LED Indicators

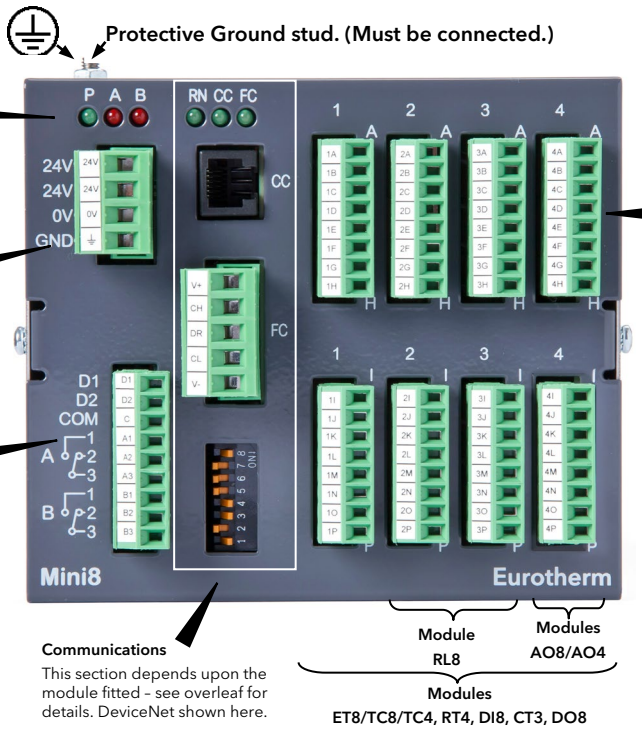
Legend	Colour	Function	Action
P	Green	Power Status	On – Power on Off – Power off
A	Red	Relay A state	On – Energized Off - De-energized
B	Red	Relay B state	On – Energized Off - De-energized

Power Supply (also see +++NOTE++)

Legend	Supply		
24V	24V dc	Linked	These terminals can accept wire sizes 0.2 – 2.5mm² (24– 12 AWG). Tightening torque 0.5 to 0.6Nm (≈ 5lb.in.)
24V	24V dc		
0V	0V		
GND	Ground		

Standard I/O Connections

Legend	Function	Specifications
D1	Digital input 1	Digital Inputs: -28.8V to +5V = Off +5V to 10.8V = undefined +10.8V to +28.8V = On Typical drive current: 2.5mA @ 10.8V Relay contacts: 1 Amp max, 42V dc max. These terminals can accept wire sizes 0.14 – 1.5mm² (28– 16 AWG). Tightening torque 0.22 to 0.25Nm (1.95 – 2.21lb.in.)
D2	Digital input 2	
C	Digital input common	
A1	Relay A normally open	
A2	Relay A normally closed	
A3	Relay A common	
B1	Relay B normally open	
B2	Relay B normally closed	
B3	Relay B common	



Cable sizing for thermocouple inputs for ET8/TC8/TC4 modules

Module	Min size (solid)	Max size (solid)	Min size (flexible)	Max size (flexible)
ET8/TC8/TC4	0.14mm² (28AWG)	1.5mm² (16AWG)	0.14mm² (28AWG)	1.5mm² (16AWG)

+++NOTE+++

Power Supply Specification

Voltage: 17.8V dc min to 28.8V dc max
Power consumption : 15W max

ET8/TC8/TC4 Thermocouple Input

Note: TC4 supports channels A to H. ET8/TC8 support channels A to P.

Isolation

- Channel to channel: 42V pk
- Channel to system: 42V pk

Legend	Function
A	TC1+
B	TC1-
C	TC2+
D	TC2-
E	TC3+
F	TC3-
G	TC4+
H	TC4-
I	TC5+
J	TC5-
K	TC6+
L	TC6-
M	TC7+
N	TC7-
O	TC8+
P	TC8-

RT4 2, 3, 4 Wire RTD Input

Isolation

- Channel to channel: 42V pk
- Channel to system: 42V pk

Legend	Function
A	CH1 I+
B	CH1 S+
C	CH1 S-
D	CH1 I-
E	CH2 I+
F	CH2 S+
G	CH2 S-
H	CH2 I-
I	CH3 I+
J	CH3 S+
K	CH3 S-
L	CH3 I-
M	CH 4 I+
N	CH4 S+
O	CH4 S-
P	CH4 I-

2 3 4 wire

DI8 Logic Input

Note: Input specification as for 'Standard I/O' above

Isolation

- Channel to channel: 42V pk
- Channel to system: 42V pk

Legend	Function
A	D1+
B	D1-
C	D2+
D	D2-
E	D3+
F	D3-
G	D4+
H	D4-
I	D5+
J	D5-
K	D6+
L	D6-
M	D7+
N	D7-
O	D8+
P	D8-

CT3 Current transformer Input

Note: Isolation provided by current transformers

Isolation

- Channel to channel: N/A
- Channel to system: N/A

Legend	Function
A	N/A
B	N/A
C	N/A
D	N/A
E	N/A
F	N/A
G	N/A
H	N/A
I	In1 A
J	In1 B
K	No connection
L	In2 A
M	In2 B
N	No connection
O	In3 A
P	In3 B

DO8 Logic Output

Note: Requires 24Vdc supply

Isolation

- Channel to channel: N/A
- Channel to system: 42V pk with independent supply

Legend	Function
A	Supply In +
B	Supply In +
C	OP1 +
D	OP2 +
E	OP3 +
F	OP4 +
G	Supply & OP-
H	Supply & OP-
I	Supply In +
J	Supply In +
K	OP5 +
L	OP6 +
M	OP7 +
N	OP8 +
O	Supply & OP-
P	Supply & OP-

Links are internally connected

RL8 Relay Output (slots 2 and/or 3 only)

Note: Protective earth conductor MUST be used if RL8 module is fitted

Contact voltage/current – 264Vac/2A RMS max.

Isolation

- Channel to channel: 264Vac basic
- Channel to system: Reinforced

Legend	Function
A	RLY1 A
B	RLY1 B
C	RLY2 A
D	RLY2 B
E	RLY3 A
F	RLY3 B
G	RLY4 A
H	RLY4 B
I	RLY5 A
J	RLY5 B
K	RLY6 A
L	RLY6 B
M	RLY7 A
N	RLY7 B
O	RLY8 A
P	RLY8 B

AO8/AO4 Analog Output (slot 4 only)

Note: AO4 supports channels 1 to 4 only

Output current – 0 to 20mA, 360Ω max load

Isolation

- Channel to channel: 42V pk
- Channel to system: 42V pk

Legend	Function
A	OP1 +
B	OP1 -
C	OP2 +
D	OP2 -
E	OP3 +
F	OP3 -
G	OP4 +
H	OP4 -
I	OP5 +
J	OP5 -
K	OP6 +
L	OP6 -
M	OP7 +
N	OP7 -
O	OP8 +
P	OP8 -

⚠⚠ DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

Only qualified personnel must install, operate and maintain this equipment.

Turn off all power to product and all I/O circuitry (alarms, control I/O etc.) before starting the installation, removal, wiring, maintenance or inspection of the product.

Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment, i.e. UK, the latest IEE wiring regulations, (BS7671), and USA, NEC class 1 wiring methods.

Do not apply voltages in excess of 42V dc/30V ac to any terminals other than the RL8 terminals.

The unit must be installed in an enclosure or cabinet.

Do not exceed the device's ratings.

All connections must be tightened in conformance with the specified torque specifications.

Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462 BS 7671, NFC 18-510.

Ensure the mandatory protective ground connection is connected during installation. Connection of this protective ground connection must be made before turning on any power supplying this product.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

HAZARD OF FIRE

Do not install if the unit or any part of the unit is damaged. Contact your supplier.

Do not insert anything through the case apertures.

Ensure the correct wire gauge size is used per circuit and it is rated for the current capacity of the circuit.

Ensure when using ferrules (cable ends) that the correct size is selected and each is securely fixed to the wire using a crimping tool.

Ensure only the originally supplied connectors are used.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Do not use the product for critical control or protection applications where human or equipment safety relies on the operation of the control circuit or the triggering of an alarm.

Ensure electrically conductive pollution is be excluded from the cabinet in which the controller is mounted.

Ensure appropriate safety interlocks are used where personnel and/or equipment hazards exist.

Ensure wires are routed to minimize the pick-up of EMI (Electromagnetic interference) keeping cable lengths to a minimum.

Modifying, disassembling or repairing the product beyond what is stated in the User Manual is strictly forbidden. Contact your supplier for repair.

Ensure all cables and wiring harness are secured using a relevant strain relief mechanism.

Only connect wires to identified terminals shown on the product wiring label, the wiring section of the product User guide or Installation sheet.

Only use copper cables (except for the thermocouple wiring).

Ensure only persons with expertise in the design and programming of control systems are allowed to program, install, alter and commission this product.

Do not use, or implement a controller configuration (control strategy) into service without ensuring the configuration has completed all operational tests, been commissioned and approved for service.

Electrostatic discharge precautions.

Ensure all electrostatic discharge precautions are taken before handling the unit.

Failure to follow these instructions can result in death, serious injury or equipment damage.

RoHS Statement

China RoHS Compliance - MINI8

部件名称 Part Name	有害物质 - Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 Metal parts	O	O	O	O	O	O
塑料部件 Plastic parts	O	O	O	O	O	O
电子件 Electronic	X	O	O	O	O	O
触点 Contacts	O	O	O	O	O	O
线缆和线缆附件 Cables & cabling accessories	O	O	O	O	O	O

40

本表格依据SJ/T11364的规定编制。
O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

This table is made according to SJ/T 11364.
O: indicates that the concentration of hazardous substance in all of the homogeneous materials for this part is below the limit as stipulated in GB/T 26572.
X: indicates that concentration of hazardous substance in at least one of the homogeneous materials used for this part is above the limit as stipulated in GB/T 26572.

Manufacturing Address

Eurotherm Limited (Head Office)
Faraday Close
Durrington
Worthing, West Sussex
BN13 3PL U.K
Tel. (+44) 1903 268500
https://www.eurotherm.com

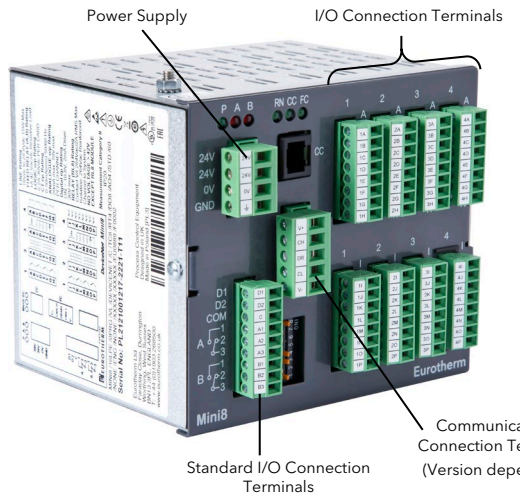
Eurotherm Automation SAS
6 Chemin des Joncs - CS 20214
Dardilly cedex
Lyon, 69574
France

Contact Information
Scan for local contacts

https://www.eurotherm.com/contact-us/

MINI8™ CONTROLLER (FIRMWARE V5+)

INSTALLATION AND WIRING INSTRUCTIONS



WHAT IS THE MINI8 CONTROLLER?

The Mini8 Controller is a compact multi-loop PID controller and data acquisition unit, offering a choice of I/O and field communications and designed for mounting on a 35mm 'Top Hat' DIN Rail.

Pre-assembled in the factory, the controller is fitted with all the I/O required for the application, as specified at time of order. The Mini8 Controller can be supplied as a configured instrument, or it can be configured using iTools configuration software running on a personal computer.

⚠ WARNING: This product can expose you to chemicals including lead and lead compounds which are known to the State of California to cause cancer and birth defects or other reproductive harm.
For more information go to: https://www.P65Warnings.ca.gov

HA033649/4 CN 41608 05/2024

HA033649ENG

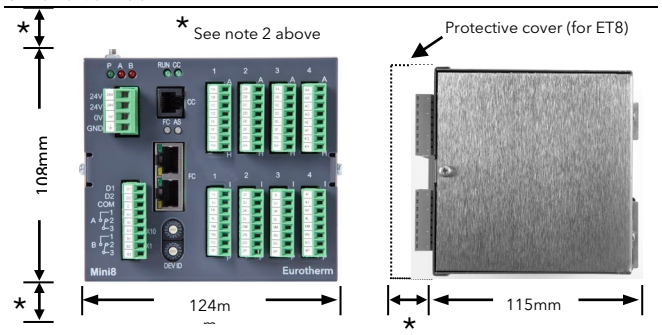
INSTALLING THE MINI8 CONTROLLER

MOUNTING THE UNIT (ETHERNET (MODBUS/TCP) UNIT SHOWN)

This unit is intended to be mounted horizontally on a symmetrical DIN rail, 35 x 7.5 or 35 x 15, to the requirements of EN50022.

Notes:

1. The controller is for interior use only and must be mounted in a suitable enclosure.
2. A gap of at least 25mm should be allowed above and below the unit, for ventilation. For cable clearance, a gap of 25mm (31mm if protective cover fitted) should be allowed at the front of the unit.



DIN RAIL MOUNTING

1. Mount the DIN rail horizontally, using suitable bolts.

Note: The unit is NOT intended to be mounted in any other orientation.

2. Ensure that the DIN rail makes good electrical contact with the metal base of the panel.
3. Hook the upper edge of the DIN rail clip on the instrument onto the top of the DIN rail
4. Slowly and firmly, rock the unit downwards until the DIN rail Locking Mechanism springs into place. This is confirmed by an audible 'Click'.
   The unit is now mounted to the DIN rail.

Note: To remove the unit, carefully use a screwdriver to lever down the DIN rail locking mechanism and lift the unit forward when released from the DIN rail.

Environmental Requirements	Minimum	Maximum
Temperature	0°C	55°C
Humidity (Relative – RH)	5% RH	95% RH
Altitude		2000m

PROTECTIVE COVER

When ET8 modules are fitted, also fit the clear protective cover to enhance thermal stability. The figure below shows the cover in place. The cover can be mounted either way up.

COMMUNICATIONS INTERFACE

Various operational functions are indicated through the LEDs across the top of the unit.

All controllers have a configuration port 'CC' and a field communication port 'FC' on the communications module.

Note: If the Run mode green LED (RN) is permanently ON, the unit is operating normally.

CONFIGURATION PORT

The EIA232 configuration port (RJ-11 socket) is located to the right of the Power connector. The Mini8 Controller is configured using iTools configuration software running on a PC.

Note: The unit will NOT control whilst in configuration mode.

9 Pin DF to PC Com port	RJ11 Pin	Function	
-	6	(N/C)	Appropriate cable is available from the supplier, order code SubMin8/cable/config.
3 (TX)	5	RX	
2 (RX)	4	TX	
5 (0V)	3	0V (Gnd)	
	2	(N/C)	
	1	Reserved	

Note: The unit can also be configured to communicate via other protocols, as listed below, using the field network, dependent on the hardware fitted.

Product Tools Updates

https://www.eurotherm.com/en/products/temperature-controllers-en/software/eurotherm-itools/

COMMUNICATIONS – ETHERNET (MODBUS/TCP)

Protocol is Modbus/TCP, 10BASE-T/100BASE-TX on an Ethernet network.

RUN LED	Run Status
Steady green	Run mode
Off	Not running
Flashing green	Standby

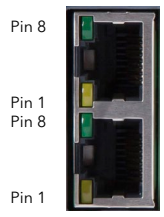
CC LED	Configuration Port Status
Flashing green	EIA232 configuration port activity
Off	Configuration port inactive
On	Not applicable

FC LED	Run Status
Flashing green	Modbus/TCP traffic received
Off	No Modbus/TCP traffic
On	Not applicable

AS LED	Run Status
On	DHCP enabled and IP address obtained
Flashing green	DHCP enabled but using link-local address
Off	Using static IP address

RJ45 PIN FUNCTIONS

The connector includes two LEDs:
Green = Link/Activity: Off=No Link, On=Link, Blink= activity
Yellow = Speed: Off=No Link or 10Mbps, On=100Mbps



RJ45	Colour	Signal
8	Brown	N/A
7	Brown/White	N/A
6	Green	Rx-
5	Blue/White	N/A
4	Blue	N/A
3	Green/White	Rx+
2	Orange	Tx-
1	Orange/White	Tx+
	Plug shroud to cable screen	

THE ADDRESS SWITCH

This switch is situated at the bottom of the Comms slot.

The switches are set as follows:
00 = DHCP (Dynamic Address) enabled
01 to FE = Static IP (use most recently obtained/configured address)
FF = Reserved

ALLOCATION OF ADDRESSES

DHCP is where the instrument (IP host) will ask a DHCP server to provide it with an IP Address. Typically, this happens at start-up, but can be repeated during operation. DHCP includes the concept of assigned values that will 'expire'.

A DHCP server is required that can respond to the request. The DHCP server will need to be configured to correctly respond to the request. This configuration depends on the local company network policy.

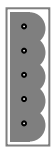
If a DHCP server is not available on the network, the instrument will assign itself a link-local IP address in the region 169.254.0.0 to 169.254.255.255.

NOTE: This will overwrite the default IP address, so connection to iTools via configuration port is required to obtain or change the IP address in this case.

COMMUNICATIONS - DEVICENET®

This instrument supports DeviceNet, and Enhanced DeviceNet Protocols.

DeviceNet uses a 5-way screw terminal connector with 5.08mm pitch. The mating connector is supplied to aid user wiring.



Pin	Legend	Function
5	V+	V+
4	CH	CAN HIGH
3	DR	DRAIN
2	CL	CAN LOW
1	V-	V-

Enhanced DeviceNet uses an M12, five-pin 'Micro-Connect' connector.

Screened DeviceNet specified cable should be used for field wiring.

Pin	Legend	Function
5	CAN_L	CAN LOW
4	CAN_H	CAN HIGH
3	V-	V-
2	V+	V+
1	DR	DRAIN

Terminators

DeviceNet®/Enhanced DeviceNet®

The DeviceNet® specification states that the bus terminators (121Ω) must not be included as any part of a master or slave.

Note: Terminators are not supplied but must be used where required.

POWER

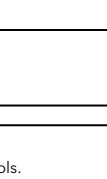
The bus is powered by the network at approximately 100mA.

ADDRESS CONFIGURATION

Each unit must have a unique network address, configured as shown below. The comms. module automatically restarts after the address has been edited.

Note: iTools can be used to configure the address when the switches are set to 'off'.

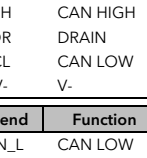
SW	OFF	DeviceNet	Baud Rate		
			125K	250K	500K
8	Baud rate	Baud rate	OFF	OFF	ON
7	Baud rate	Baud rate	OFF	ON	OFF
6	-	Address 32			
5	-	Address 16			
4	-	Address 8			
3	-	Address 4			
2	-	Address 2			
1	-	Address 1			



OFF ? ON

The Enhanced DeviceNet® version uses two BCD rotary switches.

SW		Enhanced DeviceNet
0 to 9	MSD	First digit of address
0 to 9	LSD	Second digit of address
For example, an address of 13 would be configured by setting the MSD to 1 and LSD to 3.		



Note: Any address between 64 and 99 is ignored. The address must be configured using iTools.

BAUD RATE

All units must be set to the same Baud rate and must be restarted after the Baud rate is edited. For DeviceNet this is configured using the rotary switch as shown below.

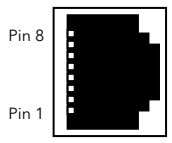
Note: Select the 'Prog' position to enable firmware upgrades. The instrument may need a re-start.

COMMUNICATIONS - MODBUS

Protocol is Modbus RTU, EIA422, EIA485 3-wire or 5-wire.

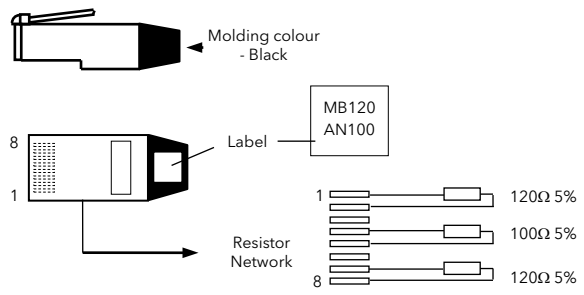
The Modbus network connection is two RJ45 sockets connected in parallel. This allows connections to be daisy-chained from one unit to the next using category 5 patch cables. The line terminator is required on the last unit in the chain.

RJ45 Pin	Colour	3-wire	5-wire
8	Brown	N/A	RxA
7	Brown/White	N/A	RxB
6	Green	N/A	Gnd
5	Blue/White	N/A	N/A
4	Blue	N/A	N/A
3	Green/White	Gnd	Gnd
2	Orange	A	TxA
1	Orange/White	B	TxB
Plug shroud to cable screen			



RJ45 COMMUNICATIONS TERMINATIONS

The communication line must be daisy-chained from unit to unit with the unit at each end of the chain correctly terminated. A black Modbus terminator containing the correct termination resistors is available from your supplier, order code SubMin8/TERM/MODBUS/RJ45.



Note:
The Baud rate defaults to 19200 but can be set during configuration using the iTools configuration software.

THE ADDRESS SWITCH

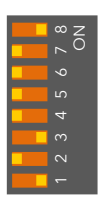
This switch is situated below the Comms connector.

Each unit must have a unique address on the Modbus network.

Note:
If address 0 is set the unit will take the address and Parity settings from the configuration of the instrument.

SW	OFF	ON
8	3-wire	5-wire
7	No parity	Parity
6	Even	Odd
5	N/A	Address 16
4	N/A	Address 8
3	N/A	Address 4
2	N/A	Address 2
1	N/A	Address 1

Supports address 1 to 31



OFF ↔ ON

COMMUNICATIONS - ETHERCAT

EtherCAT module

OP LED	Run Status
Steady green	Run mode
Off	Not running
Flashing green	Standby

CC LED	Configuration Port Status
Flashing green	EIA232 configuration port activity
Off	Configuration port inactive
On	Not applicable

RUN LED	EtherCAT Slave Run Status
Off	Initialization
Flashing green	Pre-operational
Single flash green	Safe operational
Steady green	Operational
Flickering green	Boot state

ERR LED	Status -
Off	Normal operation
Steady red	No communications
Double flash red	Communications with master lost
Single flash red	EtherCAT comms has changed the EtherCAT state autonomously
Blinking red	Mini8 controller and EtherCAT master configuration do not match

DEV ID (HEX)

Valid address range 1 to FE (254).
The example shows an address of 00.
A setting of FF (255) is reserved.

EtherCAT devices can be daisy chained using 2 x RJ45 connectors.

Switches or hubs should be EtherCAT compatible.