voltage range DC	20 - 30 V		
Power	Typically 35 W / max. 150 W (typically 119 BTU / max. 510 BTU)		
Current consumption AC	1 A		
Current consumption DC	3 A		
Connections	via control spring terminals, green Flexible cable up to 2.5 mm ² (AWG14) Fixed cable up to 4 mm ² (AWG12)		
Recommended fuses	4 AT		
Max. operating voltage Um	250 VAC		
Only for MT-4x7 and MT-5x7 Real-time clock Data buffer Battery Capacitor	yes Lithium battery and capacitor buffered, maintenance-free > 5 years at least 4 days		
Interfaces			
Ethernet at MT-4x7 and MT-5x7 Copper (TX)	Either copper or optical fibre 10/100Base-TX, 10/100 Mbit, (Ex e) or 2x 10/100Base-TX, 10/100 Mbit (Ex nA) (only BT versions, not 600 SERIES) *		
* Note	If the customer installs an operation system, the driver for the "USB-SK-LAN-Adapter" must be installed. For this, please contact support@stahl-hmi.de . (Driver is part of STAHL images)		
Optical fibre (SX) at MT-6x7 Copper (CAT)	1000Base-SX, 1000 Mbit, multi-mode, intrinsically safe (Ex op is) Direct connection, Gigabit		
Optical fibre (FO) (MM / SM)	Direct connection		
USB	2x Ex ia; 1x Ex nA		
USB	for keyboard and mouse (Ex ia)		
Serial	RS-232, (Ex nA)		
Video in (optional)	FBAS (Ex nA)		
Audio	Line out interface (Ex nA) (Line in only at MT-6x7)		
Audio sound (optional)	Audio amplifier (mono amplifier) 3.5 W, for 2x loudspeaker connection (Ex nA)		
Voltage output	12 V DC, max. 500 mA *		
* Note	The voltage output has an internal fuse that cannot be replaced !		

Cable type optical fibre	Multi-mode optical fibre cable (50 µm core cross section and 125 µm external cross section)	
SX	Multi-mode optical fibre cable (50 µm core cross section and 125 µm external cross section)	
MM	Multi-mode optical fibre cable (62.5 µm core cross section and 125 µm external cross section)	
SM	Single mode optical fibre cable (9 µm core cross section and 125 µm external cross section)	
Data cable lengths		
Optical fibre		
SX	up to 550 m (1,804 ft) via 50/125 µm optical fibre cable	
MM	up to 550 m (1,804 ft) via 50/125 µm optical fibre cable, up to 300 m (985 ft) via 62.5/125 µm optical fibre cable	
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 AWG23 at 1x TX 2x up to 100 m (330 ft) via CAT5 installation cable AWG22 at 2TX	
Copper (CAT)		
for DVI1	up to 140 m (460 ft) via CAT7 installation cable AWG23	
for DVI2	up to 500 m (1,640 ft) via CAT7 installation cable AWG23	
for DVI3	up to 150 m (492 ft) via CAT7 installation cable AWG23	
Enclosure	Stahl	
Enclosure protection type	IP66	
Permitted ambient temperature range	-30 °C ... +60 °C / [-22 °F ... +140 °F]	
Operating temperature range		
Cold start temperature *	-10 °C ... +50 °C / [+14 °F ... +122 °F]	
Operation	-20 °C ... +60 °C / [-4 °F ... +140 °F]	
Operation with heater version O30 **	-30 °C ... +50 °C / [-22 °F ... +122 °F]	
Storage temperature range	-30 °C ... +70 °C / [-22 °F ... +158 °F]	
* Note on cold start temperature	If the device is switched on in an ambient temperature of below -10 °C / [+14 °F], the display will require some time warming up before everything is clearly visible. Depending on how low the actual temperature is, this process may take up to 3 hours.	
** Note on operation	Operation at +60 °C / [+140 °F] for a maximum of 5 hours, at +50 °C / [+122 °F] for continuous operation (24/7)	
** Note on the O30 version	The O30 version is only available for the AC version devices !	
Operating temperature range for DVI1		
Cold start temperature	+5 °C ... +40 °C / [+41 °F ... +104 °F]	
Operation	+5 °C ... +40 °C / [+41 °F ... +104 °F]	
Storage temperature range	-20 °C ... +70 °C / [-4 °F ... +158 °F]	
Heat dissipation	about 40 % via the front plate and 60 % via the enclosure	
Relative humidity	10 to 90 % at +40 °C / [+104 °F], non-condensing	
for DVI1	20 to 80 % at +40 °C / [+104 °F], non-condensing	
Environmental conditions		
	Level	Test specification
Damp heat (cyclic) (only device with glass touch (TG))	+55 °C (±2 °C) ≥95 %	IEC 60068-2-30 : 2005
Dry heat	+65 °C	IEC 60068-2-2 : 2007 IEC 60068-2-78 : 2012
Vibration (sinus)	5 up to 13.2 Hz: ±1 mm 13.2 up to 100 Hz: ±0.7 g Sweep cycle 1 oct/min Axis X, Y, Z	IEC 60068-2-6 : 2008
	71.7 up to 79.2 Hz: ±0.7 g 120 min. Sweep cycle 1 oct/min Axis X	IEC 60068-2-6 : 2008 Dwell test
	30 Hz: ±0.7 g 90 min. Sweep cycle 1 oct/min Axis Y, Z	

Dimensions			
Front	660 mm x 475 mm (25.98" x 18.70")		
Cut-out (w x h) (+/-0.5 mm) (0.002")	615 mm x 435 mm (24.21" x 17.13")		
Depth of cut-out	110 mm (4.33")		
Cut-out dimension for rear mount module (w x h)	475.7 mm x 298.1 mm (18.73" x 11.74")	523 mm x 295 mm (20.59" x 11.61")	520.4 mm x 326 mm (20.49" x 12.83")
Wall thickness	≤ 5 mm (0.02")		
Mounting position	Vertical or horizontal		
Weight	16.00 kg (35,3 lbs))		

3.1 Resolution at MT-6x7 (KVM Systems) with DVI3

Function / Equipment	MT-667	MT-677	MT-687
Resolution in pixels	1680 x 1050	1920 x 1080	1920 x 1200
	1280 x 1024	1600 x 1200	1920 x 1080
	1280 x 960	1600 x 1000	1680 x 1050
	1152 x 864	1400 x 1050	1600 x 1200
	1024 x 768	1360 x 768	1280 x 1024
	800 x 600	1280 x 1024	1280 x 960
		1280 x 920	1280 x 800
		1280 x 800	1152 x 864
		1152 x 864	1024 x 768
		1024 x 768	800 x 600
		800 x 600	

3.2 Additionally for MT-4x7 (Panel PC)

3.2.1 All devices up to hardware revision 01.01.00

Processor	Intel Atom N270; 1.6 GHz
RAM	1 or 2 GB
Data memory	4 or 16 GB
	128 GB MLC
	128 GB SLC
Type of data memory	Flash memory (SATA)
Operating system	Windows XP Embedded Windows XP Professional Windows 7 Ultimate (32 bit)
Global language support	Via Multi-Language interface of Windows XP Embedded (25 languages)

3.2.2 All devices starting from hardware revision 01.01.01

Processor	Intel Bay Trail (BT) Atom E3845 Quad Core; 1.91 GHz		
RAM	4 GB		
Data memory	Size	TBW	Test profile
	64 GB MLC	18.75	JESD218 Client profile
	128 GB MLC	37.5	
Type of data memory	Flash memory (Solid state drive - SSD)		
Graphics controller	Integrated Intel Gen. 7 HD Graphics		
Operating system	Windows Embedded Standard 7 (64 bit) Windows 7 Ultimate (64 bit)		
Global language support	Via Windows operating system		

3.3 Additionally for MT-5x7 (Thin Clients)

3.3.1 All devices up to hardware revision 01.01.00

Processor	AMD Geode LX 800; 266 MHz
RAM	512 MB 2 GB *
Data memory	1 GB 16 GB *
Operating system	Windows Embedded Standard 2009 and Remote Firmware Windows Embedded Standard 7, Remote Firmware and Delta V *



* The combination of 2 GB RAM with 16 GB data memory is only available for the operating system with Delta V !

3.3.2 All devices starting from hardware revision 01.01.01

Processor	Intel Bay Trail (BT) Atom E3845 Quad Core; 1,91 GHz
RAM	4 GB
Data memory	64 GB
Type of data memory	Flash memory (SATA)
Graphics controller	Integrated Intel Gen. 7 HD Graphics
Operating system	Windows 10 IoT Enterprise and Remote Firmware

4 Conformity to standards

The MT-xx7 HMI devices comply with the following standards and directives:

Standard		Classification
Initial certification		
ATEX directive		
until 19.04.2016	from 20.04.2016	
94/9/EG	2014/34/EU	
EN 60079-0 : 2009		General requirements
EN 60079-11 : 2007		Intrinsic safety "i"
EN 60079-15 : 2010		Type of protection "n"
EN 60079-28 : 2007		Optical radiation
EN 60079-31 : 2009		Protected by enclosures "tD" (dust)
EN 61241-11 : 2006		Intrinsic safety "iD" (dust)
The product corresponds to requirements from:		
EN 60079-0 : 2012		General requirements
EN 60079-11 : 2012		Intrinsic safety "i"
EN 60079-31 : 2014		Protected by enclosures "tD" (dust)
Electromagnetic compatibility		
EMV directive		
until 19.04.2016	from 20.04.2016	Classification
94/9/EG	2014/34/EU	
EN 61000-6-2 : 2006		Interference resistance
EN 61000-6-4 : 2007 + A12 : 2011		Interference emission
Low voltage directive		
Directive 2006/95/EC		
EN 60950-1 : 2006 + A11 : 2009 + A1 : 2010 + A12 : 2011		Information technology equipment – Safety – Part 1: General requirements
RoHS directive		
2011/65/EU		Classification
EN 50581 : 2012		Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

5 Certificates

The MT-xx7 HMI devices are certified for installation in the following areas:

Europe:

according to ATEX Directive
for installation in zones 2 and 22

International / Australia:

IECEX (International Electrotechnical Commission System for Certification to
Standards for Electrical Equipment for Explosive Atmospheres)

Russia / Kazakhstan / Belarus:

TR (Technical Regulation of the Eurasian Customs Union (EAC))

China:

according to CNEX

carried out by:

CQST (China National Quality Supervision and Test Centre for Explosion Protected Electrical Products)

Marine certification:

DNV / GL (Det Norske Veritas / Germanischer Lloyd)

5.1 ATEX


The ATEX certificates are listed under the following certification numbers:

Certificate number for MT-xx7: BVS 12 ATEX E 033 X

5.2 IECEx

The IECEx certification is listed under the following certificate number:

Certificate number: IECEx BVS 14.0034X

 DOCUMENTATION	You can access all IECEx certificates on the official website of the IEC under their certificate number. http://iecex.iec.ch/iecex/iecexweb.nsf/welcome?openform .
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5.3 TR

The TR certificate is listed under the following certificate number:


Certificate number: TC RU C-DE.ГБ04.B00478

5.4 CNEX

The CNEX certification is listed under the following certificate number:

Certificate number: CNEx14.2205X



5.5 DNV / GL

 NOTICE	NB: Only the HMI devices type: MT-667-DVI3-yM-FO-TFT-TG-AC-O30-AL MT-677-DVI3-yM-FO-TFT-TG-AC-O30-AL MT-687-DVI3-yM-FO-TFT-TG-AC-O30-AL have DNV / GL certification! with y: M = FO direct connection multi-mode S = FO direct connection single mode
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The DNV / GL certification is listed under the following certificate number:

Certificate number: TAA00000BK

6 Marking

Manufacturer	R. STAHL HMI Systems GmbH	
Type code	MT-4x7 / MT-5x7 / MT-6x7	
CE classification:	 0158	
Testing authority and certificate number:	BVS 12 ATEX E 033 X	
Ex classification:		
ATEX guideline		II 3(1) G Ex nA nR [ia op is Ga] IIC T4 Gc II 3(1) D Ex tc IIIC [ia op is Da] IP66 T110°C Dc
IECEX		Ex nA nR [ia op is Ga] IIC T4 Gc Ex tc IIIC [ia op is Da] IP66 T110°C Dc
TR		2Ex nA nR ia [ia op is Ga] IIC T4 Gc X Ex tc ia IIIC [ia op is Da] IP66 T110°C Dc
CNEX		Ex nA nR [ia op is Ga] IIC T4 Gc Ex tc IIIC [ia op is Da] IP66 T110°C Dc

7 Power supply

7.1 HMI devices

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

8 Permitted maximum values

8.1 External, non-intrinsically safe circuits

Input voltage "PWR" (X10):

Nominal voltage:	20 ...240 VAC/VDC (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 VDC (± 10 %)
Max. operating voltage U_m	≤ 250 VAC

12 V (X14):

Rated voltage	12 VDC (± 10 %)
Power consumption I_{max}	≤ 400 mA
Max. operating voltage U_m	≤ 250 VAC

RS-232 "SER" (X97):

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

Video "CAM" (X101):

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

Audio "AUD" (X105):

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

Copper Ethernet (CAT7 1) (X16):

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

8.2 External inherently safe optical interface

Ethernet optical fibre (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

8.3 External intrinsically safe circuits

Keyboard (X11)

The maximum values are:

U_i	=	5.5	C		U_o	=	5.5	C
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	μ F		C_o	=	50	μ F
L_i	=	negligible	mH		L_o	=	40	μ H

Pointer device (X12):

The maximum values are:

U_i	=	5.5	C		U_o	=	5.5	C
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	μ F		C_o	=	50	μ F
L_i	=	negligible	mH		L_o	=	40	μ H

USB1i (X24):

The maximum values are:

U_i	=	5.5	C		U_o	=	5.5	C
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	μ F		C_o	=	50	μ F
L_i	=	negligible	mH		L_o	=	40	μ H


USB2i (X25):

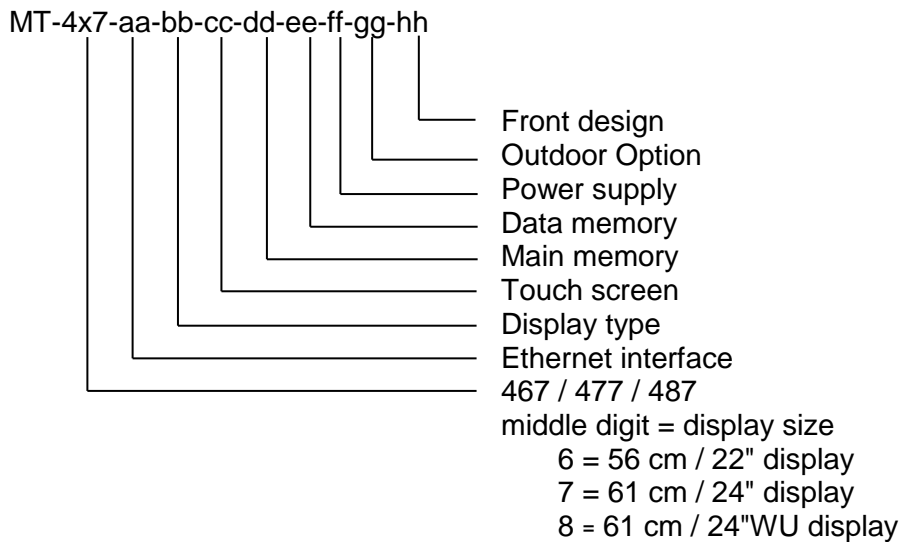
The maximum values are:

U_i	=	5.5	C		U_o	=	5.5	C
I_i	=	3	A		I_o	=	309	mA
P_i	=	2	W		P_o	=	629	mW
C_i	=	negligible	μ F		C_o	=	50	μ F
L_i	=	negligible	mH		L_o	=	40	μ H

9 Type code


9.1 MT-4x7 (Panel PC)

 NOTICE	These versions apply to all Panel PC's up to hardware revision 01.01.00, with Atom N270 processor.
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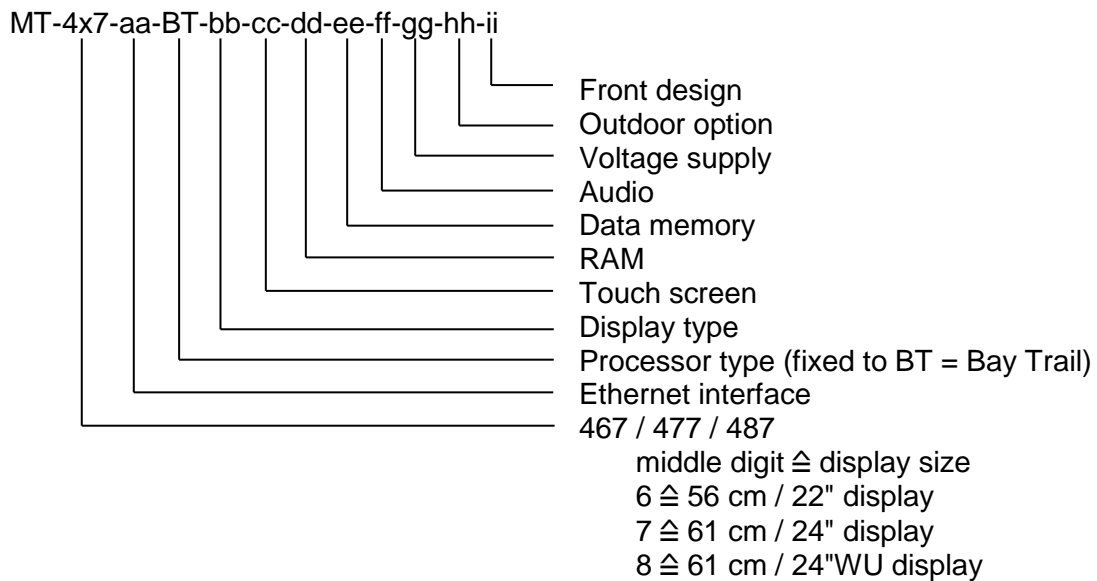
Product type:

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

 NOTICE	* The O30 option is only available for AC devices !
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9.2 MT-4x7-*-BT (Panel PC)

 NOTICE	These versions apply to all Panel PC's starting from hardware revision 01.01.01, with Bay Trail Atom E3845 processor.
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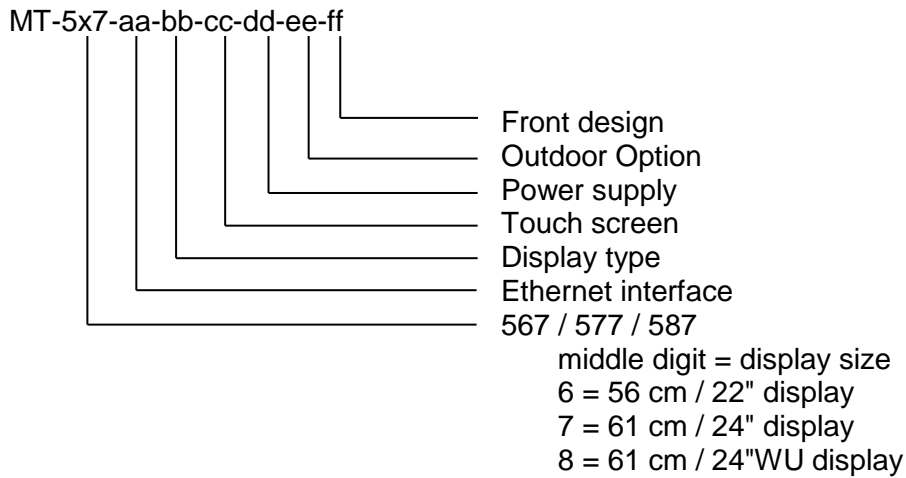
Device variant:

Classification product key	Description
	Type with
MT-4x7- SX -BT-bb-cc-dd-ee-ff-gg-hh-ii	Optical fiber Ethernet interface 1000Base-SX (Ex op is), multi-mode
MT-4x7- TX -BT-bb-cc-dd-ee-ff-gg-hh-ii	Copper Ethernet interface 10/100Base-TX (Ex nA)
MT-4x7- 2TX -BT-bb-cc-dd-ee-ff-gg-hh-ii	2x Copper Ethernet interface 10/100Base-TX (Ex nA)
MT-4x7-aa-BT- TFT -cc-dd-ee-ff-gg-hh-ii	TFT display (standard)
MT-4x7-aa-BT-bb- T -dd-ee-ff-gg-hh-ii	Touch screen (membrane)
MT-4x7-aa-BT-bb- TG -dd-ee-ff-gg-hh-ii	Touch screen glass
MT-4x7-aa-BT-bb-cc- R3 -ee-ff-gg-hh-ii	4 GB RAM
MT-4x7-aa-BT-bb-cc-dd- 64GB -ff-gg-hh-ii	64 GB Solid State Drive
MT-4x7-aa-BT-bb-cc-dd- 128GBM -ff-gg-hh-ii	128 GB Solid State Drive MLC
MT-4x7-aa-BT-bb-cc-dd-ee- SND -gg-hh-ii	Audio amplifier (mono amplifier) 3.5 W
MT-4x7-aa-BT-bb-cc-dd-ee-ff- AC -hh-ii	Power supply 100 - 240 VAC, 50 - 60 Hz
MT-4x7-aa-BT-bb-cc-dd-ee-ff- DC -hh-ii	Voltage supply 24 VDC
MT-4x7-aa-BT-bb-cc-dd-ee-ff-gg- O30 -ii	Outdoor installation -30 °C [-22 °F] *
MT-4x7-aa-BT-bb-cc-dd-ee-ff-gg-hh- AL	Aluminium front plate
MT-4x7-aa-BT-bb-cc-dd-ee-ff-gg-hh- RM	Rear mount module

 NOTICE	* The O30 option is only available for AC devices !
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9.3 MT-5x7 (Thin Client)

 NOTICE	These versions apply to all Thin Client's up to hardware revision 01.01.00, with AMD Geode LX processor.
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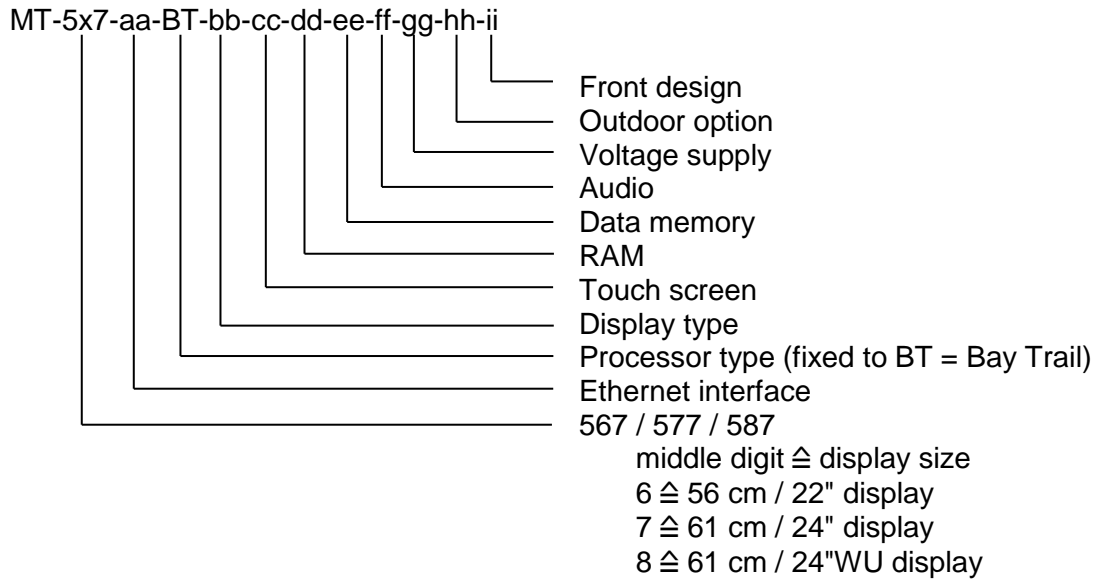
Product type:

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

 NOTICE	* The O30 option is only available for AC devices !
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9.4 MT-5x7-*-BT (Thin Client)

 NOTICE	These versions apply to all Thin Client's starting from hardware revision 01.01.01, with Bay Trail Atom E3845 processor.
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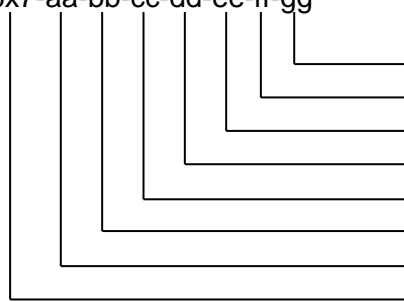
Device variant:

Classification product key	Description
	Type with
MT-5x7- SX -BT-bb-cc-dd-ee-ff-gg-hh-ii	Optical fiber Ethernet interface 1000Base-SX (Ex op is), multi-mode
MT-5x7- TX -BT-bb-cc-dd-ee-ff-gg-hh-ii	Copper Ethernet interface 10/100Base-TX (Ex nA)
MT-5x7- 2TX -BT-bb-cc-dd-ee-ff-gg-hh-ii	2x Copper Ethernet interface 10/100Base-TX (Ex nA)
MT-5x7-aa-BT- TFT -cc-dd-ee-ff-gg-hh-ii	TFT display (standard)
MT-5x7-aa-BT-bb- T -dd-ee-ff-gg-hh-ii	Touch screen (membrane)
MT-5x7-aa-BT-bb- TG -dd-ee-ff-gg-hh-ii	Touch screen glass
MT-5x7-aa-BT-bb-cc- R3 -ee-ff-gg-hh-ii	4 GB RAM
MT-5x7-aa-BT-bb-cc-dd- 64GB -ff-gg-hh-ii	64 GB Solid State Drive
MT-5x7-aa-BT-bb-cc-dd-ee- SND -gg-hh-ii	Audio amplifier (mono amplifier) 3.5 W
MT-5x7-aa-BT-bb-cc-dd-ee-ff- AC -hh-ii	Power supply 100 - 240 VAC, 50 - 60 Hz
MT-5x7-aa-BT-bb-cc-dd-ee-ff- DC -hh-ii	Voltage supply 24 VDC
MT-5x7-aa-BT-bb-cc-dd-ee-ff-gg- O30 -ii	Outdoor installation -30 °C [-22 °F] *
MT-5x7-aa-BT-bb-cc-dd-ee-ff-gg-hh- AL	Aluminium front plate
MT-5x7-aa-BT-bb-cc-dd-ee-ff-gg-hh- RM	Rear mount module

 NOTICE	* The O30 option is only available for AC devices !
---	---

9.5 MT-6x7 (KVM Systems)

MT-6x7-aa-bb-cc-dd-ee-ff-gg



- Front design
- Outdoor option
- Voltage supply
- Audio
- Touch screen
- Display type
- Transfer technology

667 / 677 / 687
 middle digit $\hat{=}$ display size
 6 $\hat{=}$ 56 cm / 22" display
 7 $\hat{=}$ 61 cm / 24" display
 8 $\hat{=}$ 61 cm / 24"WU display

Device variant:

Classification product key	Description
	Type with
MT-6x7- DVI1-CAT -bb-cc-dd-ee-ff-gg	DVI1 KVM, with direct copper connection, Gigabit (Ex nA)
MT-6x7- DVI1-MM -bb-cc-dd-ee-ff-gg	DVI1 KVM, with direct optical fibre connection (Ex op is), multi-mode
MT-6x7- DVI1-SM -bb-cc-dd-ee-ff-gg	DVI1 KVM, with direct optical fibre connection (Ex op is), single mode
MT-667- DVI2-CAT -bb-cc-dd-ee-ff-gg	DVI2 ** KVM, with direct copper connection, Gigabit (Ex nA)
MT-6x7- DVI3-CAT -bb-cc-dd-ee-ff-gg	DVI3 KVM, with direct copper connection, Gigabit (Ex nA)
MT-6x7- DVI3-MM-FO -bb-cc-dd-ee-ff-gg	DVI3 KVM, with direct optical fibre connection (Ex op is), multi-mode
MT-6x7- DVI3-SM-FO -bb-cc-dd-ee-ff-gg	DVI3 KVM, with direct optical fibre connection (Ex op is), single mode
MT-6x7-aa- TFT -cc-dd-ee-ff-gg	TFT display (standard)
MT-6x7-aa-bb- T -dd-ee-ff-gg	Touch screen (membrane)
MT-6x7-aa-bb- TG -dd-ee-ff-gg	Touch screen glass
MT-6x7-aa-bb-cc- SND -ee-ff-gg	Audio amplifier (mono amplifier) 3.5 W
MT-6x7-aa-bb-cc-dd- AC -ff-gg	Power supply 100 - 240 VAC, 50 - 60 Hz
MT-6x7-aa-bb-cc-dd- DC -ff-gg	Voltage supply 24 VDC
MT-6x7-aa-bb-cc-dd-ee- O30 -gg	Outdoor installation -30 °C [-22 °F] *
MT-6x7-aa-bb-cc-dd-ee-ff- AL	Aluminium front plate
MT-6x7-aa-bb-cc-dd-ee-ff- RM	Rear end module

NOTICE	* The O30 option is only available for AC devices !
	** The DVI2 KVM solution is only available together with the MT-667 HMI device !

10 Safety information



The notes listed in section 10. must be heeded to avoid injury and damage to equipment !

10.1 General Safety Information

- All relevant accident prevention regulations and the rules for electric installations have to be observed during installation, maintenance 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.

10.2 Installation safety information

- The in each case valid 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.
- The HMI device has been certified as a fixed installed device. It must be fixed with a bracket or be secured in another way at a specified position.
- The HMI device must be disconnected from the mains for a change of position. The EPL must be adhered to.
- Only appropriate tools must be used for the installation.
- The screws on the lid of the Ex nA 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 IP66 or may have to be adapted to meet country-specific requirements. The pre-assembled cable entry threads are:
 - 2x M16x1,5
 - 1x M20x1,5
 - 3x M25x1,5The 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")
 - Cable entry M25 for round cable, outside cable cross-section 11...16 mm (0.43"...0.63")
- The device must not be opened, maintained or repaired in hazardous atmospheres (sole exception: the connection box) All circuits must be completely de-energised before the device is connected. Before opening the connection box ensure that all circuits are isolated. You must also ensure that the power supply circuit is isolated. The cable diameter must meet the terminal specifications. The connection box must be tightly sealed.
- The wire used for earthing must have a minimum cross section of 4 mm² ! 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. The cables used in intrinsically safe circuits must have been tested to AC 500 V / DC 750 V. If the cable properties are unknown, assume 200 pF/m and 1 µH/m.
- If display types MT-xx7-DVI1-MM or MT-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 nA 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 mm ² (AWG)
max. 55 m (180 ft)	1.5 mm ² (AWG16)
max. 90 m (295 ft)	2.5 mm ² (AWG14)
max. 150 m (492 ft)	4 mm ² (AWG12)
max. 225 m (738 ft)	6 mm ² (AWG10)
max. 375 m (1230 ft)	10 mm ² (AWG8)
max. 600 m (1968 ft)	16 mm ² (AWG6)

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).

- If the intrinsically safe interfaces of an intrinsically safe device or a partially intrinsically safe device are or have been connected to a not intrinsically safe circuit, the certification ceases to apply and the device may no longer be operated as an intrinsically safe device. After the device has been operated as intrinsically safe with a low level of protection (e.g. an Ex ia device at an Ex ib interface), it may no longer be operated in applications for a higher level of protection (e.g. 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.

**ATTENTION**

The audio Interface (X105) can handle high voltage up to 100 V. For installation and wiring the national standards must be observed and a properly insulation needed to prevent a hazard.

10.2.1 Only for HMI devices with DVI3

- The USB interfaces of the MT-6x7-DVI3 devices are only certified for the connection of keyboards and pointer units from R. STAHL HMI Systems GmbH.

10.3 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 zone 20, 21 or 22 as EPL Da/Db/Dc, dust deposits 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.

10.4 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.

11 Assembly and disassembly

11.1 General information


 NOTICE	Assembly and disassembly are subject to general technical rules. Additional, specific safety regulations apply to electronic and pneumatic installations.
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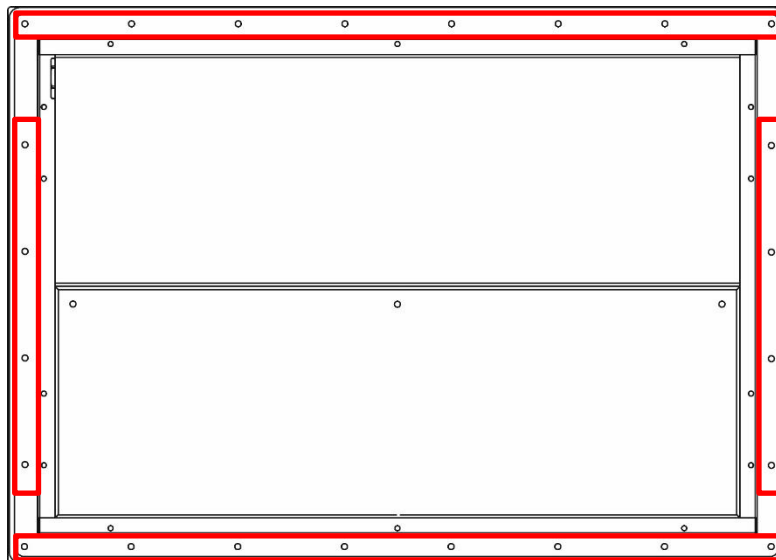
11.2 Cut-out MT-xx7

Make a cut-out with the following dimensions:

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


11.3 Tightening torque

 NOTICE	The tightening torque of the nuts for the fixing bolts of the MT-4x7/5x7/6x7/ panel mount devices is 1.2 N (+- 0.2 N) !
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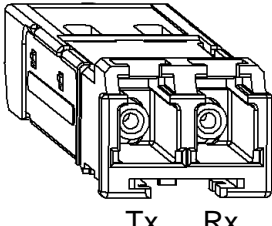


12 Operation


12.1 General information

 NOTICE	When operating the devices, particular care shall be taken that: <ul style="list-style-type: none"> the HMI device has been properly installed according to instructions, the HMI device is undamaged, the terminal compartment is clean, all screws are tightened fast, before switching the HMI device on, its external equipotential bonding terminal is properly connected to the equipotential bonding system at its place of use, the cover of the terminal compartment is completely closed.
---	---


12.2 Connections


Terminal	Pin	Definition / typical cable color				Connection	
X10 PWR	1	Power supply HMI device +24 VDC or 100 - 240 VAC				Power supply of the HMI device. Ex nA	
	2	Power supply HMI device 0 VDC or 100 - 240 VAC					
	3	Earth connection					
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 nA	
	2	D-		White			
	3	D+		Green			
	4	GND		Black			
X14	1	+12 V		Red		12 VDC output Ex nA, max. 500 mA	
	2	GND		Black			
X16 CAT7 / CAT5 Data			Tx	2TX	Tx	2TX	Ethernet copper connection * Ex nA either * TX or 2TX (2TX not 600 SERIES)
	1	TRD0+	TxD + 1	White / Orange	White / Orange 1		
	2	TRD0-	TxD - 1	Orange	Orange 1		
	3	TRD1+	RxD + 1	White / Green	White / Green 1		
	4	TRD1-	RxD - 1	Green	Green 1		
	5	TRD2+	TxD + 2	Blue / White	White / Orange 2		
	6	TRD2-	TxD - 2	Blue	Orange 2		
	7	TRD3+	RxD + 2	White / Brown	White / Green 2		
	8	TRD3-	RxD - 2	Brown	Green 2		
9	SHLD	SHLD	Screen	Screen			
X18 FO 1 Data		 <p>Tx Rx</p>			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 nA interface RS-232	
	2	RxD		Blue			
	3	RTS		White / Orange			
	4	CTS		Orange			
	5	GND		Black			

X101 CAM	1	Signal FBAS	White	Video Ex nA interface (optional)
	2	Screen (GND)	Black	
X105 AUD	1	CH1 / line out left	Red	Audio Ex nA interface (Line in only 600 SERIES)
	2	CH2 / line out right	Black	
	3	CH3 / line in left	Red	
	4	CH4 / line in right	Black	
	5	GND	Black	
or				
X105 AUD	1	LS1+	Red	Audio sound
	2	LS1-	Black	Ex nA interface
	3	LS2+	Red	(optional)
	4	LS2-	Black	
	5	GND	Black	

	<p>The following applies to all terminals: 0.2 - 2.5 mm² / AWG24 - AWG14 for flexible cable 0.2 - 4 mm² / AWG24 - AWG12 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)</p> <p>* 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 ! The option 2TX is only possible at devices with Bay Trail processor (BT) and NOT at 600 SERIES ! If display types MT-xx7-DVI1-MM or MT-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 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</p> <p>** The USBi2 connection (X25) is NOT available for devices with touch screen and may NOT be connected.</p>
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13 Data loss

	<p>In the case of applications that require constant writing into memory, R. STAHL HMI systems recommends you use external storage media (USB sticks, network servers) for these write processes.</p>
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	<p>Try and avoid cyclical writes (log files, databases, etc.) to the SSD ! The endurance of an SSD depends on the number of write cycles (TBW / terabytes written). Writing to the SSD with a simultaneous drop in voltage is most likely going to result in data loss !</p>
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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

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

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 (amendment) 2012/19/EU on waste electrical and electronic equipment (WEEE). Under this directive, HMI devices are listed in category 9 (monitoring and control instruments).

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

16.1 RoHS directive 2011/65/EC

The revised version of the RoHS (restriction of hazardous substances) 2002/95/EC directive, directive 2011/65/EC, extends its area of application to all electric and electronic products.

In the case of HMI devices (category 9 – monitoring and controlling devices) a transitional period applies until 22.07.2017, after which the banned substances listed in RoHS 2011/65/EC directive apply to all devices newly put on the market.

17 Declaration of EC conformity

EG/EU-Konformitätserklärung
EC/EU Declaration of Conformity
Déclaration de Conformité CE/UE



R. STAHL HMI Systems GmbH • Adolf-Grimme-Allee 8 • 50829 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:

Bedien- und Beobachtungsgeräte

Operating and Monitoring Devices

Consoles de commande et de visualisation

Typ(en), *type(s), type(s):*

Display Unit MT-##7*-CAT7*

Display Unit MT-##7*-MM*

Display Unit MT-##7*-SM*

**=any alphanumeric or symbolic character, without relevance for explosion protection*

#=one numeric character, without relevance for explosion protection

mit den Anforderungen der folgenden Richtlinien und Normen übereinstimmt.

is in conformity with the requirements of the following directives and standards.

est conforme aux exigences des directives et des normes suivantes.

Richtlinie(n) / Directive(s) / Directive(s)			Norm(en) / Standard(s) / Norme(s)	
Bis/Until/Jusque'au 2016-04-19:		Ab/From/De 2016-04-20:	EN 60079-0: 2009 EN 60079-11: 2007 EN 60079-15: 2010 EN 60079-28: 2007 EN 60079-31: 2009 EN 61241-11: 2006	Das Produkt entspricht Anforderungen aus: <i>Product corresponds to requirements from:</i> <i>Produit correspond aux exigences:</i> EN 60079-0: 2012, EN 60079-11: 2012, EN 60079-31: 2014
94/9/EG	ATEX-Richtlinie	2014/34/EU		
94/9/EC	ATEX Directive	2014/34/EU		
94/9/CE	Directive ATEX	2014/34/UE		

Kennzeichnung, *marking, marquage:*



II 3(1) G Ex nA nR [ia op is Ga] IIC T4 Gc
II 3(1) D Ex tc IIIC [ia op is Da] IP66 T110°C Dc

CE 0158

EG/EU-Baumusterprüfbescheinigung:

EC/EU Type Examination Certificate:

Attestation d'examen CE/UE de type:

BVS 12 ATEX E 033 X

DEKRA EXAM GmbH (NB 0158)

Dinnendahlstraße 9, 44809 Bochum, Germany

Bis/Until/Jusque'au

2016-04-19:

Ab/From/De

2016-04-20:

EN 61000-6-2: 2006
EN 61000-6-4: 2007 + A1:2011

2004/108/EG

EMV-Richtlinie

2014/30/EU

2004/108/EC

EMC Directive

2014/30/EU

2004/108/CE

Directive CEM

2014/30/UE

Produktnormen nach Niederspannungsrichtlinie:

Product standards according to Low Voltage Directive:

Normes des produit pour la Directive Basse Tension:

EN 60950-1:2006 + A11:2009 + A12:2011 + A1:2010

Produktnormen nach RoHS-Richtlinie (2011/65/EU):

Product standards according to RoHS Directive:

Normes des produit pour la Directive RoHS:

EN 50581:2012

Köln, 2015-12-11

i.V.

J. Düren

Technical Director

i.V.

W. Bertges

Quality Manager

Ort und Datum
Place and date
Lieu et date

18 Release notes

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

Version 01.03.05

- Inclusion of DNV / GL certification for 600 SERIES
- Addition of section "Tightening torque"
- Addition of section "Data loss"
- Changing of data memory size at MT-4x7 BT into 64 GB
- Changing of processor, RAM and data memory size at MT-5x7 BT
- Changing of operating system at MT-5x7 BT
- Changing of information according to "Operating temperature range"
- Addition of "Operating force touch" in section "Technical data"
- Addition of "Cut-out dimension for rear mount module" in section "Technical data"
- Addition of "Environmental conditions" in section "Technical data"
- Changing of Type code BT versions
- Addition of version 2TX at BT
- Addition of 2TX in "Technical data"
- Addition of terminal assignment 2TX with notice
- Addition of "video interface" in table "Connections"
- Addition of "audio sound interface" in section "Technical data"
- Addition of "audio sound interface" in table "Connections"
- Addition of "voltage output interface" in section "Technical data"
- Changing of "Order" in "versions" in section "Type code"
- Addition of note "Audio interface" in section "Installation safety information"
- Text-, layout- and formal corrections
- Removal of previous release notes

Version 01.02.06

- Limitation of DNV / GL certification for ET-6x7-DVI3-yM-FO-TFT-TG-AC-O30-AL devices

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