operator interfaces with integrated CANOpen master & controller

HMI4-SB
HMI4-SE

HMI4-LB
HMI4-LE

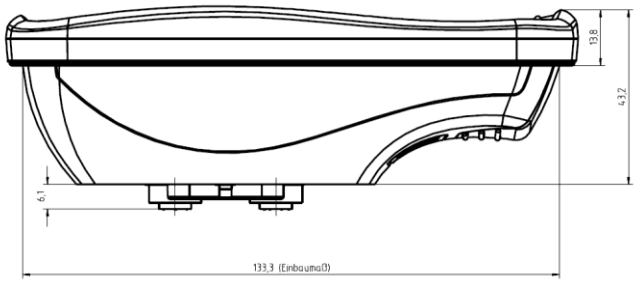
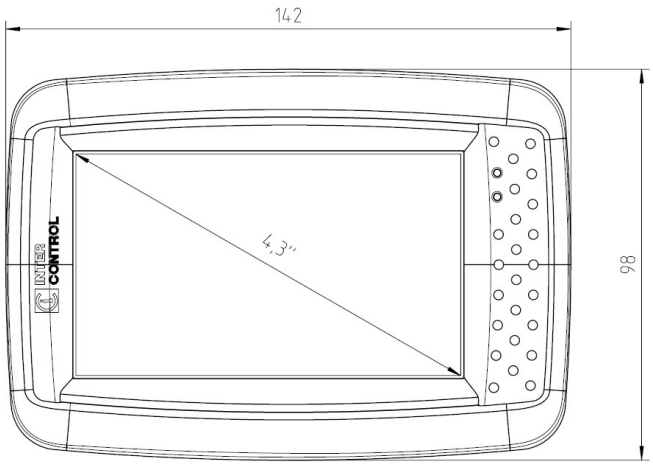
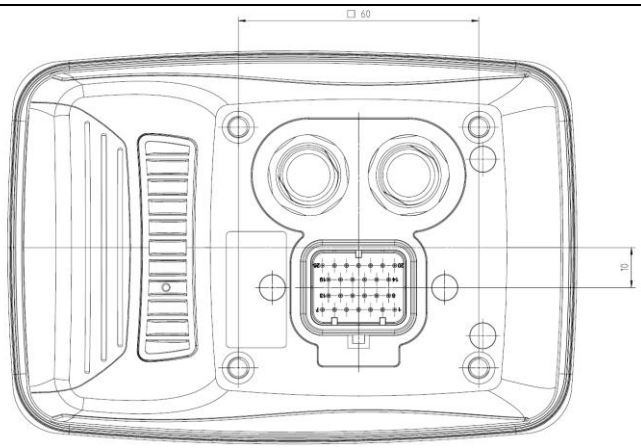
HMI7-SB
HMI7-SE

HMI7-LB
HMI7-LE

INTER CONTROL

Technical Data Sheet
digsy HMI 4 SB

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.040**
2 Mechanical	
2.1 Dimensions	
	
	

<table>
<tr><td>2.2 Housing</td><td>Plastic housing, coloured black, RAL 9005
with rubber frame, coloured charcoal-grey, RAL 7015</td></tr>
<tr><td>2.3 Mounting</td><td>• landscape or portrait
• standalone
• in-dash

Mounting accessories (not included):
• Build-in mounting frame, grey: 4305.86.040
• Standalone mounting adaptor, black: 4305.86.042</td></tr>
<tr><td colspan="2">3 Display</td></tr>
<tr><td>Type</td><td>TFT Colour Graphic LCD with LED backlight</td></tr>
<tr><td>Size</td><td>4.3”, 95 mm (W) x 53 mm (H)</td></tr>
<tr><td>Resolution</td><td>480 x 272 pixel, WQVGA, 15:9</td></tr>
<tr><td>Colours</td><td>16.7 Mio.</td></tr>
<tr><td>Brightness</td><td>typ. 400 cd/m²</td></tr>
<tr><td>Contrast Ratio</td><td>typ. 400:1</td></tr>
<tr><td colspan="2">4 Input Devices</td></tr>
<tr><td>4.1 Touch</td><td>-</td></tr>
<tr><td>4.2 Left Keypad</td><td>-</td></tr>
<tr><td>4.3 Right Keypad</td><td>-</td></tr>
<tr><td>4.4 Indicators and Sensors</td><td>• Light sensor
• 1 Multicolour-LED</td></tr>
<tr><td>4.5 Encoder</td><td>-</td></tr>
<tr><td colspan="2">5 Electronics</td></tr>
<tr><td>5.1 Processor platform</td><td></td></tr>
<tr><td>CPU</td><td>Freescale I.MX35®, 532 MHz</td></tr>
<tr><td>Mass storage</td><td>512 Mbyte (approx. 450 MB for customer use)</td></tr>
<tr><td>RAM</td><td>128 MByte</td></tr>
<tr><td>RTC</td><td>buffered by battery</td></tr>
<tr><td>5.2 Interfaces</td><td></td></tr>
<tr><td>5.2.1 Power supply</td><td></td></tr>
<tr><td>Operating voltage range</td><td>9 … 36 V DC</td></tr>
<tr><td>Protection</td><td>short circuit protection</td></tr>
<tr><td>Overvoltage resistance</td><td>48V for max. 2 minutes</td></tr>
<tr><td>Inverse polarity protection</td><td>up to -48 V DC for max. 5 minutes</td></tr>
<tr><td>Current consumption (without external load), max</td><td>
<table>
<tr><th>Power Mode</th><th>current at 13,5 V DC</th><th>current at 27 V</th></tr>
<tr><td>On</td><td>430 mA</td><td>240 mA</td></tr>
<tr><td>Low-power</td><td>160 mA</td><td>90 mA</td></tr>
<tr><td>Sleep</td><td>90 mA</td><td>55 mA</td></tr>
<tr><td>Off</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>5.2.2 Can Interfaces</td><td>• 2 x CAN-Interfaces
• ISO 11898, CAN-specification 2.0 B active,
• up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)</td></tr>
</table>

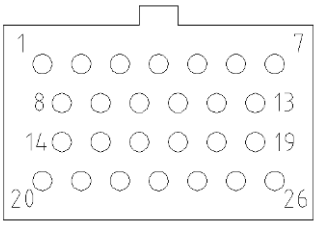
5.2.3 RS232	1 x RS232-Interface
Type	EIA232 (only RxD, TxD, GND)
Speed	max. 115 Kbps
5.2.4 USB	Host 2.0
Main connector	1 x Full speed
6 Connections	
Main connector	Part no. connector set: **4305.86.001** Tyco-AMP 1437288-6 • Mating connector (customer) Tyco-AMP 3-1437290-7 • Mating crimp contact (customer) Tyco AMP 3-1447221-4
Connector pinout	see chap. 9.
7 Software	
7.1 Operating System	Linux, kernel 2.6.28
7.2 Application Programming	CODESYS-Tools (3.5)
8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 e1 - Type approval	EU Directive 72/245/EWG (1-Jan 2013)
8.3 Protection Level (IP Code)	IP 6k5 and 6k7 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access
8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions o Mechanical Shock: Level 2 o Random Vibration: Level 2 o Sinusoidal Vibration: Level 2
8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads o Operating Temperature Range: -30 … +65°C o Storage Temperature Range: -40 … +85°C • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

9.1 Main connector pinout

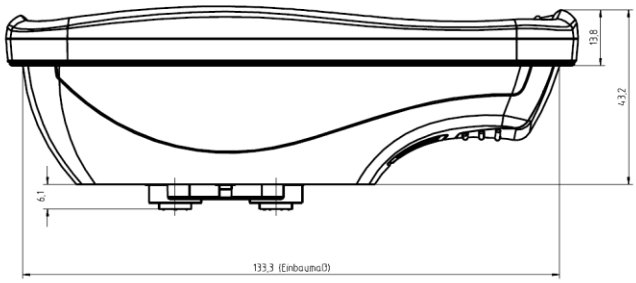
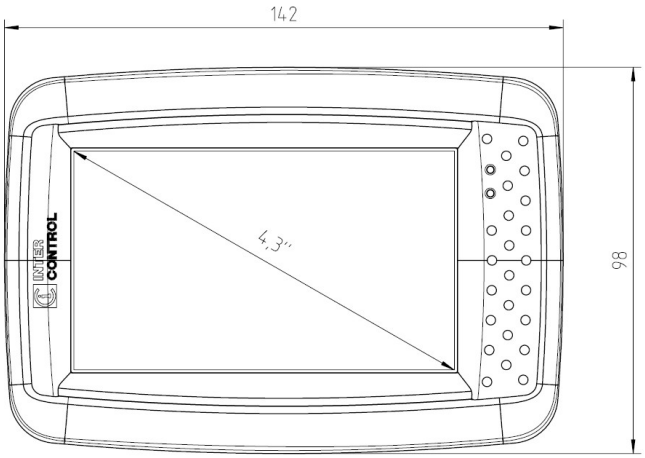
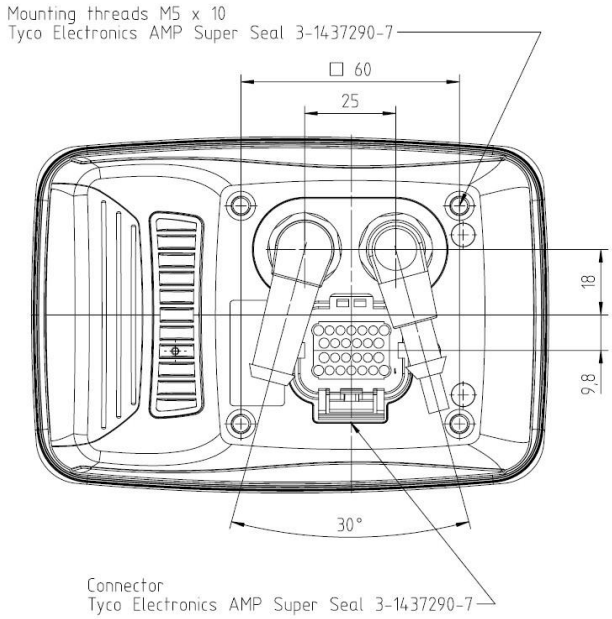
pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	car ground
5	n. c.	not connected
6	n. c.	not connected
7	n. c.	not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5 V DC supply
13	USB_GND	USB supply ground
14	USB_D-	USB data line -
15	USB_D+	USB data line +
16	RS232: RxD	RS232 receive data
17	RS232: TxD	RS232 transmit data
18	RS232: GND	RS232 ground
19	n. c.	not connected
20	n. c.	not connected
21	n. c.	not connected
22	n. c.	not connected
23	SERV_EN	service enable
24	n. c.	not connected
25	n. c.	not connected
26	n. c.	not connected

view on rear side of the *digsy* HMI 4 SB



Technical Data Sheet
digsy HMI 4 SE

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.041**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7015
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.040** • Standalone mounting adaptor, black: **4305.86.042**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	4.3”, 95 mm (W) x 53 mm (H)
Resolution	480 x 272 pixel, WQVGA, 15:9
Colours	16.7 Mio.
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 400:1
4 Input Devices	
4.1 Touch	analogue resistive
4.2 Left Keypad	-
4.3 Right Keypad	-
4.4 Indicators and Sensors	• Light sensor • 1 Multicolour-LED
4.5 Encoder	-
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	1 Gbyte (approx. 900 MB for customer use)
RAM	256 MByte
RTC	buffered by battery
5.2 Buzzer	• 60 dB(A) in 30 cm distance • lifetime min. 1000h
5.3 Interfaces	
5.3.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for max. 2 minutes
Inverse polarity protection	up to -48 V DC for max. 5 minutes
Current consumption (without external load), max	

Power Mode	current at 13,5 V DC	current at 27 V
On	430 mA	240 mA
Low-power	160 mA	90 mA
Sleep	90 mA	55 mA
Off	0 mA	0 mA

5.3.2 Can Interfaces	• 2 x CAN-Interfaces • ISO 11898, CAN-specification 2.0 B active, • up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)
5.3.3 RS232	1 x RS232-Interface
Type	EIA232 (only RxD, TxD, GND)
Speed	max. 115 Kbps
5.3.4 USB	Host 2.0
Main connector	1 x Full speed
5.3.5 Inputs	4 configurable analogue/digital inputs
input impedance	> 3kOhm
resolution	10 bit resolution (1028 digits, 1 digit = 11,7 mV)
Voltage range	0 … 12 V
max. protectable input voltage	36 V DC
protection	short circuit protection
frequency	max. signal frequency 50 Hz
5.3.6 Outputs	3 digital outputs
short circuit protection	up to 36 V DC
I_{max}	300 mA open drain
$R_{DS,on}$	< 1 Ohm
$R_{DS,off}$	> 100 kOhm
5.3.7 Video-Interface	analog video input, 1 Vss
5.3.8 Ethernet-Interface	1 x 10/100 Mbit/s Base T
6 Connections	
Main connector	Part no. connector set: **4305.86.001** Tyco-AMP 1437288-6 • Mating connector (customer) Tyco-AMP 3-1437290-7 • Mating crimp contact (customer) Tyco AMP 3-1447221-4
Video connector	M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101
Ethernet connector	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101
Connector pinout	see chap. 9.
7 Software	
7.1 Operating System	Linux, kernel 2.6.28
7.2 Application Programming	CODESYS-Tools (3.5)
8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 8.2 e1 - Type approval	EU Directive 72/245/EWG
8.3 Protection Level (IP Code)	IP 6k5 and 6k7 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access

8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

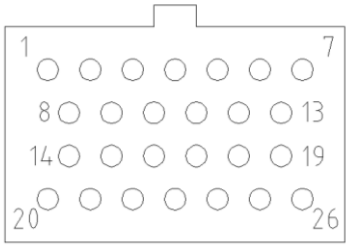
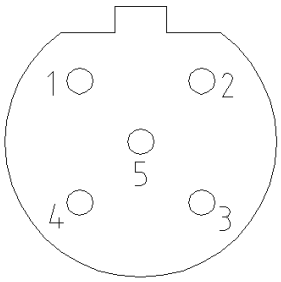
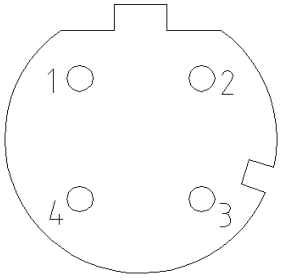
8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
	  ○ Mechanical Shock: Level 2
	  ○ Random Vibration: Level 2
	  ○ Sinusoidal Vibration: Level 2

8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
	  ○ Operating Temperature Range: -30 … +65°C
	  ○ Storage Temperature Range: -40 … +85°C
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

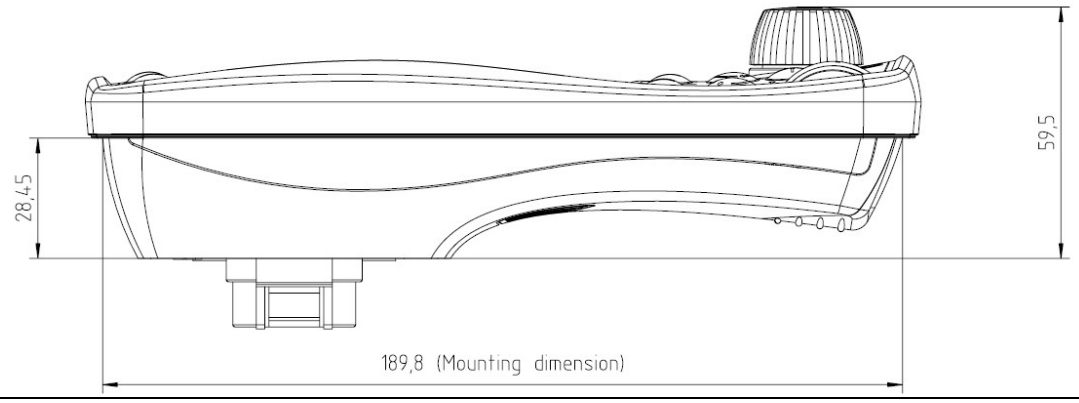
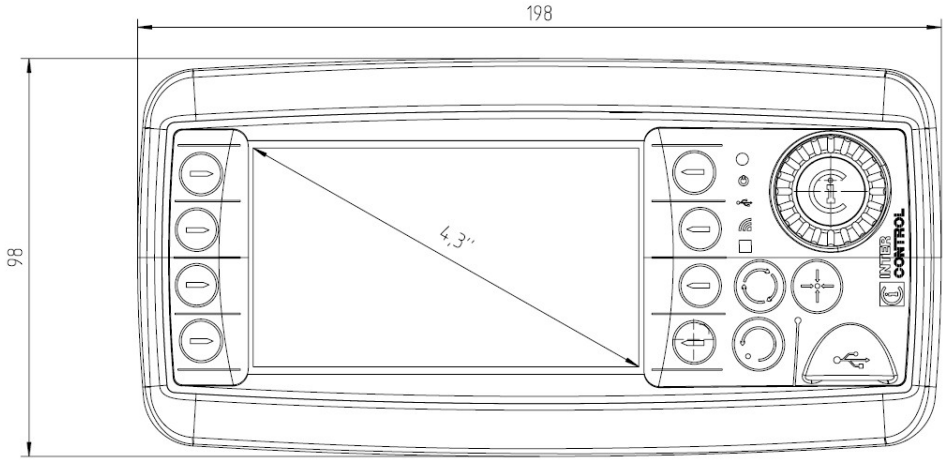
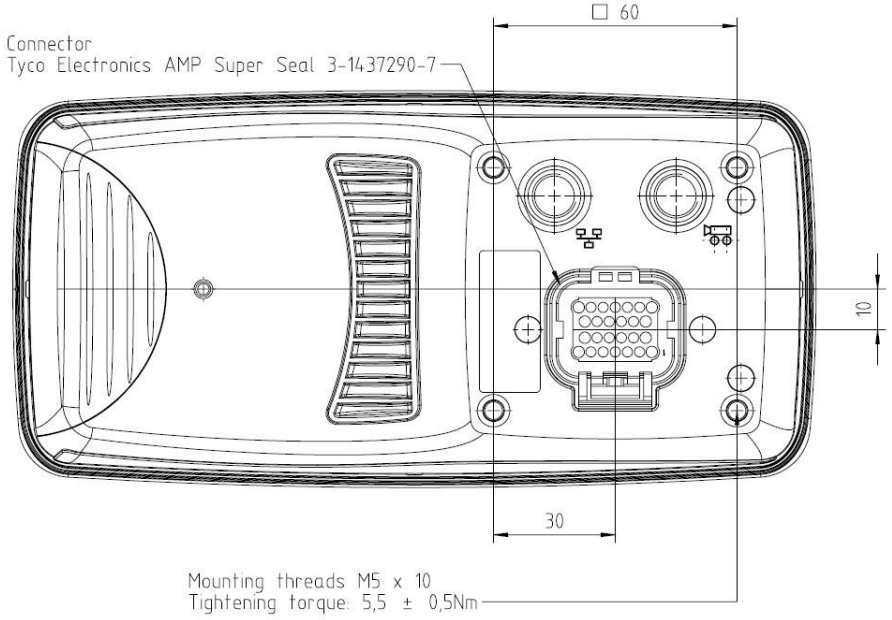
9.1 Main connector pinout

pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	Car GND
5	n. c.	Not connected
6	n. c.	Not connected
7	n. c.	Not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5V supply
13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
16	RS232: RxD	RS232 receive data
17	RS232: TxD	RS232 transmit data
18	RS232: GND	RS232 GND
19	A/DI3	analog/digital input 3
20	A/DI1	analog/digital input 1
21	A/DI2	analog/digital input 2
22	A/DI4	analog/digital input 4
23	SERV_EN	service enable
24	DO3	digital output 3
25	DO1	digital output 1
26	DO2	digital output2

	view on rear side of the *digsy* $_{HMI}$ 4 SE 
9.2 Video connector pinout	<table><tr><th></th><th>Round Connector, 5 pins, M12</th></tr><tr><td>1</td><td>VidSig+</td></tr><tr><td>2</td><td>n. c.</td></tr><tr><td>3</td><td>Camera+</td></tr><tr><td>4</td><td>Camera -</td></tr><tr><td>5</td><td>VidSig GND</td></tr></table> Video- Connector, M12, female, 5 pins, b-coded **view on rear side of the *digsy* $_{HMI}$ 4 SE** 
9.3 Ethernet connector pinout	<table><tr><th></th><th>Round Connector, 4 pins, M12, acc. To IEC 61076-2-101</th></tr><tr><td>1</td><td>TD+</td></tr><tr><td>2</td><td>RD+</td></tr><tr><td>3</td><td>TD-</td></tr><tr><td>4</td><td>RD-</td></tr></table> Ethernet Connector, M12, female, 4 pins, d-coded **view on rear side of the *digsy* $_{HMI}$ 4 SE** 

Technical Data Sheet
digsy HMI 4 LB

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.042**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7015
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.041** • Standalone mounting adaptor, black: **4305.86.042**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	4.3”, 95 mm (W) x 53 mm (H)
Resolution	480 x 272 pixel, WQVGA, 15:9
Colours	16.7 Mio.
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 400:1
4 Input Devices	
4.1 Touch	-
4.2 Left Keypad	• 4 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.3 Right Keypad	• 4+3 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.4 Indicators and Sensors	• 1 Multicolour-LED • 2 Status-LED’s • light sensor
4.5 Encoder	• electromechanical encoder with 16 mechanical detents and push function • lifetime: 1 million cycles
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	512 Mbyte (approx. 450 MB for customer use)
RAM	128 MByte
RTC	buffered by gold cap
5.2 Interfaces	
5.2.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for 2 minutes
Inverse polarity protection	up to -48 V DC

<table>
<tr><td>Current consumption (without external load), max</td><td>
<table>
<tr><th>Power Mode</th><th>current at 13,5 V DC</th><th>current at 27 V</th></tr>
<tr><td>On</td><td>430 mA</td><td>240 mA</td></tr>
<tr><td>Low-power</td><td>160 mA</td><td>90 mA</td></tr>
<tr><td>Sleep</td><td>90 mA</td><td>55 mA</td></tr>
<tr><td>Off</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>5.2.2 Can Interfaces</td><td>• 2 x CAN-Interfaces
• ISO 11898, CAN-specification 2.0 B active,
• up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)</td></tr>
<tr><td>5.2.3 RS232</td><td>1 x RS232-Interface</td></tr>
<tr><td>Type</td><td>EIA232 (only RxD, TxD, GND)</td></tr>
<tr><td>Speed</td><td>max. 115 Kbps</td></tr>
<tr><td>5.2.4 USB</td><td>Host 2.0</td></tr>
<tr><td>Main connector</td><td>1 x Full speed</td></tr>
<tr><td>6 Connections</td><td></td></tr>
<tr><td>Main connector</td><td>Part no. connector set: 4305.86.001
Tyco-AMP 1437288-6
• Mating connector (customer) Tyco-AMP 3-1437290-7
• Mating crimp contact (customer) Tyco AMP 3-1447221-4</td></tr>
<tr><td>Connector pinout</td><td>see chap. 9.</td></tr>
<tr><td>7 Software</td><td></td></tr>
<tr><td>1.1 Operating System</td><td>Linux, kernel 2.6.28</td></tr>
<tr><td>1.2 Application Programming</td><td>CODESYS-Tools (3.5)</td></tr>
<tr><td>8 Testing and Verification</td><td></td></tr>
<tr><td>8.1 CE-Compliance</td><td>EU Directive 2004/108/EC (EMC) according to
• EN 12895: Industrial Trucks – Electromagnetic compatibility
• EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply
• EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria</td></tr>
<tr><td>8.2 e1 - Type approval</td><td>EU Directive 72/245/EWG (1-Jan 2013)</td></tr>
<tr><td>8.3 Protection Level (IP Code)</td><td>IP 6k5 and 6k7 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access</td></tr>
<tr><td>8.4 Electrical Requirements</td><td>12 and 24V-Systems according to:
• ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads
• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions</td></tr>
<tr><td>8.5 Mechanical Requirements</td><td>• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
○ Mechanical Shock: Level 2
○ Random Vibration: Level 2
○ Sinusoidal Vibration: Level 2</td></tr>
</table>

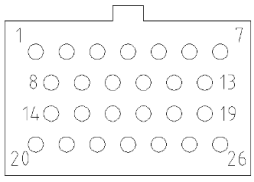
8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
	  ○ Operating Temperature Range: -30 … +65°C
	  ○ Storage Temperature Range: -40 … +85°C
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

9.1 Main connector pinout

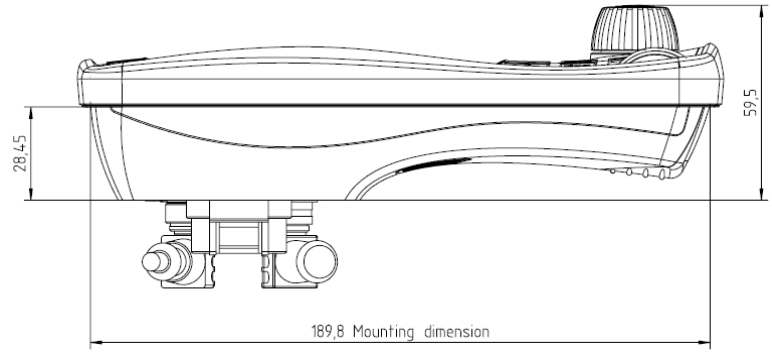
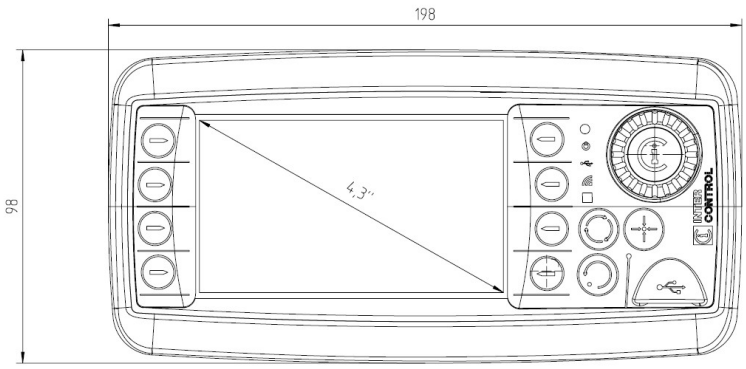
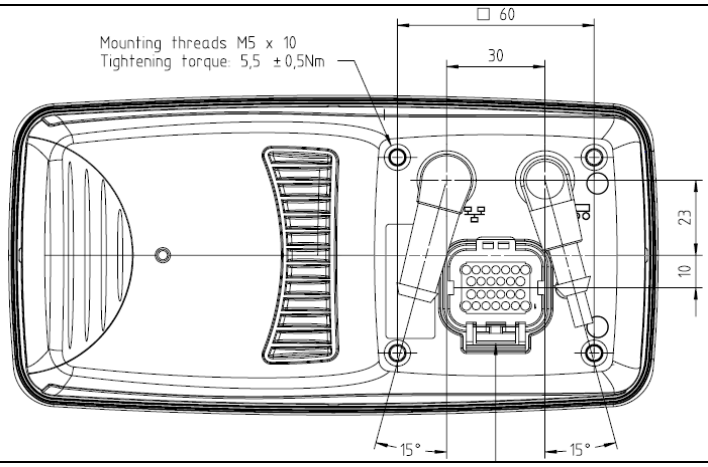
pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	car ground
5	n. c.	not connected
6	n. c.	not connected
7	n. c.	not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5 V DC supply
13	USB_GND	USB supply ground
14	USB_D-	USB data line -
15	USB_D+	USB data line +
16	RS232: RxD	RS232 receive data
17	RS232: TxD	RS232 transmit data
18	RS232: GND	RS232 ground
19	n. c.	not connected
20	n. c.	not connected
21	n. c.	not connected
22	n. c.	not connected
23	SERV_EN	service enable
24	n. c.	not connected
25	n. c.	not connected
26	n. c.	not connected

view on rear side of the *digsy* $_{HMI}$ 4 LB



Technical Data Sheet
digsy HMI 4 LE

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.043**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7015
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.041** • Standalone mounting adaptor, black: **4305.86.042**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	4.3”, 95 mm (W) x 53 mm (H)
Resolution	480 x 272 pixel, WQVGA, 15:9
Colours	16.7 Mio.
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 400:1
4 Input Devices	
4.1 Touch	analogue resistive
4.2 Left Keypad	• 4 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.3 Right Keypad	• 4+3 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.4 Indicators and Sensors	• Light sensor • 1 Multicolour-LED • 3 Status-LED’s
4.5 Encoder	• electromechanical encoder with 16 mechanical detents and push function • lifetime: 1 million cycles
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	1 Gbyte (approx. 900 MB for customer use)
RAM	256 MByte
RTC	buffered by gold cap
5.2 Buzzer	• 60 dB(A) in 30 cm distance • lifetime min. 1000h
5.3 Interfaces	
5.3.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for 2 minutes
Inverse polarity protection	up to -48 V DC

<table>
<tr><td>Current consumption (without external load), max</td><td>
<table>
<tr><th>Power Mode</th><th>current at 13,5 V DC</th><th>current at 27 V</th></tr>
<tr><td>On</td><td>430 mA</td><td>240 mA</td></tr>
<tr><td>Low-power</td><td>160 mA</td><td>90 mA</td></tr>
<tr><td>Sleep</td><td>90 mA</td><td>55 mA</td></tr>
<tr><td>Off</td><td>0 mA</td><td>0 mA</td></tr>
</table>
</td></tr>
<tr><td>5.3.2 Can Interfaces</td><td>• 2 x CAN-Interfaces
• ISO 11898, CAN-specification 2.0 B active,
• up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)</td></tr>
<tr><td>5.3.3 RS232</td><td>1 x RS232-Interface</td></tr>
<tr><td>Type</td><td>EIA232 (only RxD, TxD, GND)</td></tr>
<tr><td>Speed</td><td>max. 115 Kbps</td></tr>
<tr><td>5.3.4 USB</td><td>Host 2.0</td></tr>
<tr><td>Main connector</td><td>1 x Full speed</td></tr>
<tr><td>On front</td><td>1 x USB slot High speed</td></tr>
<tr><td>5.3.5 Inputs</td><td>4 configurable analogue/digital inputs</td></tr>
<tr><td>input impedance</td><td>> 3kOhm</td></tr>
<tr><td>resolution</td><td>10 bit resolution (1028 digits, 1 digit = 11,7 mV)</td></tr>
<tr><td>Voltage range</td><td>0 … 12 V</td></tr>
<tr><td>max. protectable input voltage</td><td>36 V DC</td></tr>
<tr><td>protection</td><td>short circuit protection</td></tr>
<tr><td>frequency</td><td>max. signal frequency 50 Hz</td></tr>
<tr><td>5.3.6 Outputs</td><td>3 digital outputs</td></tr>
<tr><td>short circuit protection</td><td>up to 36 V</td></tr>
<tr><td>I_{max}</td><td>300 mA open drain</td></tr>
<tr><td>$R_{DS,on}$</td><td>< 1 Ohm</td></tr>
<tr><td>$R_{DS,off}$</td><td>> 100 kOhm</td></tr>
<tr><td>5.3.7 Video-Interface</td><td>• analog video input, 1 Vss
• camera control output (open drain) for special functionality (mirror, shutter, heating etc.),
• ampacity 300mA @ 12V DC</td></tr>
<tr><td>5.3.8 Ethernet-Interface</td><td>1 x 10/100 Mbit/s Base T</td></tr>
<tr><td colspan="2">6 Connections</td></tr>
<tr><td>Main connector</td><td>Part no. connector set: 4305.86.001
Tyco-AMP 1437288-6
• Mating connector (customer) Tyco-AMP 3-1437290-7
• Mating crimp contact (customer) Tyco AMP 3-1447221-4</td></tr>
<tr><td>Video connector</td><td>M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101</td></tr>
<tr><td>Ethernet connector</td><td>M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101</td></tr>
<tr><td>Connector pinout</td><td>see chap. 9.</td></tr>
<tr><td colspan="2">7 Software</td></tr>
<tr><td>1.1 Operating System</td><td>Linux, kernel 2.6.28</td></tr>
<tr><td>1.2 Application Programming</td><td>CODESYS-Tools (3.5)</td></tr>
</table>

8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 8.2 e1 - Type approval	EU Directive 72/245/EWG
8.3 Protection Level (IP Code)	IP 6k5 and 6k7 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access
8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
	  ○ Mechanical Shock: Level 2
	  ○ Random Vibration: Level 2
	  ○ Sinusoidal Vibration: Level 2

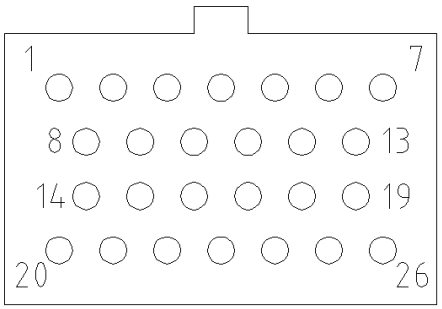
8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
	  ○ Operating Temperature Range: -30 … +65°C
	  ○ Storage Temperature Range: -40 … +85°C
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

9.1 Main connector pinout

pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	Car GND
5	n. c.	Not connected
6	n. c.	Not connected
7	n. c.	Not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5V supply
13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
16	RS232: RxD	RS232 receive data
17	RS232: TxD	RS232 transmit data
18	RS232: GND	RS232 GND
19	A/DI3	analog/digital input 3
20	A/DI1	analog/digital input 1
21	A/DI2	analog/digital input 2
22	A/DI4	analog/digital input 4
23	SERV_EN	service enable
24	DO3	digital output 3
25	DO1	digital output 1
26	DO2	digital output2

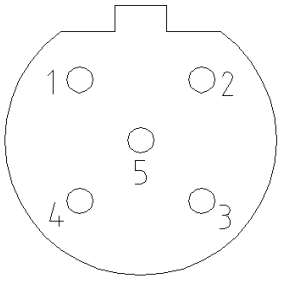
view on rear side of the *digsy* HMI 4 LE



9.2 Video connector pinout

	Round Connector, 5 pins, M12
1	VidSig+
2	Mirror
3	Camera+
4	Camera -
5	VidSig GND

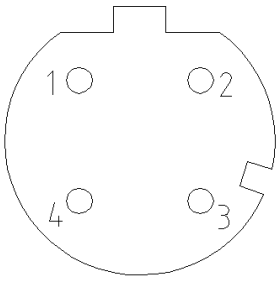
Video- Connector, M12, female, 5 pins, b-coded
view on rear side of the *digsy* HMI 4 LE



9.3 Ethernet connector pinout

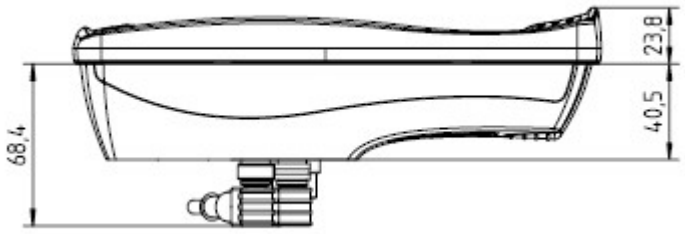
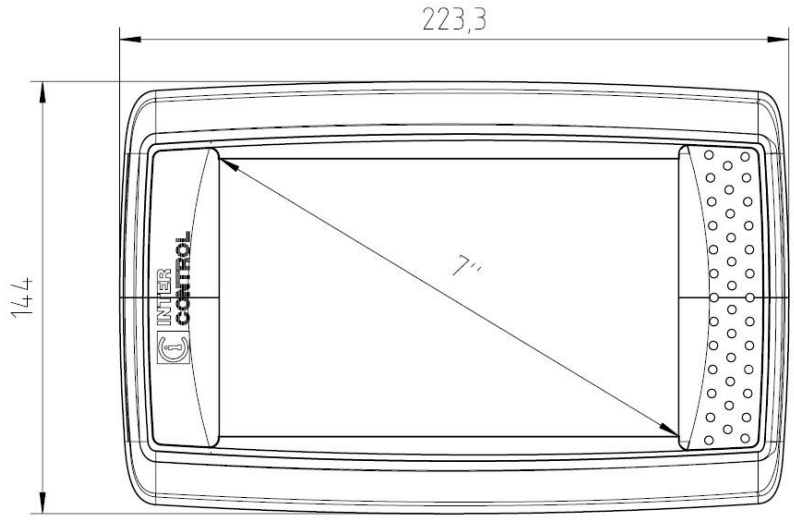
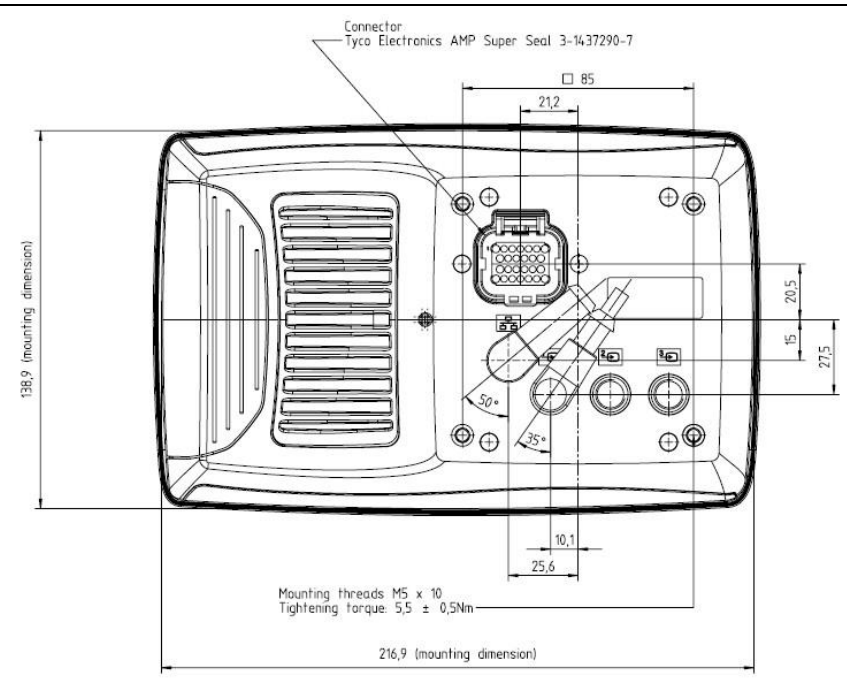
	Round Connector, 4 pins, M12, acc. To IEC 61076-2-101
1	TD+
2	RD+
3	TD-
4	RD-

Ethernet Connector, M12, female, 4 pins, d-coded
view on rear side of the *digsy* HMI 4 LE



Technical Data Sheet
digsy HMI 7 SB

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.070**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7011
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.070** • Standalone mounting adaptor, black: **4305.86.072**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	7”, 152 mm (W) x 91 mm (H)
Resolution	800 x 480 pixel, (WVGA), 15:9
Colours	262k
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 500:1
4 Input Devices	
4.1 Touch	-
4.2 Left Keypad	-
4.3 Right Keypad	-
4.4 Indicators and Sensors	-
4.5 Encoder	-
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	512 Mbyte (approx. 450 MB for customer use)
RAM	128 Mbyte
RTC	buffered by gold cap
5.2 Buzzer	• 65 dB(A) in 30 cm distance • lifetime min. 1000h
5.3 Interfaces	
5.3.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for max. 2 minutes
Inverse polarity protection	up to -48 V DC for max. 5 minutes
Current consumption (without external load), max	**Power Mode** / **current at 13,5 V DC** / **current at 27 V** **On**: 900 mA / 500 mA **Low-power**: 200 mA / 120 mA **Sleep**: 100 mA / 65 mA **Off**: 0 mA / 0 mA
5.3.2 Can Interfaces	• 2 x CAN-Interfaces • ISO 11898, CAN-specification 2.0 B active, • up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)
5.3.3 RS232	1 x RS232-Interface
Type	EIA232 (only RxD, TxD, GND)
Speed	max. 115 Kbps

5.3.4 USB	Host 2.0
Main connector	1 x Full speed
5.3.5 Video-Interface	• analog video input, 1 Vss • camera control output (open drain) for special functionality (mirror, shutter, heating etc.), • ampacity 300mA @ 12V DC
5.3.6 Ethernet-Interface	1 x 10/100 Mbit/s Base T
6 Connections	
Main connector	Part no. connector set: **4305.86.001** Tyco-AMP 1437288-6 • Mating connector (customer) Tyco-AMP 3-1437290-7 • Mating crimp contact (customer) Tyco AMP 3-1447221-4
Video connector	M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101
Ethernet connector	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101
Connector pinout	see chap. 9.
7 Software	
7.1 Operating System	Linux, kernel 2.6.28
7.2 Application Programming	CODESYS-Tools (3.5)
8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 e1 - Type approval	EU Directive 72/245/EWG (Jan-2013)
8.3 Protection Level (IP Code)	IP 6k5 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access
8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
	  ○ Mechanical Shock: Level 2
	  ○ Random Vibration: Level 2
	  ○ Sinusoidal Vibration: Level 2

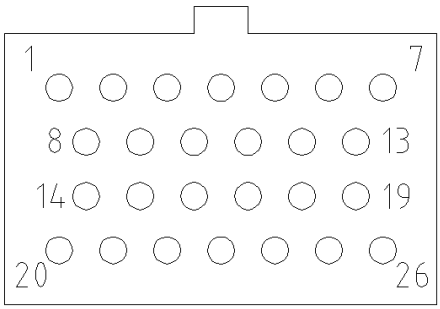
8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
	  ○ Operating Temperature Range: -30 … +65°C
	  ○ Storage Temperature Range: -40 … +85°C
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

9.1 Main connector pinout

pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	Car GND
5	n. c.	Not connected
6	n. c.	Not connected
7	n. c.	Not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5V supply
13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
16	RS232 RxD	RS232 receive data
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 GND
19	n. c.	Not connected
20	n. c.	Not connected
21	n. c.	Not connected
22	n. c.	Not connected
23	SERV_EN	service enable
24	n. c.	Not connected
25	n. c.	Not connected
26	n. c.	Not connected

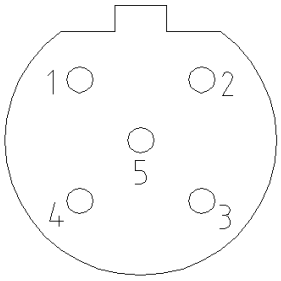
view on rear side of the *digsy* HMI 7 SB



9.2 Video connector pinout

	Round Connector, 5 pins, M12
1	VidSig+
2	Mirror
3	Camera+
4	Camera -
5	VidSig GND

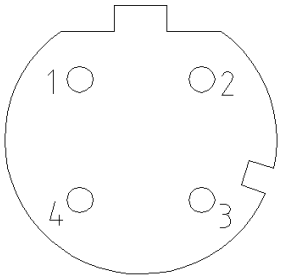
Video- Connector, M12, female, 5 pins, b-coded,
view on rear side of the *digsy* HMI 7 SB



9.3 Ethernet connector pinout

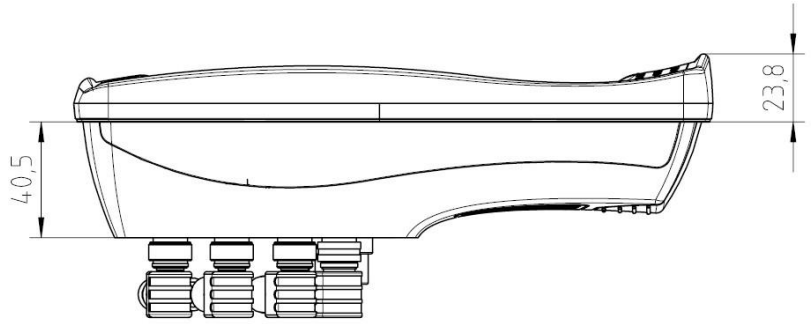
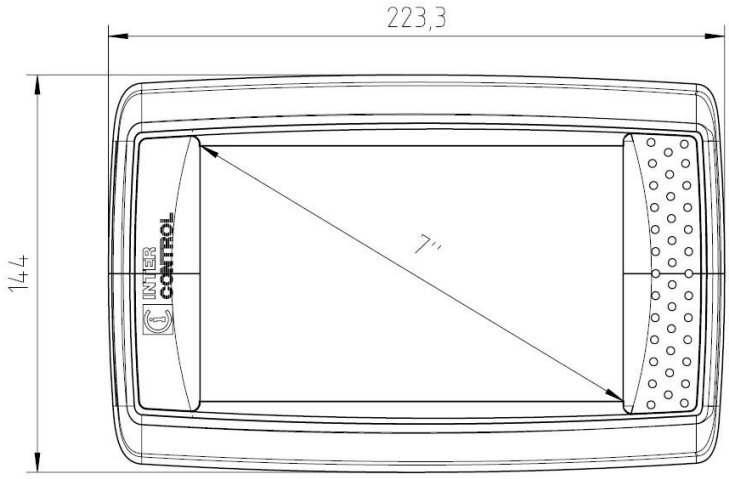
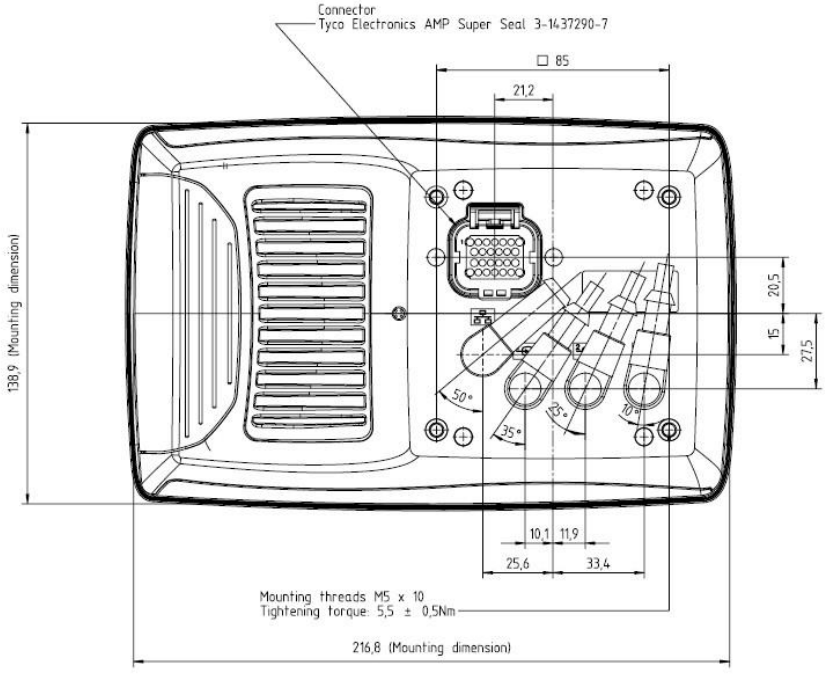
	Round Connector, 4 pins, M12, acc. To IEC 61076-2-101
1	TD+
2	RD+
3	TD-
4	RD-

Ethernet Connector, M12, female, 4 pins, d-coded,
view on rear side of the *digsy* HMI 7 SB



Technical Data Sheet
digsy HMI 7 SE

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.071**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7015
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.070** • Standalone mounting adaptor, black: **4305.86.072**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	7”, 152 mm (W) x 91 mm (H)
Resolution	800 x 480 pixel, (WVGA), 15:9
Colours	262k
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 500:1
4 Input Devices	
4.1 Touch	Analogue resistive
4.2 Left Keypad	-
4.3 Right Keypad	-
4.4 Indicators and Sensors	-
4.5 Encoder	-
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	1 GByte (approx. 900 MB for customer use)
RAM	256 Mbyte
RTC	buffered by gold cap
5.2 Buzzer	• 65 dB(A) in 30 cm distance • lifetime min. 1000h
5.3 Interfaces	
5.3.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for max. 2 minutes
Inverse polarity protection	up to -48 V DC for max. 5 minutes
Current consumption (without external load), max	**Power Mode** / **current at 13,5 V DC** / **current at 27 V** **On**: 900 mA / 500 mA **Low-power**: 200 mA / 120 mA **Sleep**: 100 mA / 65 mA **Off**: 0 mA / 0 mA
5.3.2 CAN Interfaces	• 2 x CAN-Interfaces • ISO 11898, CAN-specification 2.0 B active, • up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)
5.3.3 RS232	1 x RS232-Interface

Type	EIA232 (only RxD, TxD, GND)
Speed	max. 115 Kbps
5.3.4 USB	Host 2.0
Main connector	1 x Full speed
5.3.5 Inputs	4 configurable analogue/digital inputs
input impedance	> 3kOhm
resolution	10 bit resolution (1028 digits, 1 digit = 11,7 mV)
Voltage range	0 … 12 V
max. protectable input voltage	36 V DC
protection	short circuit protection
frequency	max. signal frequency 50 Hz
5.3.6 Outputs	3 digital outputs
short circuit protection	up to 36 V DC
I_{max}	300 mA open drain
$R_{DS,on}$	< 1 Ohm
$R_{DS,off}$	> 100 kOhm
5.3.7 Video-Interface	• 3 analog video inputs, 1 Vss • camera control output (open drain) for special functionality (mirror, shutter, heating etc.), • ampacity 300mA @ 12V DC
5.3.8 Ethernet-Interface	1 x 10/100 Mbit/s Base T
6 Connections	
Main connector	Part no. connector set: **4305.86.001** Tyco-AMP 1437288-6 • Mating connector (customer) Tyco-AMP 3-1437290-7 • Mating crimp contact (customer) Tyco AMP 3-1447221-4
Video connector	M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101
Ethernet connector	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101
Connector pinout	see chap. 9.
7 Software	
7.1 Operating System	Linux, kernel 2.6.28
7.2 Application Programming	CODESYS-Tools (3.5)
8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 e1 - Type approval	EU Directive 72/245/EWG (Jan-2013)
8.3 Protection Level (IP Code)	IP 6k5 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access

8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

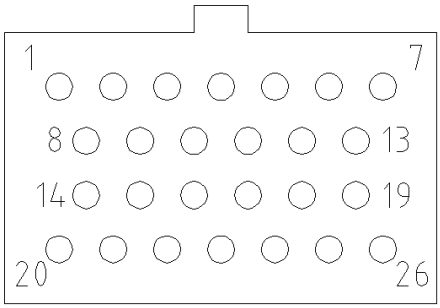
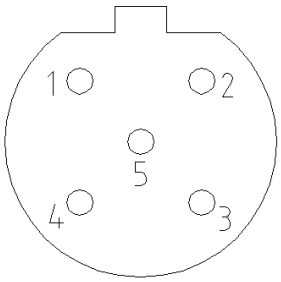
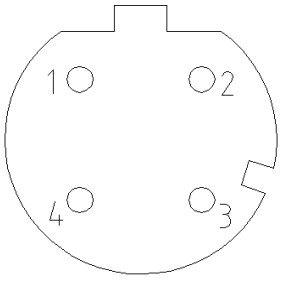
8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
	  ○ Mechanical Shock: Level 2
	  ○ Random Vibration: Level 2
	  ○ Sinusoidal Vibration: Level 2

8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
	  ○ Operating Temperature Range: -30 … +65°C
	  ○ Storage Temperature Range: -40 … +85°C
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

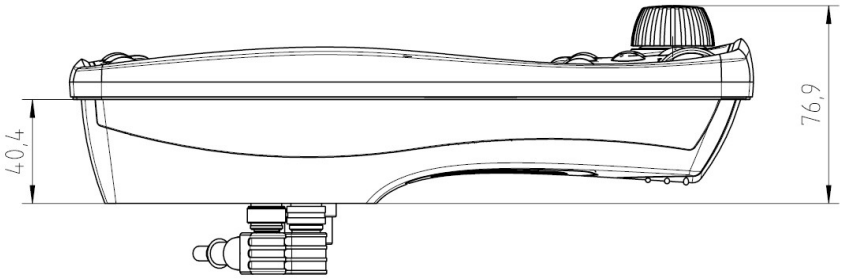
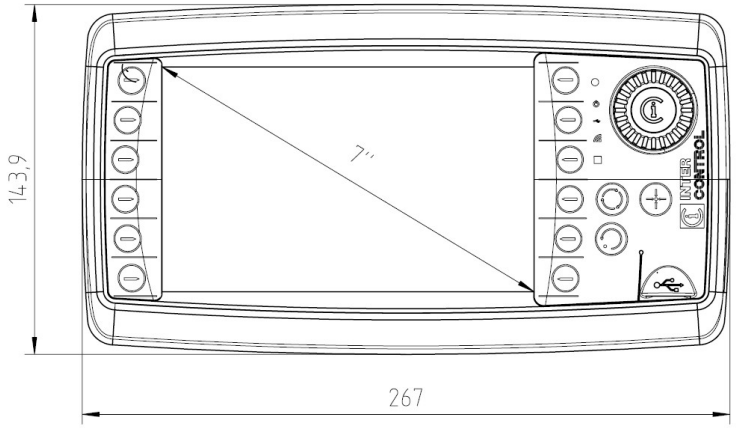
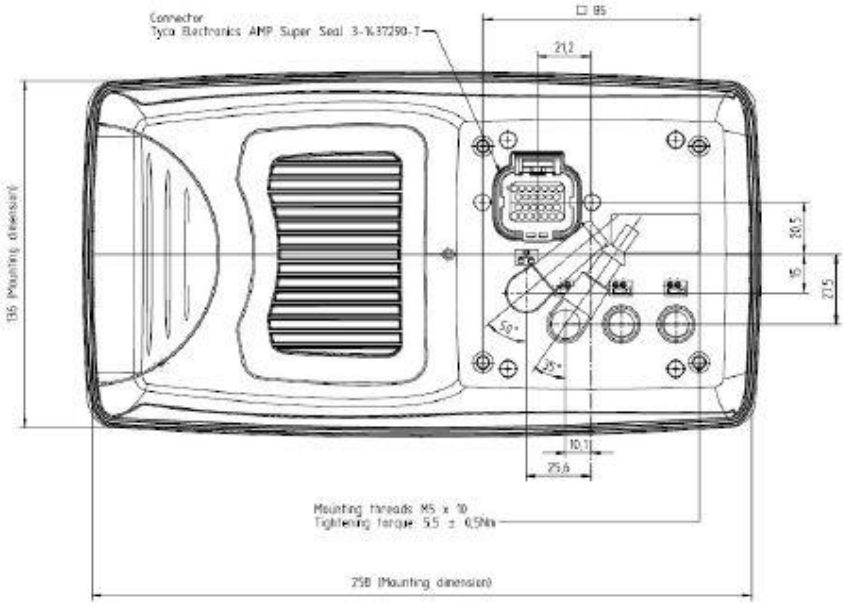
9.1 Main connector pinout

pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	Car GND
5	n. c.	Not connected
6	n. c.	Not connected
7	n. c.	Not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5V supply
13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
16	RS232 RxD	RS232 receive data
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 GND
19	A/DI3	Analog/digital input 3
20	A/DI1	Analog/digital input 1
21	A/DI2	Analog/digital input 2
22	A/DI4	Analog/digital input 4
23	SERV_EN	service enable
24	DO3	Digital output 3
25	DO1	Digital output 1
26	DO2	Digital output 2

	view on rear side of the *digsy* $_{HMI}$ 7 SE 
9.2 Video connector pinout	<table><tr><th></th><th>Round Connector, 5 pins, M12</th></tr><tr><td>1</td><td>VidSig+</td></tr><tr><td>2</td><td>Mirror</td></tr><tr><td>3</td><td>Camera+</td></tr><tr><td>4</td><td>Camera -</td></tr><tr><td>5</td><td>VidSig GND</td></tr></table> Video- Connector, M12, female, 5 pins, b-coded, **view on rear side of the *digsy* $_{HMI}$ 7 SE** 
9.3 Ethernet connector pinout	<table><tr><th></th><th>Round Connector, 4 pins, M12, acc. To IEC 61076-2-101</th></tr><tr><td>1</td><td>TD+</td></tr><tr><td>2</td><td>RD+</td></tr><tr><td>3</td><td>TD-</td></tr><tr><td>4</td><td>RD-</td></tr></table> Ethernet Connector, M12, female, 4 pins, d-coded, **view on rear side of the *digsy* $_{HMI}$ 7 SE** 

Technical Data Sheet
digsy HMI 7 LB

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.072**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7015
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.071** • Standalone mounting adaptor, black: **4305.86.072**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	7”, 152 mm (W) x 91 mm (H)
Resolution	800 x 480 pixel, (WVGA), 15:9
Colors	262k
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 500:1
4 Input Devices	
4.1 Touch	-
4.2 Left Keypad	• 6 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.3 Right Keypad	• 6+3 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.4 Indicators and Sensors	• Light sensor • 1 Multicolour-LED • 2 Status-LED’s
4.5 Encoder	• optical encoder with 16 mechanical detents and push function • lifetime: 1 million cycles
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	512 MByte (approx. 450 MB for customer use)
RAM	128 Mbyte
RTC	buffered by gold cap
5.2 Buzzer	• 65 dB(A) in 30 cm distance • lifetime min. 1000h
5.3 Interfaces	
5.3.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for 2 minutes
Inverse polarity protection	up to -48 V DC

Current consumption (without external load), max	<table><tr><th>Power Mode</th><th>current at 13,5 V DC</th><th>current at 27 V</th></tr><tr><td>On</td><td>900 mA</td><td>500 mA</td></tr><tr><td>Low-power</td><td>200 mA</td><td>120 mA</td></tr><tr><td>Sleep</td><td>100 mA</td><td>65 mA</td></tr><tr><td>Off</td><td>0 mA</td><td>0 mA</td></tr></table>
5.3.2 Can Interfaces	• 2 x CAN-Interfaces • ISO 11898, CAN-specification 2.0 B active, • up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)
5.3.3 RS232	1 x RS232-Interface
Type	EIA232 (only RxD, TxD, GND)
Speed	max. 115 Kbps
5.3.4 USB	Host 2.0
Main connector	1 x Full speed
5.3.7 Video-Interface	• analog video input, 1 Vss • camera control output (open drain) for special functionality (mirror, shutter, heating etc.), • ampacity 300mA @ 12V DC
5.3.8 Ethernet-Interface	1 x 10/100 Mbit/s Base T
6 Connections	
Main connector	Part no. connector set: **4305.86.001** Tyco-AMP 1437288-6 • Mating connector (customer) Tyco-AMP 3-1437290-7 • Mating crimp contact (customer) Tyco AMP 3-1447221-4
Video connector	M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101
Ethernet connector	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101
Connector pinout	see chap. 9.
7 Software	
7.1 Operating System	Linux, kernel 2.6.28
7.2 Application Programming	CODESYS-Tools (3.5)
8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 e1 - Type approval	EU Directive 72/245/EWG (Jan-2013)
8.3 Protection Level (IP Code)	IP 6k5 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access

8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
	  ○ Mechanical Shock: Level 2
	  ○ Random Vibration: Level 2
	  ○ Sinusoidal Vibration: Level 2

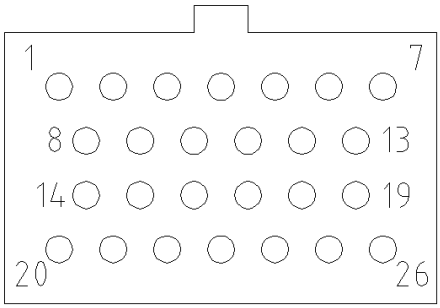
8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
	  ○ Operating Temperature Range: -30 … +65°C
	  ○ Storage Temperature Range: -40 … +85°C
	• ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

9.1 Main connector pinout

pin no.	assignment	description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage - ;terminal 31
4	CarGND	Car GND
5	n. c.	Not connected
6	n. c.	Not connected
7	n. c.	Not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5V supply
13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
16	RS232 RxD	RS232 receive data
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 GND
19	n. c.	Not connected
20	n. c.	Not connected
21	n. c.	Not connected
22	n. c.	Not connected
23	SERV_EN	service enable
24	n. c.	Not connected
25	n. c.	Not connected
26	n. c.	Not connected

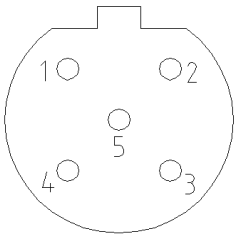
view on rear side of the *digsy* $_{HMI}$ 7 LB



9.2 Video connector pinout

	Round Connector, 5 pins, M12
1	VidSig+
2	Mirror
3	Camera+
4	Camera -
5	VidSig GND

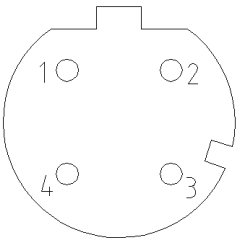
Video- Connector, M12, female, 5 pins, b-coded,
view on rear side of the *digsy* $_{HMI}$ 7 LB



9.3 Ethernet connector pinout

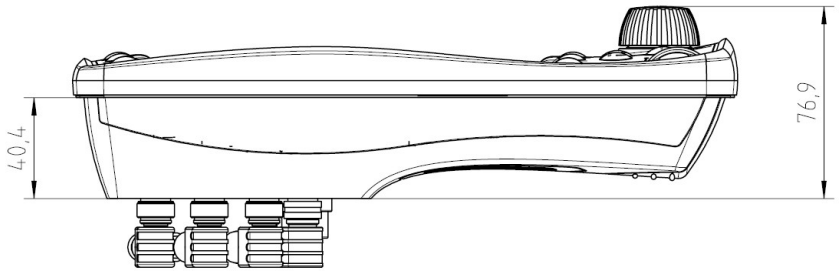
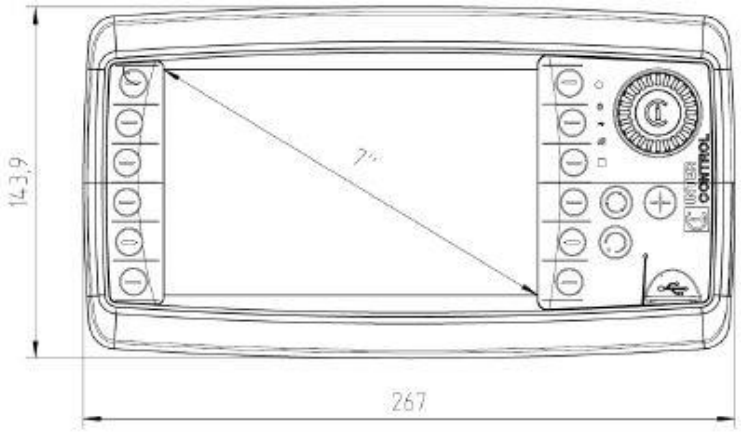
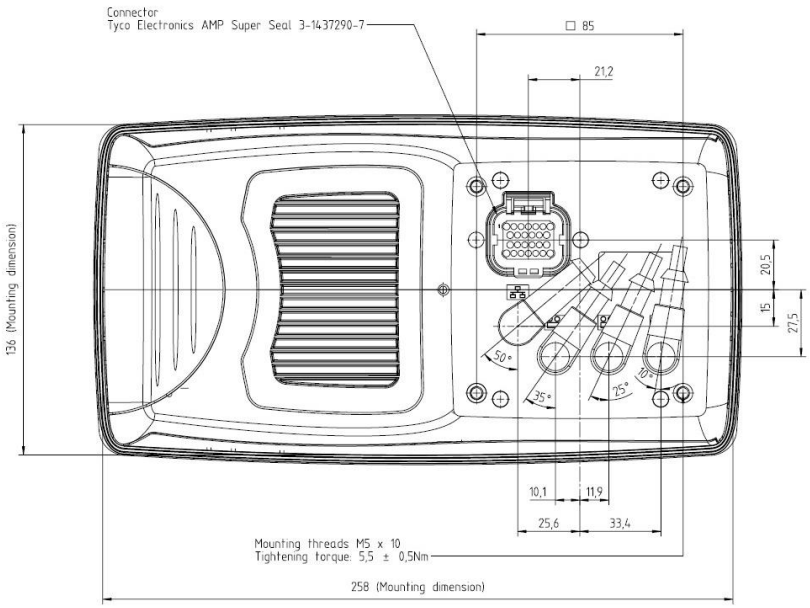
	Round Connector, 4 pins, M12, acc. To IEC 61076-2-101
1	TD+
2	RD+
3	TD-
4	RD-

Ethernet Connector, M12, female, 4 pins, d-coded,
view on rear side of the *digsy* $_{HMI}$ 7 LB



Technical Data Sheet
digsy HMI 7 LE

Inter Control Hermann Köhler Elektrik GmbH & CoKG – Schafhofstrasse 30 - DE-90411 Nuernberg

1 Order information	
Part number	**4885.86.073**
2 Mechanical	
2.1 Dimensions	
	
	

2.2 Housing	Plastic housing, coloured black, RAL 9005 with rubber frame, coloured charcoal-grey, RAL 7015
2.3 Mounting	• landscape or portrait • standalone • in-dash Mounting accessories (not included): • Build-in mounting frame, grey: **4305.86.071** • Standalone mounting adaptor, black: **4305.86.072**
3 Display	
Type	TFT Colour Graphic LCD with LED backlight
Size	7”, 152 mm (W) x 91 mm (H)
Resolution	800 x 480 pixel, (WVGA), 15:9
Colors	262k
Brightness	typ. 400 cd/m²
Contrast Ratio	typ. 500:1
4 Input Devices	
4.1 Touch	analogue resistive
4.2 Left Keypad	• 6 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.3 Right Keypad	• 6+3 keys with tactile feedback • blue LED backlight • Lifetime 1.000.000 actuations
4.4 Indicators and Sensors	• Light sensor • 1 Multicolour-LED • 3 Status-LED’s
4.5 Encoder	• optical encoder with 16 mechanical detents and push function • lifetime: 1 million cycles
5 Electronics	
5.1 Processor platform	
CPU	Freescale I.MX35®, 532 MHz
Mass storage	1 GByte (approx. 900 MB for customer use)
RAM	256 Mbyte
RTC	buffered by gold cap
5.2 Buzzer	• 65 dB(A) in 30 cm distance • lifetime min. 1000h
5.3 Interfaces	
5.3.1 Power supply	
Operating voltage range	9 … 36 V DC
Protection	short circuit protection
Overvoltage resistance	48V for max. 2 minutes
Inverse polarity protection	up to -48 V DC for max. 5 minutes

Current consumption (without external load), max	<table><tr><th>Power Mode</th><th>current at 13,5 V DC</th><th>current at 27 V</th></tr><tr><td>On</td><td>900 mA</td><td>500 mA</td></tr><tr><td>Low-power</td><td>200 mA</td><td>120 mA</td></tr><tr><td>Sleep</td><td>100 mA</td><td>65 mA</td></tr><tr><td>Off</td><td>0 mA</td><td>0 mA</td></tr></table>
5.3.2 Can Interfaces	• 2 x CAN-Interfaces • ISO 11898, CAN-specification 2.0 B active, • up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)
5.3.3 RS232	1 x RS232-Interface
Type	EIA232 (only RxD, TxD, GND)
Speed	max. 115 Kbps
5.3.4 USB	Host 2.0
Main connector	1 x Full speed
On front	1 x USB slot High speed
5.3.5 Inputs	4 configurable analog/digital inputs
input impedance	> 3kOhm
resolution	10 bit resolution (1028 digits, 1 digit = 11,7 mV)
Voltage range	0 … 12 V
max. protectable input voltage	36 V DC
protection	short circuit protection
frequency	max. signal frequency 50 Hz
5.3.6 Outputs	3 digital outputs
short circuit protection	up to 36 V
I_{max}	300 mA open drain
$R_{DS,on}$	< 1 Ohm
$R_{DS,off}$	> 100 kOhm
5.3.7 Video-Interface	• 3 analog video inputs, 1 Vss • camera control output (open drain) for special functionality (mirror, shutter, heating etc.), • ampacity 300mA @ 12V DC
5.3.8 Ethernet-Interface	1 x 10/100 Mbit/s Base T
6 Connections	
Main connector	Part no. connector set: **4305.86.001** Tyco-AMP 1437288-6 • Mating connector (customer) Tyco-AMP 3-1437290-7 • Mating crimp contact (customer) Tyco AMP 3-1447221-4
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Ethernet connector	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101
Connector pinout	see chap. 9.
7 Software	
7.1 Operating System	Linux, kernel 2.6.28
7.2 Application Programming	CODESYS-Tools (3.5)

8 Testing and Verification	
8.1 CE-Compliance	EU Directive 2004/108/EC (EMC) according to • EN 12895: Industrial Trucks – Electromagnetic compatibility • EN 13309: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
8.2 e1 - Type approval	EU Directive 72/245/EWG (Jan-2013)
8.3 Protection Level (IP Code)	IP 6k5 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access
8.4 Electrical Requirements	12 and 24V-Systems according to: • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
8.5 Mechanical Requirements	• According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions o Mechanical Shock: Level 2 o Random Vibration: Level 2 o Sinusoidal Vibration: Level 2
8.6 Climate Requirements	• According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads o Operating Temperature Range: -30 … +65°C o Storage Temperature Range: -40 … +85°C • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

9 Pinout

9.1 Main connector pinout

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1	VCC	supply voltage +; terminal 30
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7	n. c.	Not connected
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10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
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13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
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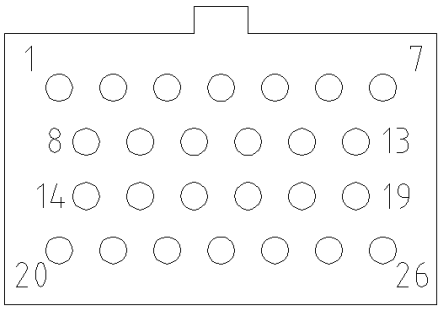
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 GND
19	A/DI3	analog/digital input 3
20	A/DI1	analog/digital input 1
21	A/DI2	analog/digital input 2
22	A/DI4	analog/digital input 4
23	SERV_EN	service enable
24	DO3	digital output 3
25	DO1	digital output 1
26	DO2	digital output 2

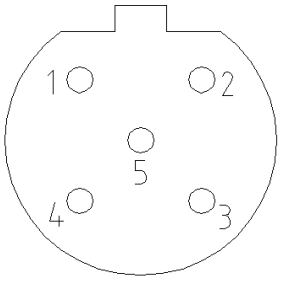
view on rear side of the *digsy* HMI 7 LE



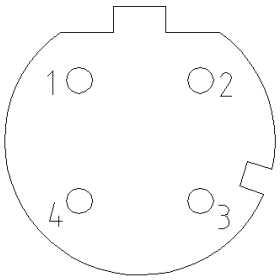
9.2 Video connector pinout

	Round Connector, 5 pins, M12
1	VidSig+
2	Mirror
3	Camera+
4	Camera -
5	VidSig GND

Video- Connector, M12, female, 5 pins, b-coded,
view on rear side of the *digsy* HMI 7 LE



9.3 Ethernet connector pinout

	Round Connector, 4 pins, M12, acc. To IEC 61076-2-101
1	TD+
2	RD+
3	TD-
4	RD-

Ethernet Connector, M12, female, 4 pins, d-coded,
view on rear side of the *digsy* HMI 7 LE