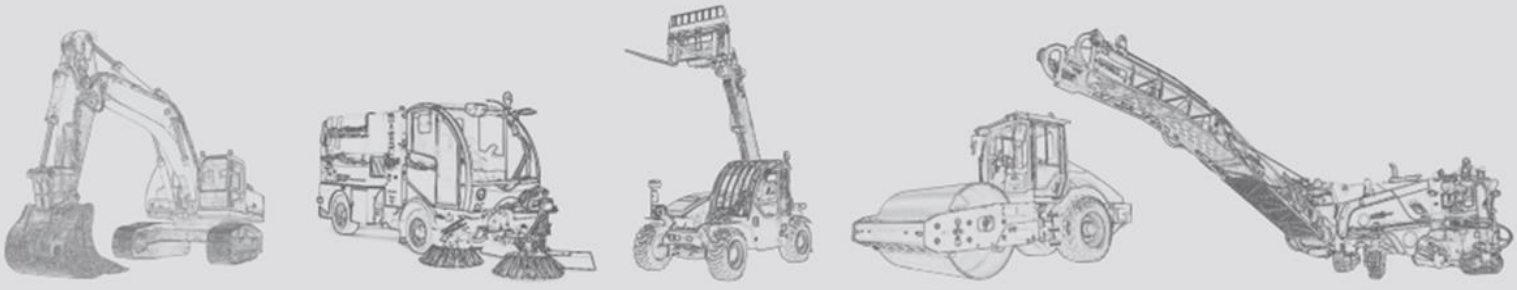
GRAFSYTECO®

GSt-A123 operator panel series



The original housing color may differ from the illustration shown here.

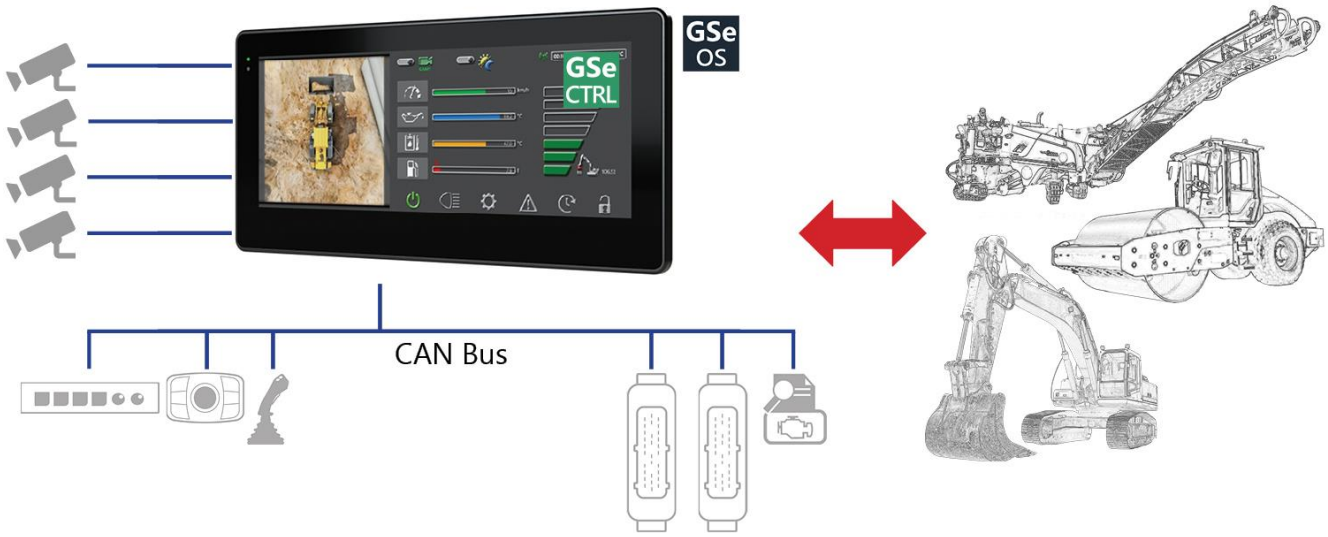
In addition to being equipped with modern technology and a low-reflection display that is easy to read in daylight, the control unit's eye-catching color design emphasizes the contrast to the harsh environment of a construction machine in outdoor use. The intuitive operation of the navigation keys focuses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

- Specially developed for use in mobile machines
- Rugged yet lightweight die-cast aluminum housing for outdoor use
- Installation via clamping bracket and assembly with a standard ball mount possible
- Display optimally readable even in direct sunlight
- Very wide reading angle in all directions
- Short-travel keys with tactile feedback
- Key illumination in RGB
- I/O's and interfaces
- Free programming with GSe-VISU®

GSt-A123 side view:
Extra slim housing design

GSt-A123 rear view:
Flexible RAM® mount (accessories)

Application example



Technical specification

Display and input media

Display	Color TFT
Format	8:3 approx. 292 x 109.5 mm, 12.3" diagonal
Resolution	1920 x 720 pixel
Backlight	1000 cd/m2 (typical)
Contrast ratio	1100:1 (typical)
Viewpoint	85°, 85°, 85°, 85° (Θy+, Θy-, Θx+, Θx-)
Cover lens	Mineral clear glass
Optical Bonding	yes
Keys	4 tactile illuminated short-travel keys on right rear side with numbering in braille for better location (optional without keys)
Key illumination	LED, RGB, individually controllable and brightness adjustable
Encoder	1 rotary-push encoder (Opt)
Touchscreen	Projected capacitive (PCAP)

Mechanical data

Front panel material	Die cast aluminum, powder coated black
Housing material	Die-cast aluminum, powder-coated basalt gray or customer-specific color
Dimensions (W x H x D)	341 x 166 x 52.2 mm
Installation dimensions (W x H)	326 ± 0.5 x 158 ± 0.5 mm
Weight	Approx. 2100 g
Mounting	Surface mounting with RAM® holder Installation with clamping jaws
Protection class	IP65 [1]
Operating temperature	-30°C ... 70°C
Storage temperature	-30°C ... 80°C

Electrical data

Supply voltage	VCC 9...32 VDC
Rated voltage	24 VDC
Power consumption	≤25W (without external load) ≤20mW standby
Fuse	external, fuse value 4 A
Processor	i.MX 8X (4x A35 + 1x M4) @ 900 MHz
Memory	1 GB RAM | 8 GB Flash | 8 kB FRAM
Interfaces	1x Ignition input (clamp 15) 3x CAN-FD 1x Ethernet 2x USB 4x Video Input 1x Audio output 1x RS485 (option)

[1] Only valid with correctly screwed on connectors or protective caps

Electrical data

	1x RS232 (option)
	Possible interface configurations see product variants
I/O's	4x multifunctional inputs
	1x Ignition (KL15)
	2x digital outputs

Other equipment

Temperature monitoring	Integrated temperature sensor for measuring the internal device temperature
Supply voltage monitoring	Measuring circuit for monitoring the supply voltage
Brightness adjustment	Ambient light sensor in the front for brightness adjustment of the display and key illumination
Status LED	RGB LED in front panel for freely programmable status display
Clock / Battery	Real time clock (RTC), Batteriegepuffert
	(year, month, day, weekday, hour, minute, second)
Wake-On-Key	When not in use (e.g. in the outdoor area of a machine), the operating device can be set to a sleep mode. Pressing any key for approx. 3s or rising edge at IGNITION input restarts the unit.

Software / Programming

Operating system	GSe-OS® Fastboot operating system based on Linux
Development environment	C/C++ programmable via GSe-VISU® software

Interfaces

Interface	**Specification and protocols**	
CAN0 ... 2	CAN FD Interface, 125 kBit/s up to 5 MBit/s acc. ISO 11898-1:2015 and ISO 11898-2:2016	
	Layer 2, GS-CAN, J1939, CANopen Slave, openSYDE	
	External bus termination with120 Ohm is required	
ETH	Gigabit-Ethernet 1000BASE-T IEEE 802.3ab	
	Data rate 10/100/1000 Mbit/s	
	Protocols: TCP/IP, UDP/IP, DHCP, OPC-UA, Modbus TCP, openSYDE, HTTP, FTP, MQTT, SSL	
USB0 ... 1	USB 2.0 Hi-Speed, Data rate up to 480 Mbit/s	
	USB Host	
	USB power supply 5 Volt	
	Output current per interface ≤ 500 mA	
$Video_{IN}$0 ... 3	4 FBAS inputs, 1 Vss, 75 Ω (Inputs switchable, four Video inputs presentable)	
	Supported video standards: PAL and NTSC	
IGN	Ignition input / digital input	
	Input resistance	105 kOhm
	Switch-on-level	~7,4 Volt
	Switch-off-level	Adjustable by software
MF_{IN}0 ... 3	Multifunctional inputs	
	Digital inputs	
	Input resistance	1 MOhm
	Switchable Input resistance	10 kOhm
	Input frequency	< 1 kHz
	Switch-on-level	4 Volt
	Switch-off-level	3 Volt
	Voltage range	0 ... U_B
	Voltage input	
	Input resistance	1 MOhm
	Switchable Input resistance	10 kOhm
	Input frequency	< 1 kHz
	Voltage range	0 ... 10 VDC
	Accuracy	+/- 3 % FS
	Resolution	7 mV
	Current input	
	Input resistance	345 Ohm
	Input frequency	< 1 kHz
	Current range	0 ... 20 mA
	Accuracy	+/- 3 % FS
	Resolution	26 µA
	Other equipment per multifunctional input	
	Switchable pull up	1 kOhm with ~11 Volt power supply
D_{OUT}0 ... 1	Digital Outputs, High-Side-Driver	
	Power supply via U_{B_DOUT}	external fuse 6A required

Interfaces

	Switching voltage U_{B_DOUT}	8 ... 32 VDC
	Switching current	0 ... 3 A
	Protective circuit for inductive loads	Integrated
	Switchable pull up resistance	100 kOhm
	Current readback	Integrated
	Protective device	Short circuit proof
	Master switch for both digital outputs	Integrated
RS232	300 Bd up to 115,2 kBd	
RS485	300 Bd up to 115,2 kBd, Modbus RTU	
Audio output	Speaker output, mono, <1 Watt, (optional line out stereo)	

Test standards / Certification

CE mark	According to EMC Directive 2014/30/EU According to RoHS Directive 2011/65/EU	
EMC	EN 61000-6-2:2019-11	EMC Immunity for industrial environments
	EN 61000-6-3:2011-09	EMC Emitted interference for residential areas
	EN 61000-4-2:2009-12	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 16750-2:2012-11	Load Dump Without Suppression Test A 24V R_i=1,0 Ohm, t_d = 100 ms, U_{a_max} = 170 V
Vibration	EN 60068-2-64:2020-09	random 8h per axis 10 ... 299 Hz: 1g 300 ... 499 Hz: 0.05g 500 ... 2000 Hz: 2g
Shock	EN 60068-2-27:2010-02	30g / 18ms: 5 shocks
Cold	EN 60068-2-1:2008-01	Test temperature -30°C / 2h
Dry heat	EN 60068-2-2:2008-05	Test temperature 70°C / 2h
Temperature change	EN 60068-2-14:2010-04	Test temperature -30°C ... +70°C: 20 cycles a 300min
Temperature shock	EN 60068-2-14:2010-04	Test temperature -30°C ... +70°C: 5 cycles a 120min
Damp heat	EN 60068-2-38:2010-06	Test Z/AD Test temperature 40°C/ 93%RH with -10° cold phase / 21 days
E1-Zeichen	UN/ECE-R10	

General accessories (not included in the scope of delivery of the device)

Item number	Designation
180456	Surface mounting set with RAM® holder
190140	Installation kit with clamping bracket
185320	GSe-VISU® software for application creation

Note:

The accessories listed here are not included in the scope of delivery of the device and must, depending on the type of installation, be ordered separately if required.

Due to different variants, the possible cable accessories can be found in the description of the pin assignment

Mechanical dimensions

For intuitive finding of a key for a specific function, these keys are numbered with symbols in Braille to the left and right of the key.
This makes it easier to operate the keys blindly, since they are not visible to the user on the back of the device

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All dimensions are in [mm].
Housing color (here: basalt grey RAL7012) and number of connectors differs from the illustration shown here depending on the variant.

Product variants

GSt- A 123 - 1 0 1

Series designation
A-Series

Display size
123 = 12.3 inch

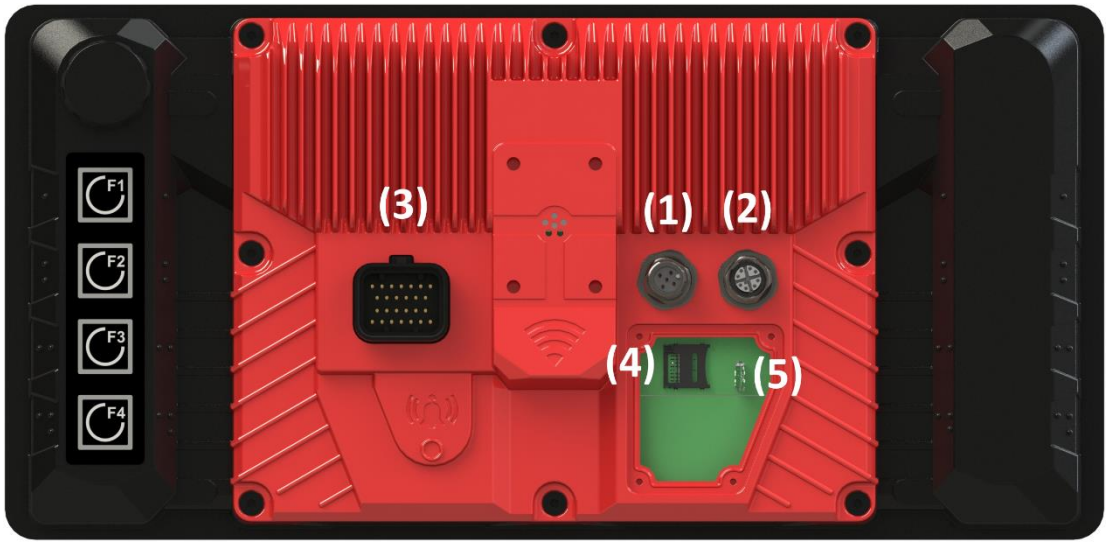
Device version
1 = Standard version with i.MX8X processor

Housing color
0 = Basalt gray RAL7012 with keyboard
1 = Ruby red RAL3003 with keyboard
2 = Basalt gray RAL7012 no keyboard
3 = Ruby red RAL3003 no keyboard

Interface configuration
0 = 2x M12: 1x CAN + Ethernet
1 = 2x M12: 1x CAN + Ethernet + 26p interface connector + USB-C + µSD card holder

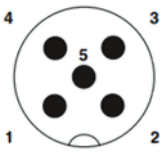
Standard-variants	Article-Number	CAN 0	CAN 1	CAN 2	Ethernet	USB 0	USB 1 (USB-C)	Video	I/O's	Memory card slot	Keys Encoder
GSt-A123-100	160519	✓			✓						✓
GSt-A123-101	160542	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSt-A123-120	160546	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Pin assignment



(1) Main connector
(2) Interfaces Connector I
(3) Interfaces Connector II
(4) Micro SD card holder
(5) USB-C connector

Pin assignment main connector (all variants)



M12 A-coded 5 pin, male

Pin	Signal	Description
1	Ignition	Ignition input (clamp 15)
2	U_B	Power supply (clamp 30)
3	GND	Ground (clamp 31)
4	CAN_H	CAN0 High
5	CAN_L	CAN0 Low

Pin assignment interfaces connector I (all variants)

M12 X-coded 8 pin, socket for

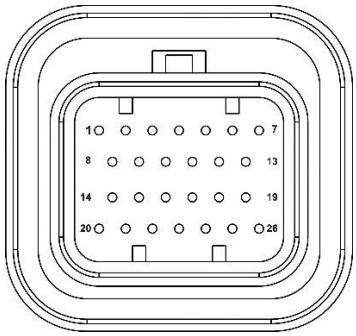
Pin	Signal	Description
1	ETH DA+	Gigabit Ethernet Pair A+
2	ETH DA-	Gigabit Ethernet Pair A-
3	ETH DB+	Gigabit Ethernet Pair B+
4	ETH DB-	Gigabit Ethernet Pair B -
5	ETH DC+	Gigabit Ethernet Pair C+
6	ETH DC-	Gigabit Ethernet Pair C-
7	ETH DD-	Gigabit Ethernet Pair D-
8	ETH DD+	Gigabit Ethernet Pair D+

Cable accessories for main connector (all variants)

Item number	Designation
190113	Cable CAN / Ub, 5p M12 -> open end 3m
190144	GSt-A070/A123 GBit Ethernetkabel, 8p M12x -> RJ45
190143	GSt-A070/A123 Anschlusskabel 26p -> offenes Ende 3m

Pin assignment interfaces connector II

(3) Interface connector II



TE Connectivity SUPERSEAL 1.0, 26 pin, Male

Pin	Signal	Option
1	CAN2-FD_H	CAN2-FD High (Optional RS485_A / RS232_RX)
2	CAN2-FD_L	CAN2-FD Low (Optional RS485_B / RS232_TX)
3	GND	Ground (clamp 31)
4	CAN1-FD_H	CAN1-FD High
5	CAN1-FD_L	CAN1-FD Low
6	GND	Ground (clamp 31)
7	Ignition (KL15)	Ignition input (clamp 15)
8	UB_DOUT (6A external fuse protection)	Power supply 9..32 VDC for digital outputs
9	$_{DOUT0}$ (3A)	Digital output 0
10	$_{DOUT1}$ (3A)	Digital output 1
11	Speaker -	Loudspeaker - (Optional LineOut l)
12	Speaker +	Speaker + (Optional LineOut r)
13	GND	Ground (clamp 31)
14	USB 5V	USB_VBUS (+5 VDC $_{Imax=500}$ mA)
15	GND	Ground (clamp 31)
16	MFIN0	Multifunction input 0
17	MFIN1	Multifunction input 1
18	VideoIN0	Analog video input 0
19	UB	Power supply 9...32 VDC (clamp 30)
20	USB D+	USB Data+
21	USB D-	USB Data
22	MFIN2	Multifunction input 2
23	MFIN3	Multifunction input 3
24	VideoIN1	Analog video input 0
25	VideoIN2	Analog video input 0
26	VideoIN3	Analog video input 0

Cable accessories for I/O connector

Item number	Designation
190143	GSt-A070/A123 Connection cable 26p -> open end 3m

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 you to 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.

Danger to life from electric shock

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!

Danger to life due to incorrect entries or incorrect operation

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.

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

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