vario*EC*$_{mini}$

Graphic operating terminal for extruder automation

Operating terminal with convenient user interface for connection to a KS vario control system

Comprehensive range of functions for operating extruders with up to 12 control zones

High-contrast STN LC colour display

Touchscreen

Ethernet interface

- Graphical touch-screen operation
- Simple access for max. 12 control loops
- Heating current monitoring
- Melt temperature monitoring
- Melt pressure monitoring with drive switch-off
- Drive control, monitoring, and alarm switch-off
- Synchronization with main extruder
- Alarm handling (limit values, sensors, heating currents, etc.)
- Online trend display of all process values
- Recipe management
- 3-level password protection
- Language selection
- Direct connection of a KSvario controllersystem via RS 485 or RS 232 interface
- Access to recipes via network (Ethernet TCP/IP - FTP)
- Extremely compact design

APPLICATIONS

- Small extruders
- Laboratory extruders
- Co-extruders
- Retrofitting

DESCRIPTION

Fully graphical operating terminal

Together with the **KS vario** control system, the operating terminal forms an overall automation system for extruders. Moreover, the **varioEC**$_{mini}$ operating terminal not only ensures convenient operation of the extruder – it also provides sequencing and operating functions in a single unit.

Hereby, the sequencing terminal handles the entire drive control system, alarm processing, sequence control, and monitoring functions.

The stand-alone **KS vario** is responsible for overall temperature control. Safety- relevant functions (drive switch-off) are redundant, i.e. they are provided in the **KS vario** and in the operating terminal.

This ensures that in case of a terminal malfunction, the protective mechanisms and devices remain operative, and temperature control is continued.

The connection of the terminal is via RS485 interface to the modbus coupler of the controller.

Alternatively communication can be switched over via the RS232 Enengineering-interface of the controller.

By means of an Ethernet interface, the operating terminal can be linked into existing networks. Recipe data can be transmitted from or to the terminal.

Touchpanel

The operating terminal **varioEC**$_{mini}$ has been designed as an extremely compact unit for panel mounting.

The computing core consists of a 'low power' RISC processor, which operates without cooling fan. Flash modules are used as program memory. This design makes the terminal's hardware extremely robust and gives it a long service life.

The full-colour graphic display has a resolution of 320 x 240 pixels (1/4 VGA). Moreover, the display is featured by especially good readability and brightness as well as a durable backlighting element.

The integrated resistive 'touch' feature permits direct controller operation via the display screen. No further operating controls are required.

User interface

The terminal **varioEC**$_{mini}$ comes with a user interface for operating up to 12 control zones in a KS vario control system.
The number of control loops and the active interfaces can be configured online.

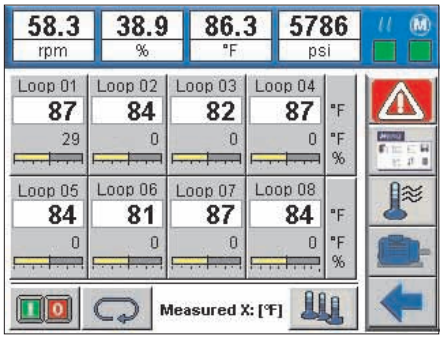
Handling of the **varioEC**$_{mini}$ is designed completely for 'touch screen' operation. All operating and functional data are selected on-screen with the help of context-related menus.

The following operating & functional display screens are available:

Operating Level

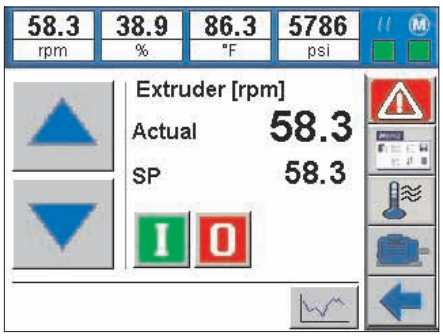
Overall survey
Display of up to 8 control loops on one page, display of one value per control loop, colour-change of the values as a function of the limit values.

Switchover of the displayed values between process value, setpoint, and heating current.



Controller settings
Individual adjustments for every control zone, plus additional functions (On/Off, W/W2, etc.).

Drives
Setpoint adjustment via touch-control buttons and direct entry.



Trend display
Online trend display: setpoint versus process value on one screen page.

Alarm page
Currently active alarms with time stamp and alarm messages in plain text.

Language selection
max. 3 languages (English / German / reserved)

Operator access
3 password levels:
0 = no changes possible
1 = entries in the Operating Level
2 = entries in the Configurating Level
3: full access, including operating panel settings

Function Level:

Control parameters
Tabular overview of control parameters and other function parameter for one controller.

Limit values
Tabular overview for one relative tolerance band, two absolute limit values, and the minimum heating current value.

Optimizing page
Page for starting / selecting the self-tuning function.

Online scaling
Scaling of all analog values for inputs and outputs.

Recipe
Reading and writing of predefined recipes, copying and saving on CF card or USB.

Device configuration (setup)
Selection of the interface.
Number of connected control loops.
Description of the control loops.

TECHNICAL DATA

PROCESSOR

CPU: Intel XscalePXA270 (416MHz)
Passive cooling
64 MByte RAM onboard
64 Mbyte on-board Flash memory

DISPLAY

5,7-inch FSTN LC colour display, QVGA, 320 x 240 pixel resolution, 256 colours,*approx.180 cd/sqm,* resistive touch

INTERFACES

Port for KS vario Modbus coupler
Type: RS 485, 9-pin Sub-D connector.
Max. cable length: 1000 m

Port for KS vario BlueControl interface
Type: V.24 / RS 232, 9-pin Sub-D connector.
Max. cable length: 3 m

Network
Ethernet interface (10/100 Base-T)

USB interface
1 x USB client (type B)
1 x USB host (type A)

Memory expansion
1 x Compact Flash card type I

POWER SUPPLY

Operating voltage: 24 V DC ≤ *20*W
Protection class III (protective low voltage)

ENVIRONMENTAL CONDITIONS

Permissible temperatures
For operation: 0...50°C
For storage / transport: -20...60 °C

Climatic category
Relative humidity: 10...95 % at 40 °C, no condensation.

INFLUENCING FACTORS

Supply voltage
No effect. No loss of configuration data in case of a power failure (Flash PROM storage).

Vibration test
Sinusoidal oscillations according to DIN EN60 068-2-6.
Test: 2g, 1 h along each axis

Shock test
According to DIN EN 60 068-2-27.
Test: 10g during 11 ms, half sine wave, three shocks along each axis and orientation.

ELECTROMAGNETIC COMPATIBILITY

Electromagnetic immunity
To EN 50 082-2
All interface cables must be screened.

Electromagnetic radiation
To EN 50 081-2
Radiation from housing: Class A in accordance with EN 55 011

GENERAL

Housing
Dimensions: 195 x 148 x 45 mm (WxHxD)
Panel cutout: 188 x 141 mm

Weight
approx. 0,8 kg

Protection mode
Front: IP 65
Rear panel: IP 20

Safety tests
Complies with EN 61 010-1 (VDE 0411-1):
Overvoltage category II
Contamination class 2
Working voltage range 50 V
Protection class III

CE marking
The unit meets the European requirements regarding „Electromagnetic Compatibility" and „Low-voltage equipment".

Standard accessories
Connecting terminal for supply voltage
USB cable
CD with drivers
Mounting elements
32 Mbyte CF card (on board)

Fig. 1: Overall dimensions of vario EC$_{mini}$

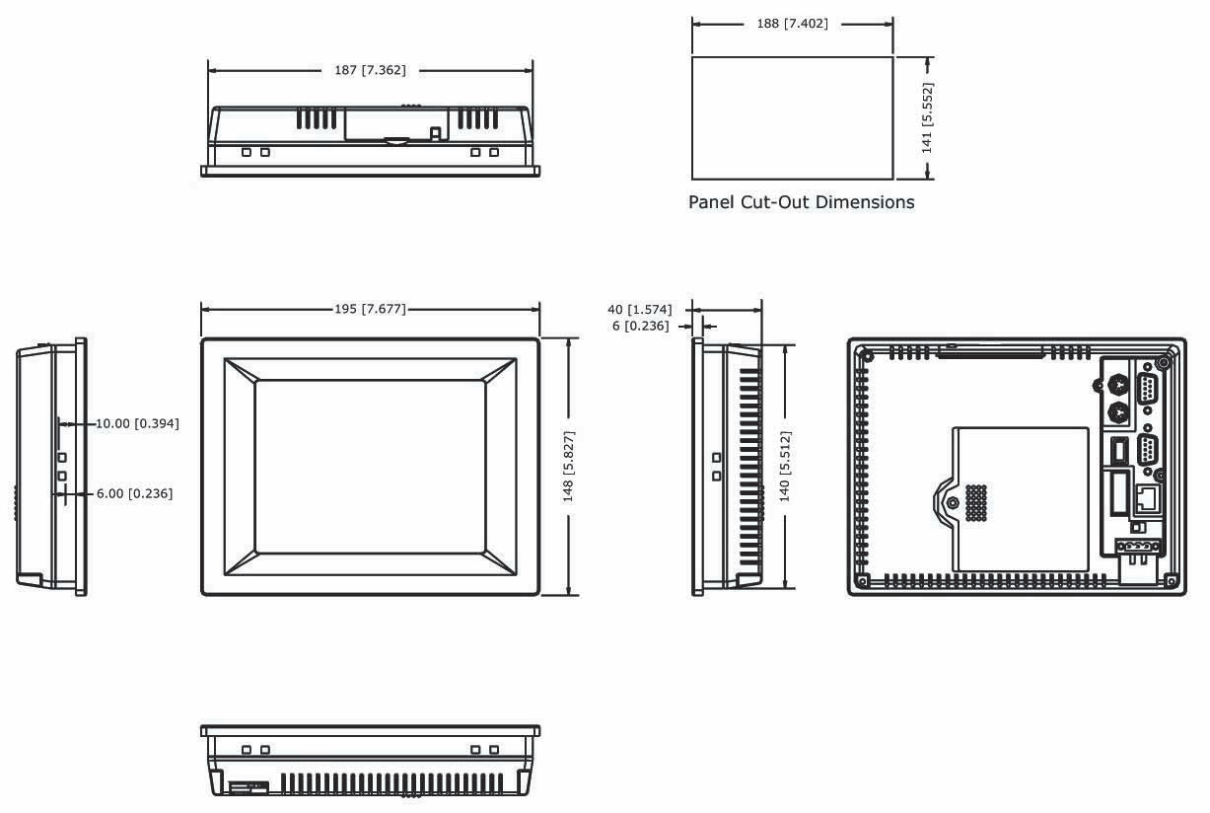
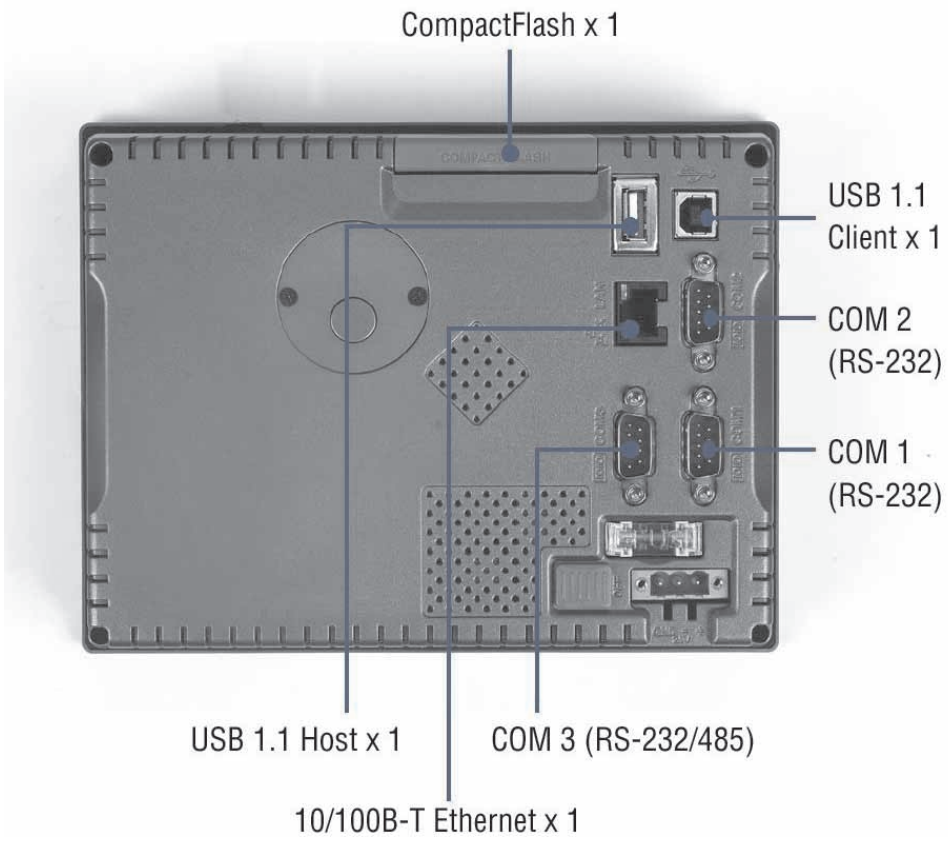


Fig. 2: Rear view of vario EC$_{mini}$



Ordering data

Description	Order-No.	Function
vario EC_{mini}	KSVC-111-20150	Fully graphical touch-screen operating terminal with software package for vario EC_{mini} with Modbus interface.
Modbuscable RS485	KSVC-119-00001	RS485 connection cable vario EC_{mini} to modbuscoupler KS VARIO BK MOD, length ca. 5 m
Modbuscable RS232	KSVC-119-00011	RS232 connection cable vario EC_{mini} to Engineering-Port KS vario controller module, length ca. 3 m

Modules for basic control system: 8 temperatures, 1 drive

Description	Order-No	Function
KS-VARIO BK MOD	KSVC-101-00151	MODBUS coupler for Ksvario, 24VDC
KS-VARIO T8/UTH	KSVC-104-00441	KS vario temperature controller, complete with accessories (connecting terminals and inscription label), 8 inputs for thermocouples, 2-wire connection + screen, 8 outputs 24 VDC, 70 mA, 1 input for sum of heating currents
VARIO DI 16/24	KSVC-102-00151	16 inputs 24 VDC, 4 wire connection
VARIO DO 16/24	KSVC-102-00251	16 outputs, 24 VDC, 500 mA, 3-wire connection
VARIO AI 2/SF	KSVC-103-00121	2 inputs, 0...20 mA, 0...10 V, 2-wire connection, module for drive speed and loading
VARIO AI 2/SF	KSVC-103-00121	2 inputs, 0...20 mA, 0...10 V, 2-wire connection, module for melt temperature and melt pressure (optional, not required with direct connection of melt pressure bridge, melt temperature via thermocouples)
VARIO AO 1/SF	KSVC-103-00211	1 output, 0 .. 20mA, 0 .. 10V, 2-wire connection
Clamps	KSVC-109-00011	2 pieces necessary

Module for control zone expansion (to max. 12 zones)

Description	Order-No	Function
VARIO UTH 4-8DO	KSVC-103-00431	4 inputs for thermocouples, 2-wire connection + screen, 8 outputs 24 VDC, 70mA, 1 input for sum of heating currents
VARIO UTH 8-8DO	KSVC-103-00441	8 inputs for thermocouples, 2-wire connection + screen, 8 outputs 24 VDC, 70mA, 1 input for sum of heating currents

Module for expansion with melt pressure bridge

Description	Order-No	Function
VARIO CO 2/U	KSVC-103-02221	2 outputs, 10 V constant, 2 x 40 mA (or 1 x 80 mA)
VARIO DO 1/230	KSVC-102-01211	1 relay with changeover contact, gold-plated, 5...253 VAC, max. 3A

For additional expansion modules for varioEC$_{mini}$: see KS vario and modular vario I/O system

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