Mini8™

MODEL

- **8 control loops**
- **32 analogue inputs**
- **Modular & compact**
- **SP programming**
- **Maths and logic**
- **Remote HMI**
- **Modbus RTU**
- **DeviceNet**

Multi-loop control and Data acquisition
Specification Sheet

The **Mini8** offers high performance control usually only found in Eurotherm's panel mount PID controllers. It is also a very competitive and compact data acquisition device. Mini8's modular design enables its I/O and feature set to be selected to cater for a wide range of applications from simple to complex.

Mini8 is an ideal partner to a programmable logic controller. Able to multi-drop on either Modbus RTU or DeviceNet the Mini8 offers a real cost effective alternative to performing analogue measurement or loop control in a PLC. Implementing these functions in the Mini8 reduces the hardware cost of the PLC, relieving it of the burden of performing analogue functions, often allowing a lower specification processor to be used.

The feature set of the Mini8 is comparable with Eurotherm's 3000 series panel controllers including its high performance PID control and SP programming functions together with a range of features such as Maths, Logic and Timing blocks.

When used in a data acquisition installation the Mini8's high density analogue I/O can be combined with Eurotherm's 5000 series data management products to provide unsurpassed local and network access to your process.

VT505 Operator Panel

- **5.7" Touchscreen LCD**
- **128 User pages**
- **34 Variables per page**
- **128 recipes**
- **Modbus RTU master**
- **Import of Bitmap images**

VT505 provides an ideal operator interface for monitoring and changing process parameters in any slave controller. Compatible with any Modbus RTU product such as the Mini8 it can also be used as a operation window into other communicating devices.

Although compact the VT505 is constructed in a rugged pressed aluminium case with a sealed matrix touch display. Its IP65 panel rating makes it ideal for harsh industrial environments.

Dynamic text, help messages and easy to use function keys provide the operator with rapid access to any data that he wishes to view or adjust. Functions can be programmed via the matrix touch screen for direct access to displays, alarms, recipe download or simply to toggle or alter a variable.

The VT505 can be ordered pre-configured to suit Mini8 applications, enabling plug and play operation, without the need for any user configuration. Alternatively, users can create their own customised view of their process using the VTWIN programming software.

Setpoint Programming

The Mini8 programmer function block enables loop setpoints to follow a pre-determined series of Ramp and Dwell segments. Mini8 can generate one profiled setpoint that can be internally soft wired to any parameter within the device. A maximum of 200 segments can be stored in up to 50 programs. Each program can trigger up to 8 digital event outputs on a per segment basis.

Heater Failure Detection

The Mini8 with a CT3 input card fitted, has the capability of detecting failures in heater loads connected to its time proportioned outputs. By measuring the current flowing through the heaters via 3 current transformer inputs the Mini8 can detect Partial Load failure, Over Current, as well as SSR short or open circuit. Individual load current parameters indicate the measurement for each heater. The current monitor block utilises a cyclic algorithm to measure the current flowing through one heater per measurement interval.


Toolkit Blocks

A range of toolkit functions, including Maths, Logic and Timing blocks can be used to create custom solutions and small machine controllers.

Configuration Tools

Configuration of the Mini8 is achieved by using a configuration wizard for simple 'Out of the box' applications or by using the iTools Graphical Wiring Editor for more demanding strategies.
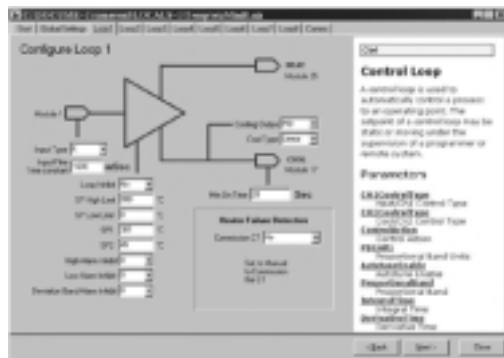
Technical specification

The I/O electrical specifications are quoted as factory calibrated worst-case; for life, over full ambient temperature range and supply voltage. Any "typical" figures quoted are the expected values at 25°C ambient and 24Vdc supply.

The nominal update of all inputs and function blocks is 110ms. However, in complex applications the Mini8 will automatically extend this time in multiples of 110ms.

Environmental Specification

Power Supply Voltage:	17.8Vdc min to 28.8Vdc max.
Supply Ripple:	2Vp-p max.
Power Consumption:	15W max.
Operating Temperature:	0 to 55°C
Storage Temperature:	-10°C to +70°C
Operating Humidity:	5% to 95% RH non-condensing
EMC:	EN61326 for Industrial Environments
Safety:	Meets EN61010, installation category II, pollution degree 2. Max. applied voltage any terminal: 42Vpk.

The Mini8 must be mounted in a protective enclosure. No terminal may be operated in excess of 42V AC/DC

Network Communications Support

Modbus RTU:	RS485, 2 x RJ45, user select switch for 3-wire or 5-wire. Baud rates: 4800, 9600, 19200
DeviceNet:	CAN, 5-pin standard "open connector" with screw terminals. Baud rates: 125k, 250k, 500k

Note: these are mutually exclusive options; refer to the Mini8 order code document.

Configuration Communications Support

Modbus RTU:	3-wire RS232, through RJ11 configuration port. Baud rates: 4800, 9600, 19200

Note: All versions of Mini8 support one configuration port.

The configuration port can be used simultaneously with the network link.

Fixed I/O Resources

The PSU card supports 2 independent and isolated relay contacts

Relay Output Types:	On/Off (C/O contacts, "On" closing the N/O pair)
Contact Current:	<1A (resistive loads)
Terminal Voltage:	<42V
Contact Material:	Gold
Snubbers:	Snubber networks are NOT fitted.
Contact Isolation:	42Vac/dc max.

The PSU card supports 2 independent and isolated logic inputs

Input Types:	Logic (24Vdc)
Input Logic 0 (off):	< 5Vdc.
Input Logic 1 (on):	> 10.8Vdc.
Input Operating Range:	-30Vdc to +30Vdc.
Input Current:	2.5mA (approx.) at 10.5V; 10mA max @ 30V supply.
Detectable Pulse Width:	110ms min.
Isolation to system:	42Vac/dc max.

TC8 8-Channel TC Input Card

The TC8 supports 8 independently programmable and electrically isolated channels, catering for all standard and custom thermocouple types.

Channel Types:	TC
mV Input Range:	-77mV to +77mV.
Resolution:	20 bit ($\Sigma\Delta$ converter), 1.6μV with 1.6s filter time
Temperature Coefficient:	< ±50ppm (0.005%) of reading/ °C
Cold Junction Range:	-10°C to +70°C
CJ Rejection:	> 30:1
CJ Accuracy:	± 1°C
Linearisation Types:	C, J, K, L, R, B, N, T, S, LINEAR mV, custom.
Accuracy:	± 1°C ± 0.1% of reading (internal CJC)
Channel PV Filter:	0.0 seconds (off) to 999.9 seconds, 1st order low-pass.
Sensor Break:	AC detector: Off, Low or High resistance trip levels.
Input Resistance :	>100 MΩ
Input Leakage Current:	<100nA (1nA typical).
Common mode rejection:	>120dB, 47 - 63Hz
Series mode rejection:	>60dB, 47 - 63Hz
Isolation channel-channel:	42Vac/dc max
Isolation to system:	42Vac/dc max

DO8 8-Channel Digital Output Card

The DO8 supports 8 independently programmable channels, the output switches requiring external power supply. Each channel is current and temperature protected, holdback limiting occurring at about 100mA. The supply line is protected to limit total card current to 200mA. The 8 channels are isolated from the system (but not from each other). To maintain isolation it is essential to use an independent and isolated PSU.

Channel Types:	On/Off, Time Proportioned
Channel Supply (Vcs):	15Vdc to 30Vdc
Logic 1 Voltage Output:	> (Vcs - 3V) (not in power limiting)
Logic 0 Voltage Output:	< 1.2Vdc no-load, 0.9V typical
Logic 1 Current Output:	100mA max. (not in power limiting)
Min. Pulse Time:	20ms
Channel Power Limiting:	Current limiting capable of driving short-circuit load
Terminal Supply Protection:	Card supply is protected by 200mA self-healing fuse
Isolation (channel-channel):	N/A (Channels share common connections)
Isolation to system:	42Vac/dc max.

CT3 3-Channel Current-Transformer Input Card

The CT3 supports 3 independent channels designed for heater current monitoring. A scan block allows periodic test of nominated outputs to detect load (failure) changes.

Channel Types:	A (current)
Factory set accuracy:	better than ±2% of range
Current Input Range :	0mA to 50mA rms
Transformer Ratio:	10/0.05 to 1000/0.05
Input Load Burden:	1W
Isolation:	None

AO8 8 Channel 4-20mA Output Card

The AO8 supports 8 independently programmable and electrically isolated mA output channels for 4-20mA current-loop applications.

Channel Types:	mA (current) Output
Output Range :	0-20mA, 360Ω
Setting Accuracy:	±0.1% of reading
Resolution:	1 part in 10000 (1uA typical)
Isolation channel-channel:	42Vac/dc max
Isolation to system:	42Vac/dc max

PID Control Loop Blocks

Number of Loops:	0 or 8 Loops (order options)
Control modes:	On/Off, single PID, Dual channel OP
Control Outputs	Analogue 4-20mA, Time proportioned logic,
Cooling algorithms:	Linear, water, fan, or oil
Tuning:	3 sets PID, One-shot auto-tune.
Auto manual control:	Bumpless transfer or forced manual output available
Setpoint rate limit:	Ramp in units per sec, per min or per hour.
Output rate limit:	Ramp in % change per second
Other features:	Feedforward, Input track, Sensor break OP, Loop break alarm, remote SP, 2 internal loop setpoints

Process Alarms

Number of alarms:	32 analogue, 32 digital, 32 Sensor break,
Alarm types:	Absolute high, absolute low, deviation high, deviation low, deviation band, sensor break
Alarm modes:	Latching or non-latching, blocking, time delay.

Setpoint Programmer

The Setpoint Programmer is a software orderable option

Number of programs:	50
Number of segments:	200
Number of event outputs:	8
Digital inputs:	Run, Hold, Reset, Program Advance, Skip Segment, Sync
Power failure action:	Ramp, Reset, Continue
Servo start:	PV, SP

Recipes

Recipes are a software orderable option

Number of recipes:	8
Tags:	24 tags in total

Load Failure Detection

Requires CT3 module

Number of loads:	16 Time Proportioned Outputs Maximum 6 loads per CT input
Alarms:	1 in 8 Partial load failure, Over current, SSR short circuit, SSR open circuit
Commissioning:	Automatic or manual
Interval time:	1 sec - 60 sec

Toolkit Blocks

User Wires	Orderable options of 30, 60 120 or 250	Input monitor:	2 blocks Max, min, time above threshold
User values:	32 real values	16 Point Linearisation:	2 blocks I6-point linearisation fit
2 Input Maths:	24 blocks Add, subtract, multiply, divide, absolute difference, maximum, minimum, hot swap, sample and hold, power, square root, Log, Ln, exponential, switch	Polynomial Fit:	2 blocks Characterisation by Poly Fit table
2 Input Logic:	24 blocks AND, OR, XOR, latch, equal, not equal, greater than, less than, greater than or equal to, less than or equal to	Switchover:	1 block Smooth transition between two values
		Timer blocks:	4 blocks OnPulse, OnDelay, OneShot, MinOn Time
8 Input Logic:	2 blocks AND, OR, XOR	Counter blocks:	2 blocks Up or down, Directional flag
8 Input Multiplexor:	4 blocks 8 sets of 8 values selected by input parameter	Totaliser blocks:	2 blocks Alarm at Threshold value
BCD Input:	2 blocks 2 decades	Real time clock:	1 block Day & time, 2 time based alarms

LEDS

Legend	P	A	B
Function	Indicates power	Relay A state	Relay B state
OFF	No power	De-energised	De-energised
ON	Powered	Energised	Energised

Power Supply

Power supply voltage	17.8 - 28.8Vdc
Power consumption	15W maximum

24V	Ø	24 V dc
24V	Ø	24 V dc
0V	Ø	0 V dc
GND	Ø	Ground

} linked

I/O Connections

D1	Ø	Digital Input 1
D2	Ø	Digital Input 2
C	Ø	Digital Input common
A1	Ø	Relay A n/open
A2	Ø	Relay A n/closed
A3	Ø	Relay A common
B1	Ø	Relay B n/open
B2	Ø	Relay B n/closed
B3	Ø	Relay B common

Digital Inputs: ON requires > 10.8V with 2mA drive, 30V max.
Relays contacts: 1 amp max. 42Vdc max.
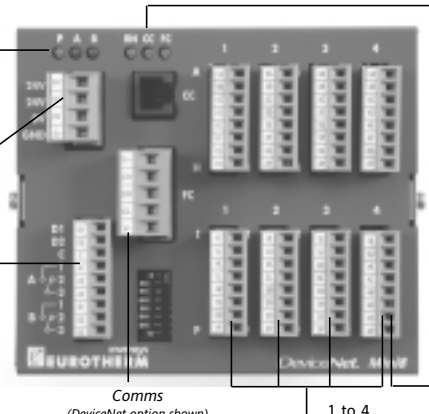
	RN	CC	FC (DeviceNet)	FC (other)
OFF	Not Running	-	OFFLINE	-
BLINK	Standby/ Config	Config Comms Traffic	READY	Field Comms Traffic
ON	Running	-	CONNECTED	-

⚠ **CAUTION**

The Mini8 is intended for operation at safe low voltage levels. No Voltage above 42 volts should be applied to the system on any terminal.
A protective earth connection is not required but good a earth connection is required to provide a ground for EMC purposes.

Comms
(DeviceNet option shown)

1 to 4

TC8
Thermocouple input

A	Ø	TC 1+
B	Ø	TC 1-
C	Ø	TC 2+
D	Ø	TC 2-
E	Ø	TC 3+
F	Ø	TC 3-
G	Ø	TC 4+
H	Ø	TC 4-

I	Ø	TC 5+
J	Ø	TC 5-
K	Ø	TC 6+
L	Ø	TC 6-
M	Ø	TC 7+
N	Ø	TC 7-
O	Ø	TC 8+
P	Ø	TC 8-

Isolation:
Channel to channel 42 volts
Channel to system 42V

CT3
Current transformer input

A	Ø	Reserved
B	Ø	Reserved
C	Ø	Reserved
D	Ø	Reserved
E	Ø	Reserved
F	Ø	Reserved
G	Ø	Reserved
H	Ø	Reserved

I	Ø	In 1 A
J	Ø	In 1 B
K	Ø	no connection
L	Ø	In 2 A
M	Ø	In 2 B
N	Ø	no connection
O	Ø	In 3A
P	Ø	In 3B

There is no channel isolation. Isolation is provided by the current transformers

DO8 Logic Output

A	Ø	Supply In +
B	Ø	Supply In +
C	Ø	OP 1 +
D	Ø	OP 2 +
E	Ø	OP 3 +
F	Ø	OP 4 +
G	Ø	Supply & OP -
H	Ø	Supply & OP -

I	Ø	Supply In +
J	Ø	Supply In +
K	Ø	OP 5 +
L	Ø	OP 6 +
M	Ø	OP 7 +
N	Ø	OP 8 +
O	Ø	Supply & OP -
P	Ø	Supply & OP -

All 4 supply In + linked internally
All 4 supply & OP - linked internally

Supply 24Vac
Isolation:
Channel to channel none
Channel to system 42V (only with independent isolated supply)

AO8 Analogue Output
(slot 4 only)

Output current 0 to 20mA, 360 ohm max. load

A	Ø	OP 1+
B	Ø	OP 1-
C	Ø	OP 2+
D	Ø	OP 2-
E	Ø	OP 3+
F	Ø	OP 3-
G	Ø	OP 4+
H	Ø	OP 4-

I	Ø	OP 5+
J	Ø	OP 5-
K	Ø	OP 6+
L	Ø	OP 6-
M	Ø	OP 7+
N	Ø	OP 7-
O	Ø	OP 8+
P	Ø	OP 8-

Isolation:
Channel to channel 42V
Channel to system 42V

Mini8 Ordering code

1 Mini8	2	3	4	5	6	7	8

9	10	11	12	13	14	15	16	17

1 Model

MINI8	Mini8 controller

2 Control Loops

ACQ	IO Acqusition only
8LP	8 Control loops

3 Programs

0PRG	No programs
1PRG	50 programs

4 PSU

VL	24Vdc

5 Communications

MODBUS	Modbus RTU
ISOLMBUS	Isolated Modbus RTU
DEVICENET	DeviceNet

6 Temperature Units

C	Centigrade
F	Fahrenheit

7 8 9 10 IO Slots 1-4

XXX	No module fitted
TC8	8 Channel TC input
AO8 (1)	8 Channel 4-20mA OP
DO8	8 Channel logic OP
CT3 (2)	3 Channel CT input

(1) AO8 in slot 4 only
(2) Only 1 CT3 per Mini8

11 Application

STD	No configuration
EC8	8 Loop plastics controller *

* Code EC8 requires 250 wires and
  Slot 1 = TC8,
  Slot 2 = CT3 or XXX,
  Slot 3 = DO8,
  Slot 4 = DO8

12 Wires

30	30 User Wires
60	60 User Wires
120	120 User Wires
250	250 User Wires

13 Recipes

None	No recipes
RCP	8 Recipes

14 Installation Manual

ENG	English
GER	German
FRA	French
SPA	Spanish
ITA	Italian

15 Configuration Software

NONE	No CD
ITOOLS	ITools CD & Mini8 documentation

16 Warranty

WL003	3 Year
WL005	5 Year

17 Calibration Certificates

XXXXX	None
CERT1	Certificate of Conformity
CERT2	Factory input calibration per input
CERT3	Customer input calibration

Accessories

Bulkhead mounting plate	SubMin8/Mechanics/Mtgplate
2.49Ω 0.1% Burden Resistor	SubMin8/Shunt/249R.1
Modbus Load Terminator	SubMin8/Resistor/Mbus/RJ45
Network 3.0m RS485 cable	SubMin8/Cable/RJ45/3.0
Network 0.5m RS485 cable	SubMin8/Cable/RJ45/0.5
Mini8 Config tools & Manuals	SubMin8/CD/std
Mini8 Config cable	SubMin8/Cable/Config
VT505 Config cable	SubV505/Cable/Config
VT505 RS232 cable	SubV505/Cable/232/3.0
VT505 RS485 cable	SubV505/Cable/485/3.0
Mini8 Installation Booklet	SubMin8/Manual/Inst
Mini8 Engineering manual	SubMin8/Manual/Eng
VT505 Operating booklet	SubMin8/Manual/Panel/EC8
Screwdriver	SubMin8/Screwdriver
1.3A, 30W Power supply	2500P/1A3/ENG
2.5A, 60W Power supply	2500P/2A5/ENG
5A, 120W Power supply	2500P/5A0/ENG
10A, 240W Power supply	1500P/10A/ENG

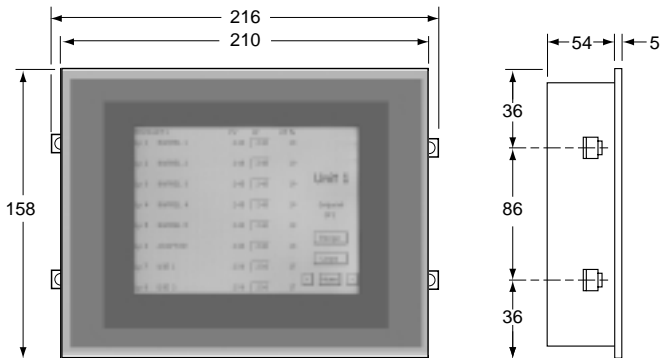## Current Transformers

10A Current Transformer	CTR100000000
25A Current Transformer	CTR200000000
50A Current Transformer	CTR400000000
100A Current Transformer	CTR500000000

Dimensions in mm

VT505 operator Panel

Dimensional details (mm)

VT505 Operator Panel

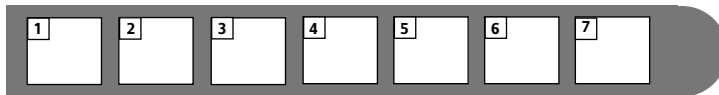|	
Display Type:	Graphic LCD. 4 tones of blue STN
Touch Screen	Matrix 20 x 16
Back Lighting	CCFL
Back Lighting lamp life	45000 hours (at 25°C)
Resolution	320 x 240 pixels
Display area (mm)	115.17 x 86.37
Columns by rows/Character dimensions	Depending on used font
Contrast adjustment	Software set
Character set	Programmable fonts/TTF Windows

User Memory

Project (byte)	640k
Recipes/Alarm buffer (bytes)	16k/-flash

Interfaces

MSP serial port	RS232/422/485/TTY 20mA

Dimensions

External (mm)	210W x 158H x 60D
Cut out (mm)	198W x 148H

Technical data

Power supply	18....32Vdc/10W
Protection level	IP65 front
Operating temperature (°C)	0...+50
Storage/transport temp. (°C)	-20... +60
Humidity (non-condensing)	<85%
Power Consumed (24Vdc)	10W
Weight (kg)	1,4

Main Features

Languages on line	4
Passwords	10/8
Pages/fields per page	128/34
Variable Formats available	DEC, HEX, BIN, BCD, ASCII, floating point
Dynamic texts/lists of images	Value depends on dimensions of project memory
ISA alarms/info-messages	-/256
Help messages (pages/info messages /alarms)	128/256/-
Recipes (no./variables per recipe)	128/256
Macros (no./commands per macro)	1024/16
Auto operations/timers/ equations	32/32/32
Max bargraphs per page (taken together with fields)	34
Project images	BMP, JPEG, TIFF, PSD, WMF, PNG, EPS, etc
Buttons per page	Number of buttons corresponding to the number of Touchscreen cells

Ordering code

1	Type
VT505	Monochrome touch screen, 320 x 240 pixels

2	Product
Std **Mini8**	Standard Configuration for Mini8

3	Applications
NONE	Blank configuration
EC8	8 loop plastics controller
EC16	16 loop plastics controller
EC24	24 loop plastics controller
EC32	32 loop plastics controller

4	Network Cables
NONE	No cable supplied
F485	Modbus RS485
F232	Modbus RS232

5	Installation Manual
ENG	English
GER	German
FRA	French

6	Configuration Software
NONE	No configuration software
VTWIN	VTWIN configuration software [1]

(1) Config cable supplied with VTWIN software

7	Config. Software Language
NONE	No configuration software
ENG	English
GER	German
FRA	French
SPA	Spanish
ITA	Italian

CE