



## GSt-E101 operator terminal series



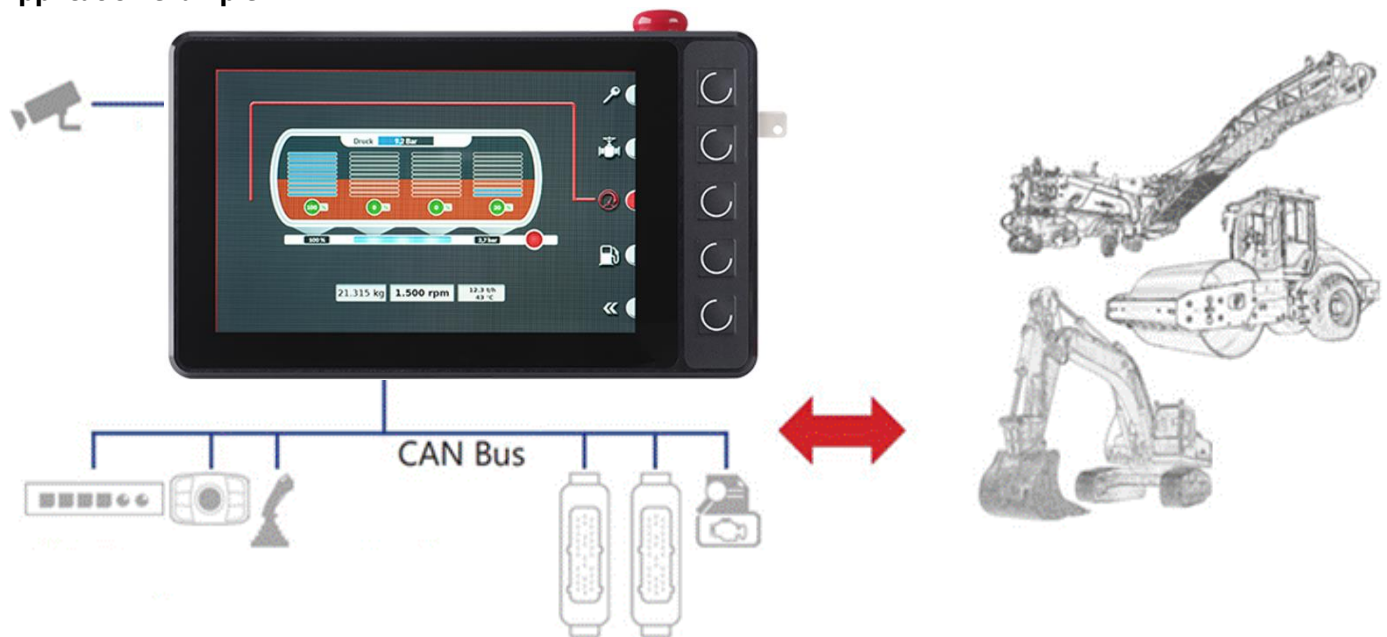


Housing color may differ in the original from the image shown here.

In addition to being equipped with modern technology and a low-reflection display that is easy to read in daylight, the control unit emphasizes the contrast to the harsh environment of a construction machine in outdoor use. The intuitive operation of the navigation keys focuses on the optimal realization of the man-machine interface. The display brightness and key illumination can be adjusted via software settings. The functional design fits perfectly into all cabs and additionally makes a strong statement for the machine manufacturer through customized look.

- 🔴 High-quality and robust operating and control unit
- 🔴 Specially developed for use in mobile machines
- 🔴 Die-cast aluminum housing for outdoor use
- 🔴 Installation and mounting with a standard ball holder or recessed mounting
- 🔴 Very bright, optically bonded 10.1-inch display with very wide viewing angle for use in direct sunlight
- 🔴 RGB illuminated short-travel keys with tactile feedback for safe operation of menu navigation and machine functions
- 🔴 Built-in ambient light sensor with automatic dimming of display and keyboard in darkness
- 🔴 I/Os and interfaces extend the range of functions
- 🔴 Customer logo on the back of the cable cover and color of the housing can be customized (on request)
- 🔴 Programming GSe-VISU®

## Application example



## Technical data

### Display

Display	Color TFT
Format	16:9 (WXGA), 216.9 x 135.6 mm, 10.1" diagonal
Resolution	1280 x 800 Pixel
Backlight	900 cd/m <sup>2</sup> (typical)
Contrast ratio	800:1 (typical)
Viewing angle	85°, 85°, 85°, 85° ( $\Theta_{y+}$ , $\Theta_{y-}$ , $\Theta_{x+}$ , $\Theta_{x-}$ )
Surface	Mineral clear glass
Optical Bonding	yes

### Input media

Keys	5 tactile short-stroke keys
Backlight buttons	RGB LED (individually controllable and brightness adjustable)
Touchscreen	(PCAP) touchscreen for free user input

### Mechanical data

Front panel material	Aluminum, black
Housing material	Die-cast aluminum, powder-coated (DB 702)
Dimensions (W x H x D)	305 x 179.6 x 65 mm
Installation dimensions (W x H)	297 ± 0.5 x 172 ± 0.5 mm
Weight	approx. 2 kg
Mounting	Surface mounting via RAM® mount system
Protection class	IP65 with sealing inserts when housing connector cover is screwed on
Operating temperature	-30°C ... 70°C
Storage temperature	-30°C ... 80°C

### Electrical data

Supply voltage	9... 32 VDC
Rated voltage	24 VDC
Power consumption	approx. 48W (without external load)
Fuse	Self-resetting
Processor	ARM®Cortex® A9 + M4   32 bit   792 MHz
Memory	256 MB RAM   64 MB Flash   8 kB FRAM
Interfaces	3x CAN ISO 11898 Version 2.0 A/B, 125 KBit/s ... 1 Mbit/s 1x CAN ISO 11898 galvanically isolated 1x Ethernet 10/100

**Electrical data**

	1x USB host (for connecting USB mass storage devices) 4 in 2 Video-IN (PAL/NTSC)
I/O's	4x digital inputs (low: 0... 2.7 V   high: 5... 32 V) 2x digital PWM outputs (10... 32 V   $I_{max}$ 1A   diagnosable   $f_{max}$ 1 kHz) 4x analog inputs (0... 10 V   0... 20 mA) 1x reference output (5 V   500 mA)

**Other equipment**

Temperature monitoring	Integrated sensor for measuring the device temperature
Operating voltage monitoring	Measuring circuit for monitoring the supply voltage
Brightness adjustment	Light sensor in front panel for brightness adjustment of display and keys
Clock / Battery	Real time clock (RTC), battery buffered (year, month, day, weekday, hour, minute, second)
Installation parts (optional)	1x emergency stop 1x key switch

**Software / Programming**

Operating system	GSe-OS® Fastboot operating system based on Linux
Development environment	C-programmable via GSe-VISU® software
Communication protocols	J1939 CANopen Modbus TCP OPC-UA openSYDE

**Testing standards and regulations**

CE mark	According to EMC Directive 2014/30/EU according to RoHS Directive 2011/65/EU
EMC	EN 61000-6-2:2019-11 Immunity for industrial environments EN 61000-6-3:2011-09 Emission for residential environments EN 61000-4-2:2009-12 Immunity ESD, Level 4: 15 kV EN 61000-4-4:2013-04: Immunity transients (burst), level 4: 4kV EN 61000-4-5:2019-03: Surge immunity, level 3: 1kV
Load Dump	ISO 16750   Pulse 5b Level 3
Vibration	EN 60068-2-64:2008 random   8h per axis 10 ... 299 Hz: 1g 300 ... 499 Hz: 0.05g 500 ... 2000 Hz: 2g
Shock	EN 60068-2-27   30g / 18ms: 5 shocks
Cold	EN 60068-2-1   Test temperature -25°C / 2h
Dry heat	EN 60068-2-2   Test temperature 70°C / 2h
Temperature change	EN 60068-2-14   Test temperature -25°C ... +70°C: 20 cycles
Temperature shock	EN 60068-2-14   Test temperature -25°C ... +70°C: 5 cycles
Damp heat	EN 60068-2-38   Test Z/AD Test temperature 40°C/ 93%RH / 21 days
Salt spray (on request)	EN 60068-2-52   severity level 3 (motor vehicle)

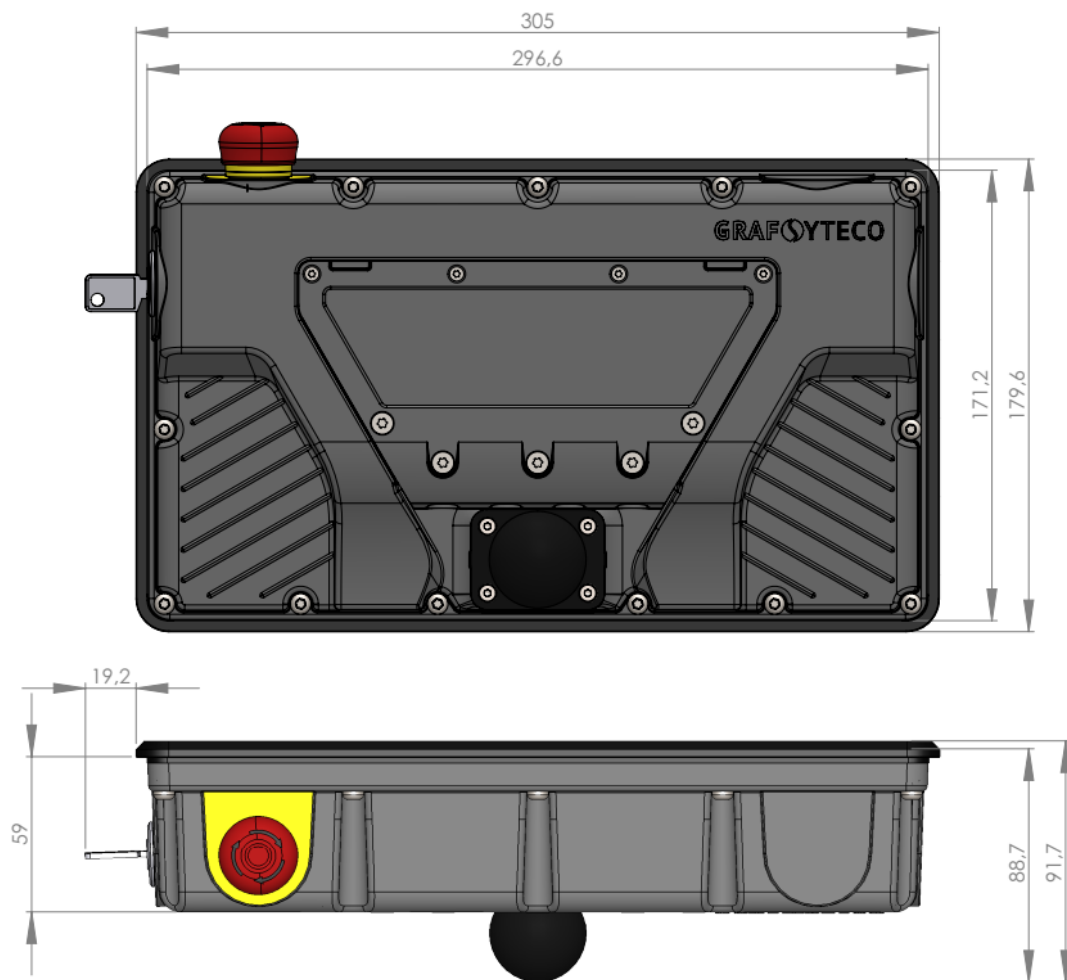
**Certifications**

E1 sign	UN/ECE-R10
---------	------------

**Accessories (not included in the scope of delivery of the device)**

Item number	Designation
180456	GSt-E101 Surface mounting set with RAM® holder
180457	GSt-E101 Installation kit with clamping frame and one-piece sealing frame (only for variant -102)
180458	GSt-E101 Installation kit with clamping frame and multi-part sealing frame (only for variant -102)
180461	GSt-E101 mating connector set with crimp contacts
185321	GSe-OS® operating system for operating and control devices
185320	GSe-VISU® Application Programming Software

## Mechanical dimensions



All dimensions are in [mm]

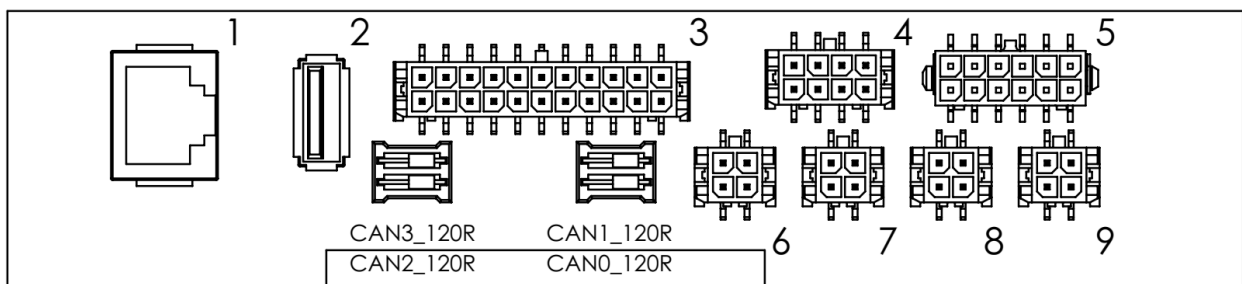
## Product variants

	GSt-	E	101	-	1	0	3
<b>Series designation</b>							
E-Series							
<b>Display size</b>							
101 = 10.1 inch							
<b>Device version</b>							
1 = Standard version, GSe-OS							
A-Z = customized variant							
<b>Housing color</b>							
0 = basalt gray RAL7012							
1 = Ruby red RAL3003							
<b>Execution</b>							
0 = with key switch and emergency stop							
2 = without key switch, without emergency stop							
3 = with rotary switch and emergency stop							

Standard-variants	Article-number	Emergency stop switch	Key switch	Rotary switch
GSt-E101-100	160506	✓	✓	
GSt-E101-102	160524			
GSt-E101-103	160549	✓		✓

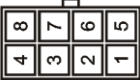


## Pin assignments

### Connector overview



(1) Ethernet	RJ45	
(2) USB	USB-A	
(3) CAN & I/Os	Molex Micro-Fit 22 pin Mating connector: Molex Type 43025-2208 Würth type 662 022 113 322	
	<b>Pin</b>	<b>Signal</b>
	1	DOUT0
	2	DOUT1
	3	CAN1H
	4	CAN1L
	5	CAN2H
	6	CAN2L
	7	CAN3H
	8	CAN3L
	9	GND
	10	AIN 0
	11	AIN 1
		<b>Description</b>
		Digital PWM output0 1A
		Digital PWM output1 1A
		CAN1 High
		CAN1 Low
		CAN2 High
		CAN2 Low
		CAN3 High
		CAN3 Low
		Ground
		Analog input 0
		Analog input 1

## Connector overview

	12	AIN 2	Analog input 2
	13	AIN 3	Analog input 3
	14	GND	Ground
	15	DIN 0	Digital input 0
	16	DIN 1	Digital input 1
	17	DIN 2	Digital input 2
	18	DIN 3	Digital input 3
	19	GND	Ground
	20	UREF (OUT)	Reference output +5V DC / $I_{max}=500mA$
	21	GND	Ground
	22	GND	Ground
(4) MAIN 	Molex Micro-Fit 8 pin Mating connector: Molex Type 43025-0808 Würth type 662 008 113 322		
	<b>Pin</b>	<b>Signal</b>	<b>Description</b>
	1	U <sub>B</sub> 9...32 VDC (IN)	Power supply (KL30)
	2	Ignition 9...32 VDC (IN)	Ignition input (KL15)
	3	GND	Ground
	4	UB_DOUT0 9...32 VDV (IN)	Power supply for digital output
	5	UB_DOUT1 9...32 VDV (IN)	Power supply for digital output
	6	GND	Ground
	7	CAN0H	CAN0_High (galvanically isolated)
	8	CAN0L	CAN0_Low (galvanically isolated)
(5) Installation parts (if present) 	Molex Micro-Fit 12 pin Mating connector: Molex Type 43025-1208 Würth type 662 012 113 322		
	<b>Pin</b>	<b>Signal</b>	<b>Description</b>
	1	GND	Ground
	2	GND	Ground
	3	n.c.	No connection
		KEY1 NO	Key switch 1 NO
		KEY2 NC	Key switch 2 NC
		UB_KEY1/2 (IN)	Supply key switch
	7	GND	Ground
	8	GND	Ground
		EMERGENCY STOP 1 NC	Emergency stop switch 1 NC
	10	EMERGENCY STOP 1 NC	Emergency stop switch 1 NC
	11	EMERGENCY STOP 2 NC	Emergency stop switch 2 NC
	12	EMERGENCY STOP 2 NC	Emergency stop switch 2 NC
(6, 7, 8, 9) VIDEO 1-4 	Molex Micro-Fit 4 pin Mating connector: Molex Type 43025-0408 Würth type 662 004 112 322		
	<b>Pin</b>	<b>Signal</b>	<b>Description</b>
	1	U <sub>B</sub> CAM (OUT)	Camera power supply 12 VDC / $I_{max}=1A$
	2	GND	Ground
	3	VIDEO IN	Video input FBAS 1VPP 50Ω PAL/NTSC
	4	GND	Ground



# Support and contact

## Notes and warnings

Incoming goods inspection

This product has been produced, tested and packed with the greatest possible care. Nevertheless, we ask that you check the device including accessories immediately after receipt for any transport damage and defects. Please refer to the delivery bill for the exact scope of delivery. If possible, a damaged device should be returned in the original packaging.

The following information must be included with the device:

- A detailed description of the defect,
- Your name as well as your address.

Ensure that the device is only commissioned by trained and qualified personnel. The qualified personnel must have sufficient knowledge in the following areas:

- Automation technology
- Control technology
- Control engineering

Observe the relevant EN, DIN and VDE standards when installing the device!

Our operator interfaces are exclusively suitable for operating, monitoring, controlling and regulating processes. In order to prevent dangerous conditions on machines or plants after incorrect entries via the HMI device, in case of malfunction or failure of the HMI device, suitable measures must be taken by programming or designing the HMI device.



Danger to life from electric shock



Danger to life due to incorrect entries or incorrect operation



Caution! Malfunction due to interference

Before commissioning, make sure that supply and data lines are protected against EMC influences.

**The technical specification may be changed at any time without notice. Errors and misprints are always reserved.**



## Contact

Graf-Sytco GmbH & Co KG  
New meadows 12  
D-78609 Tuningen

Tel: +49 (0) 7464 98 66 0  
Fax: +49 (0) 7464 98 66 770  
Mail: [info@graf-sytco.de](mailto:info@graf-sytco.de)  
URL: [www.graf-sytco.de](http://www.graf-sytco.de)

Technical support

Tel: +49 (0) 7464 98 66 255  
Mail: [support@graf-sytco.de](mailto:support@graf-sytco.de)

Order processing

Tel: +49 (0) 7464 98 66 222

Data sheet version

2.1