A 510
14.01.03 LB

TEMPERATURE CONTROLLER FOR MODULATING BURNERS

C BUS C RING

DISCONTINUED PRODUCT

DTC 618 Eng.

TO SEE A SUITABLE REPLACEMENT PRODUCT

- **Controller for Compensated or Fixed Point Flow boiler temperature**
- **Communication systems:**
  - **C-Bus** for Telemanagement
  - **C-Ring** for exchange data of common interest between local controllers
- **Power supply 230 V~ , DIN rail mounting**

CE

1. APPLICATION

DTC 618 controller is designed for temperature control of a boiler with three-wire modulating burner (common - increase - decrease).

2. FUNCTIONS

The principal functions of DTC 618 are:

- Control of boiler temperature:
  - Compensated : in relation to outside temp.; with desired room temperatures Normal, Setback 1-2, Frostprot.
  - Fixed Point : with desired boiler temp. Fixed Point 1-2 or Fixed Point by external control.
- Control 3-wire modulating burner (common - increase - decrease).
- On-Off control of boiler shut-off valve.
- On-Off control boiler pump or manifold or heating plant.
- Timed programming with seven 24hour and two 7day programmes.
- Programming with dates: 25 annual periods; one special period; heating season.
- Automatic switching British Summer Time (BST)/Greenwich Mean Time (GMT).
- Eco Off function: boiler off when outside temperature exceeds a pre-set value.
- Remote control for changing programme in use
- Four On-Off inputs for : - 3 general alarms
  - 1 alarm for burner lockout with simultaneous total exclusion of the boiler with locked-out burner (closure shut-off valve and pump idle).
- 1 input measurement flue gases temperature.
- Alarms for short or open detector circuits and defective controller.
- C-Ring connection for transmitting value outside temp. to other DTC 618 and/or plant controllers
- C-Bus connection for transmitting data to local PCs or remote Telemanagement PC
- Simulation of operation for testing electrical connections at commissioning.

3. DETECTORS & REMOTE CONTROL

No.	Description	Type	Sensing element	Code	Data sheet
1	Immersion-type boiler temp. detector	**SIH 010**	NTC 10 kΩ	B4	N 140
1	Outside temp. detector	**SAE 001**	NTC 1 kΩ	B2	N 120
1	Flue gases temp. detector	**STF 001**	PT 1 kΩ	B7	N 165
1	Manual remote control	**CDB 301**	–	A	–

4. TECHNICAL DATA

• Electrical

Power supply	230 V ~ ± 10%
Frequency	50 … 60 Hz
Consumption	5 VA
Protection	IP40
Radio disturbance	VDE0875/0871
Vibration test	with 2g (DIN 40 046)
Voltage-free output contacts:	
Maximum switched voltage	250 V ~
Maximum switched current	5 (1) A
Construction standards	Italian Electrotech. Committee(CEI)
Data storage in memory	no limits

• Mechanical

Case	DIN 6E module
Mounting	on DIN 35 rail
Materials:	
Base	NYLON
Cover	ABS
Ambient temperature:	
Operating	0 … 45°C
Storage	– 25 … + 60°C
Ambient humidity	Class F DIN 40040
Dimensions	105 x 115 x 71.5 mm
Weight	0.6 kg

• Programmes, events & periods

24hour programmes	**1**…7
Daily events	**2**…6
7day programmes	**0**…2
Annual periods	**0**…25
Special period	1

• Measurement ranges

Outside temperature	– 30,0…+ 40,0 °C
Boiler temperature	0.0…99.0 °C
Flue gases temperature	0…510 °C

• Compensated control boiler temperature

Heat emitters :	– **RADIATORS** – FAN COILS – PANELS
Design flow temperature :	
Radiators	40.0…**70.0**…99.0 °C
Fan coils	40.0…**80.0**…99.0 °C
Panels	20.0…**40.0**…50.0 °C
Design outside temperature	– 30.0…**– 5.0**…+ 20.0 °C
Correction curve origin	**20.0**…40.0 °C
Desired programmable room temperatures:	
5 NORMAL	0,0…30.0 °C
2 SETBACK	0,0…30.0 °C
FROST PROTECTION	0.0…**6.0**…30.0 °C

• Control boiler temperature at "Fixed Point"

2 programmable desired FIXED POINT temperatures	0.0…99.0 °C

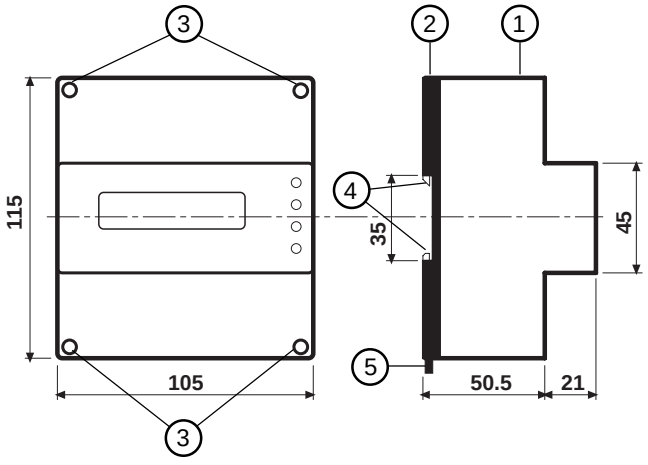
• Boiler setting data

Burner modulation time	10…**75**…3,600 s
Burner minimum On time (fixed)	60 s
Burner On-Off differential	0.5…**5.0**…50.0 °C
Boiler temp. limits	
Minimum	**1.0**…99.0 °C
Maximum	1.0…**99.0** °C
Eco Off outside temp:	– 30.0…**+18.0**…+ 40.0 °C
Delay closure shut-off valve	0…**30**…60 min

• Setting for Telemanagement & alarms (from PC)

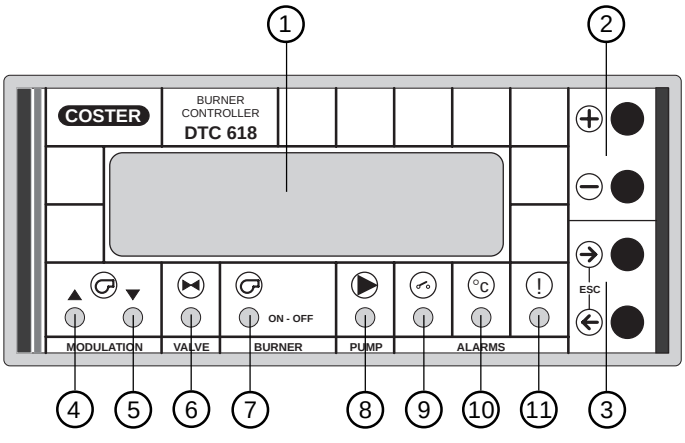
Attempted calls for sending alarms	2… **5**…200
Interval between calls for sending alarms	2…**10**…210 min.
Alarms (setting from PC):	
Difference boiler temp. (B4)	0.5…**5**…99 °C
Max. temperature boiler	1…**95**…99 °C
Max. temp. flue gases	2…**500**…510 °C
Delay single alarms	2…**30**…255 min.

5. OVERALL DIMENSIONS



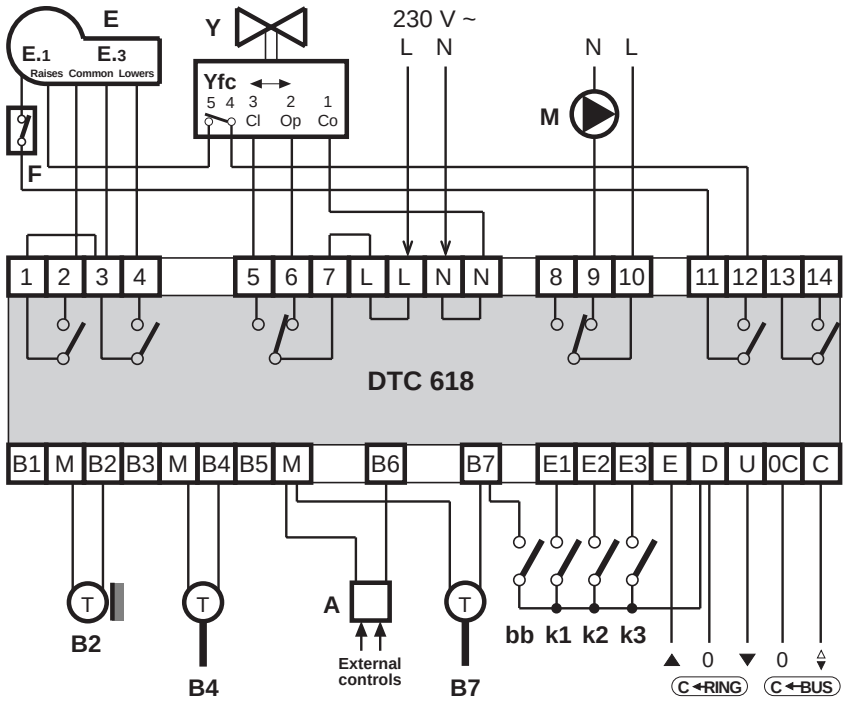
1 – Protective cover for electronic components
2 – Base with transformer, relay and terminal blocks
3 – Screws for securing base and cover
4 – DIN rail securing elements
5 – DIN rail release lever

6. FRONT PANEL



1 – Alphanumeric display
2 – + and – keys
3 – ← and → keys
LEDs :
4 – Increase modulation control
5 – Decrease modulation control
6 – Shut-off valve
7 – On-Off burner
8 – Recycle or plant pump
10 – Burner lockout alarm
11 – Measurements & detectors alarms
12 – Fault Alarm

7. WIRING DIAGRAM



A – Automatic remote control for changing programme in use
B2 – Outside temp. detector (NTC 1 kΩ ; -30…40 °C)
B4 – Boiler temp. detector (NTC 10 kΩ ; 0…99 °C)
B7 – Flue gases temp. detector (PT 1 kΩ ; 0…500 °C)
bb – Alarm contact lockout burner
E – Burner
E.1 – On-Off control burner
E.3 – 3 wire modulation control burner
F – Series of thermostats, boiler and safety burner
M – Boiler pump or manifold or heating plant
k 1…3 – Switch for signalling alarm or status
Y – Boiler shut-off valve
Yfc – Valve end run (permission On burner)
C-Bus – Transmission of data by Telemanagement
C-Ring – Transmission of data between controllers (outside temp.)

8. ELECTRICAL CONNECTIONS

Proceed as follows:
- Separate base from cover
- Mount the base on the DIN rail and check that it is firmly anchored by the securing elements (5.4)
- Carry out the wiring according to the diagram and in compliance with the regulations in force and using:
  - 1.5 mm² cables for power supply and relay control outputs;
  - 1 mm² cables for the detectors and remote control;
  - 1 mm² cables for C-Bus. For length limits see data sheets T 021 and T 022.
- Apply power (230 V~) and check its presence across terminals L and N.
- Remove power, replace cover on base/terminal block and secure it with the four screws supplied (5.3).

You are advised not to insert more than two cables in a single terminal of the controller and, if necessary, to use an external junction box.

9. SITING CONTROLLER AND DETECTORS

9.1 Controller

The controller must be installed in a dry location that meets the ambiental limits given under TECHNICAL DATA.
If installed in a space classified as “Hazardous” it must be mounted in a cabinet for electrical appliances constructed according to the regulations in force for the type of danger concerned.
The controller can be mounted on a DIN rail and installed in a standard DIN enclosure

9.2 Boiler temperature detector B4

This surface or immersion (recommended) detector must be installed in the boiler flow pipe, as close as possible to the output of the boiler.

9.3 Outside temperature detector B2

This must be installed outside the building, on the north or north-west side, at least three meters from the ground, out of direct sunlight and as far as possible from windows, doors, fireplaces and other possible sources of thermal disturbance.

9.4 Boiler flue gases temperature detector B7

This must be installed on the boiler-chimney metal connecting pipe.

10. C-RING COMMUNICATION BETWEEN CONTROLLERS (for detailed information see data sheetT 022)

In the serial C-Ring the following signals are transmitted:
- **permission to operate as Slave controllers**
- **value of outside temperature – use of a single detector for several controllers**

Each DTC 618 must be configured in relation to its task in the C-Ring.
Only one of the controllers connected in C-Ring can be configured as "PRIMARY".

M6.3
CRing connection NO

- **Not connected in C-Ring. Establishes by its programming or by externalcontrol R.a or R.m the control temperature of the boiler (Examples Plants** 10.1).

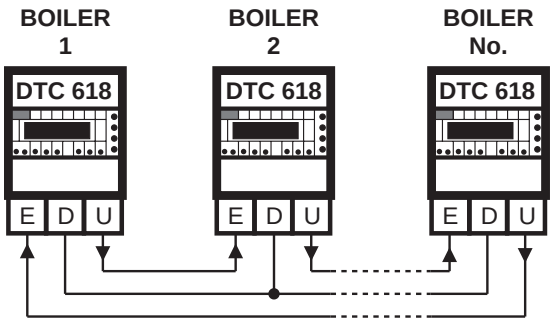
CRing connection PRIMARY

- **Connected in C-Ring with other plant controllers. Establishes by its programming or by external control R.a or R.m the boiler control . Transmits the permission signal for any "Slave" controllers to operate and for any outside temperature value.**

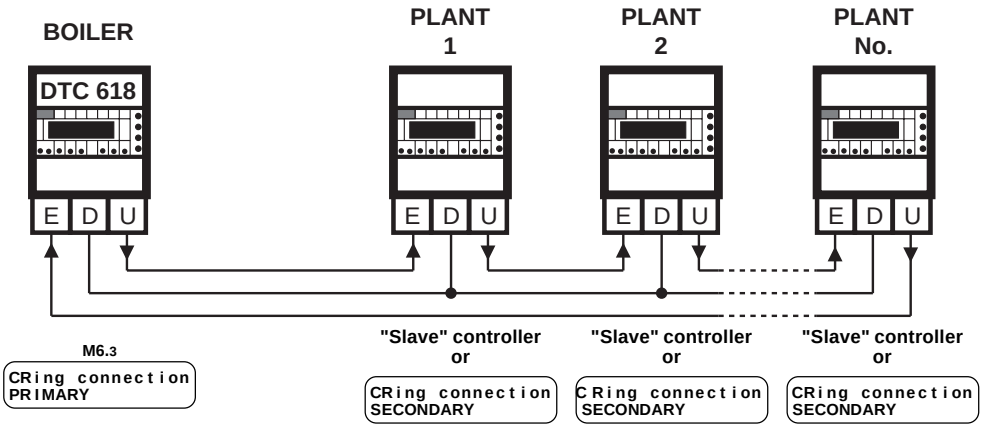
CRing connection SECONDARY

- **Connected in C-Ring with other DTC 618 controllers (of which one must be "PRIMARY"). Establishes by its programming or by external control R.a or R.m the boiler control temperature. Receives from the "PRIMARY" controller any outside temperature value.**

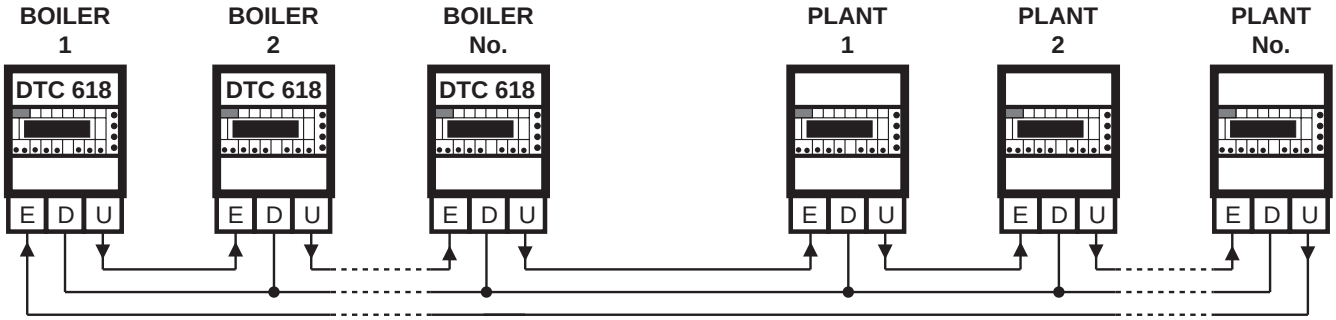
10.1 Several boilers without plant controllers in C-Ring



10.2 Boiler with plant controllers in C-Ring (communication of value outside temp. & permission Slave controllers)



10.3 Several boilers with plant controllers in C-Ring (communication of value outside temp. & permission Slave controllers)

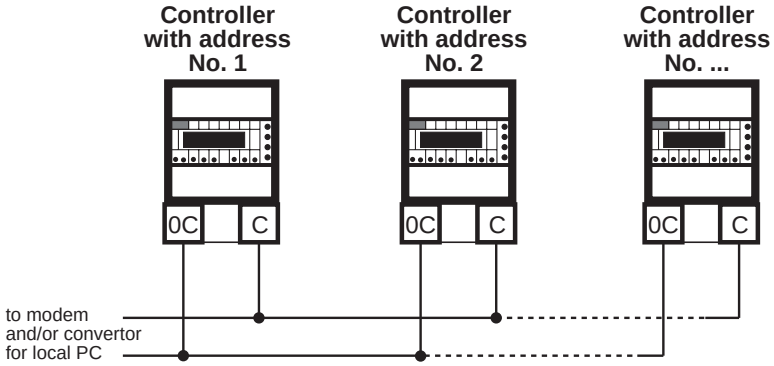


11. C-BUS COMMUNICATION FOR TELEMANAGEMENT (for detailed information see data sheet T 021)

Via the C-Bus output DTC 618 can be Telemanaged – two-way data communication with one or more local PCs and/or the central control computer via the (PSTN) telephone network,
From the PC or PCs you can:

- see and/or modify the data and values set on the display pages of the controller and configuration data dedicated exclusively to Telemanagement (see “Technical Data”).
- see the operational status of the plant components (pumps, auxiliaries in general)
- acquire the alarms coming from the plant
- read the detector measurements (temperatures: outside, flow, boiler, etc)

11.1 C-Bus electrical connections



11.2 Address for Telemanagement

M6.2

Address :	–
Group :	–

Under Telemanagement, in order for the controllers to be identified by the central PC and/or by the local PCs, they must be assigned a progressive address number.
The regulators can also be subdivided into groups according to certain common properties (e,g, same geographical area,).

When Telemanagement is not scheduled leave the address in memory (–).
To cancel the values press + and – keys at the same time.

11.3 Sending alarms

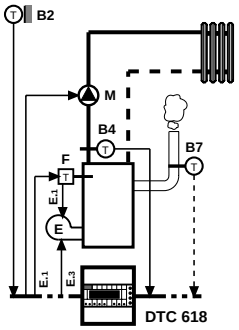
M6.1

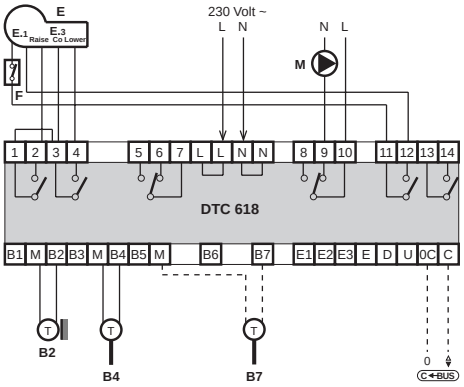
Send Alarms	:NO
PassWTeleman	:NO

- **Send alarms** : NO = **alarms not sent**
  YES = **alarms transmitted to central PC**
- **PassWTeleman** : NO = **password not enabled**
  YES = **password enabled**

12. EXAMPLES OF PLANTS

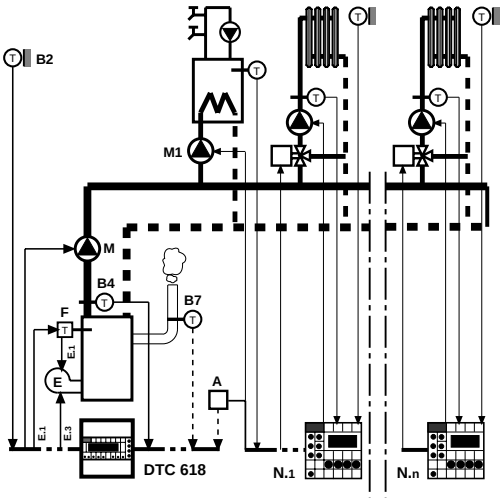
12.1 A modulating boiler with heating plant without control valve.
For compensated control in timed prog.s use temp. :NORMAL 1…5, SETBACK 1-2, FROSPROT

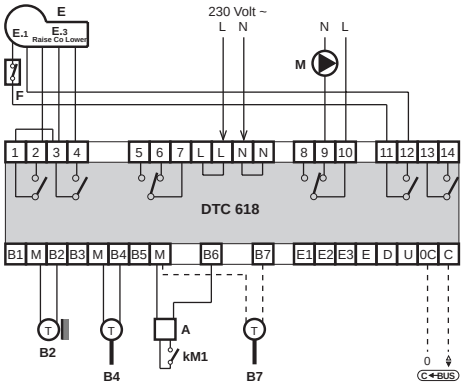




B2 – Outside temp. detector
B4 – Boiler temp. detector
B7 – Flue gases temp. detector
E – Burner
E.1 – On-Off burner control
E.3 – Modulating burner control
F – Boiler thermostats
M – Heating plant pump

12.2 A modulating boiler with consumer plants controlled by autonomous controllers.
- **For basic compensated control, in timed programming use temperatures : NORMAL 1…5, SETBACK 1-2, FROSTPROT. To ensure the temp. necessary for DHW storage use remote control CDB 301 (A) controlled (CC-M) by On contact of storage pump M1 with FLOW 1 (5-M) temperature.**
- **For fixed point control, in timed programming use the temperatures: FLOW 1-2.**

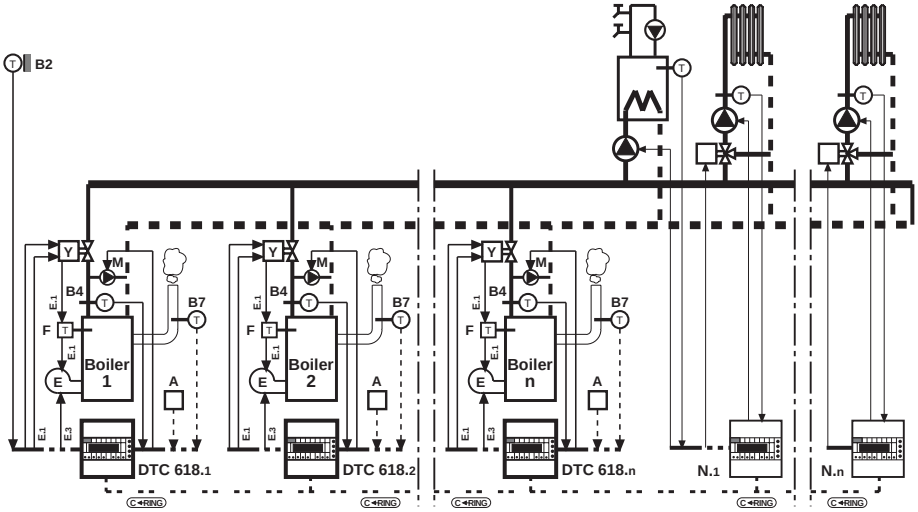




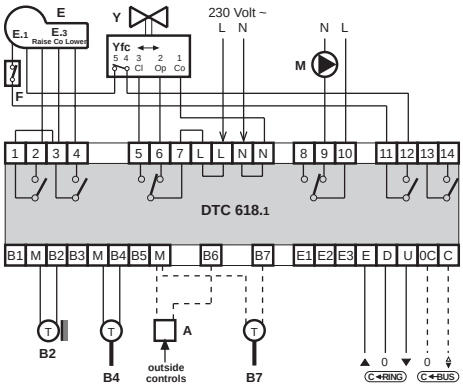
A – Automatic remote control CDB 301
B2 – Outside temp. detector
B4 – Boiler temp detector
B7 – Flue gases temp. detector
E – Burner
E.1 – On-Off control burner
E.3 – Modulating control burner
F – Boiler thermostats
M – Manifold pump
M1 – DHW storage pump
N.1…n – Plant controllers

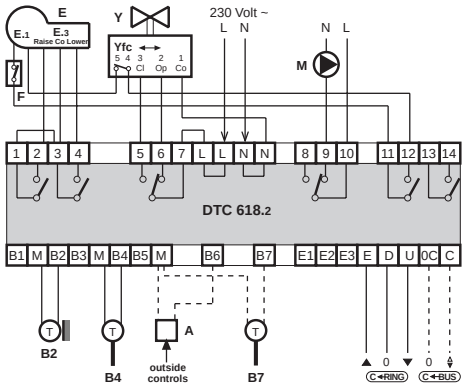
12.3 Several modulating boilers with plants controlled by autonomous controllers (connected in C-Ring only for outside detector).

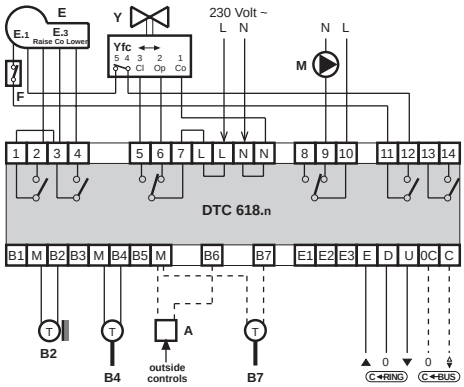
- **For basic compensated control, in the timed programming for each single boiler use the temperatures : NORMAL 1…5, SETBACK 1-2, FROSPROT. You can use different temp. for each boiler in order to share the load among them. Using the CDB 301 (A) remote control for each boiler you can subject their operation to outside controls or operation plant pumps, etc.**
- **For fixed point control, in timed programmes use the temperatures: FLOW 1-2.**



A – CDB 301automatic remote control
B2 – Outside temp. detector
B4 – Boiler temp. detector
B7 – Flue gases temp. detector
E – Modulating burner
E.1 – On-Off burner control
E.3 – Modulating burner control
F – Boiler thermostats
M – Boiler recycle pump
Y – Boiler shut-off valve
Yfc – Valve end run
N.1…n – Plant controllers (C-Ring only for outside detector)







13. OPERATION

DTC 618 is a microprocessor-based digital controller especially suitable for controlling the temperature of a boiler with modulating burner.

When the plant comprises several modulating boilers in parallel, each DTC 618 controls its own boiler and related shut-off valve with autonomous timed event programmes and desired temperatures; this permits flexible management of the boilers to meet plant requirements.

14. CONTROL OF BOILER TEMPERAURE

Control of boiler temperature, monitored by detector B4, can be:
- Compensated: boiler temperature according to outside temperature;
- Fixed Point: boiler temperature at fixed value.

The different control modes depend on the desired temperatures used in setting the timed event programmes (M2.) and in the choice of the programme to use (M0.2).
For Compensated use: - Room temp.: NORMAL 1…5, SETBACK 1-2, FROSTPROT.
For Fixed Point use: - FLOW 1-2 temperature.

14.1 Compensated

Compensated control can be used when:
- the boiler feeds a single heating circuit without it own control valve (see Example Plants 12.1).
- the boiler feeds one or more heating circuits with its own compensated controllers and has to maintain a "basic" compensated temp. that will satisfy the demand of the controllers (see Example Plants 12.2 and 12.3).

For Compensated temperature control use:
- Room temp. NORMAL 1…5 set in M1.1...5 ;
- Room temp. SETBACK 1-2 set in M1.6-7 ;
- Room temp. FROSTPROT set in M1.8 ;

The control calculates the desired flow temperature (Tf) in relation to the outside temperature (to) measured by detector B2 (or coming via C-Ring) and from the heating curve, referred to a desired room temperature of 20°C, set by means of:

M4.1

```
Heat emitters
RADIATORS
```

- Type of heat emitters: - RADIATORS; - FAN COILS; - PANELS.
  Establishes the slope of the heating curve in relation to the output curve of the heat emitters.

M4.2

```
Design outside
temp      :±xx.xc
```

- Outside design temperature (Tod), used for calculating winter heat losses from building.
  This depends on the climatic zone in which building situated.

M4.3

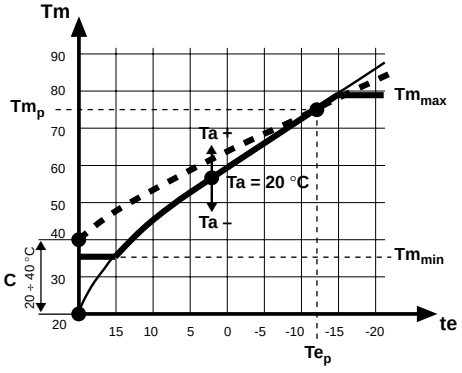
```
Design flow
temp      :±xx.xc
```

- Design flow temperature (Tfd) , used for sizing the plant.
  (eg: radiators = 70°C, fan coils = 80°C, panels = 40 °C)

M4.4

```
Curve OriginTO20
Flow T    : xx.xc
```

- The origin of the heating curve (C) (flow temp. = 20 °C with outside temp.= + 20 °C) can be with adjusted by an increase in the flow temperature (0…40°C). This may be necessary to avoid problems due to the reduced heating period used in the intermediate seasons (mild outside temperatures).



The value of the desired flow temperature (Tf) depends on the value of the room temperature (Tr) desired by the operating mode in use (parallel change +/- of the curve), Room temp. set in M1.1...8.

14.2 Fixed Point

To have temperature control at Fixed Point use:
- Flow temp. FLOW 1-2 set in **M1.9-10** ;

The controller maintains the temperature constant at the desired value FLOW 1 or FLOW 2.

14.3 Minimum and maximum limits of flow temperature

M4.5
Flow T Limits
Min:xxc Max:xxc

The desired flow temp. (**Tf**) calculated by the Compensated control can be limited by a minimum or maximum value.
Under Compensated, the minimum limit is valid only for the Normal 1…5 room temp. modes.
– Min : xx c : when the temp. falls below the minimum value the controller switches on the boiler and, using modulating control, keeps the temp. at the value set and switches it off when the temp. exceeds by 3°C the minimum value.
– Max : xx c : when the temp. rises above the maximum value the controller uses modulating control to keep the temp. at the value set and switches off the boiler when the increase exceeds the 3°C.
Warning: this control system does not replace security measures required by law.

14.4 Programme and operating mode

M0.2
Programme:
24 HOUR 1

It is possible to programme the boiler control according to consumer requirements:

• Programme = programme in use :
– *7 DAY 1…2* = with one of the two 7day programmes (**M2.9...15**) ;
– *24 HOUR1…7* = with one of the seven 24hour programmes(**M2.2...7**) ;
– *NORMAL 1…5* *xx.x c* = with one of the 5 Compensated Normal room temp. (**M1.1...5**) ;
– *SETBACK 1-2* *xx.x c* = with one of 2 Compensated Setback room temp. (**M1.6-7**) ;
– *FROSTPROT* *xx.x c* = with Compensated Frostprot room temp. (**M1.8**) ;
– *FLOW 1-2* *xx c* = with one of the 2 Fixed Point flow temp. (**M1.9-10**) ;
– *OFF* = always Off.

When in place of programme there appears:
– SUMMER = summer period in use (dates in (date in **M2.19**).
– HOLIDAY = one of holiday periods in use (**M2.17**).
– SPECIAL = Special period in use.
– TELENORMAL 1 = remote control A is on "NORMAL 1".
– TELESETBACK 1 = remote control A is on "SETBACK 1".
– TELEFLOW 1 = remote control A is on"FLOW 1".
– TELEFROSTPROT = remote control A is on "FROSTPROT".
– TELEOFF = remote control A is on "OFF".

M0.3
Mode:Normal
Td20.0c Var±0.0c

The operating mode depends on programme set in **M0.2** o or by the external controls:
• Mode = operating mode in use :
– Normal = with one of the 5 Compensated Normal room temp.
– Setback = with one of the 2 Compensated Setback room temp.
– Frostprot = with Compensated Frostprot room temp.
– Flow = with one of the 2 Fixed Point flow 1-2 temp.
– Off = boiler switched off by programme.
• Tv *xx.x* c = value of desired temp.
• Var ± *x.x* c = variation in desired temp. (room max ±3.0°C, flow max ± 50.0 °C).

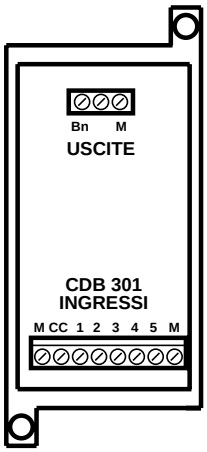
14.5 Eco Off function

This function permits switching off the boiler when outside temperature above value set and switching it on again when it is 2°C below value set.

M1.13
Burner Off: NO
Outside T.: 3.0c

• Burner Off : – *NO*: function not enabled ; – *YES*: function enabled
• Outside T : x,x c : value of outside temp. for switching off boiler.

14.6 CDB 301 automatic remote control



CDB 301 remote control permits changing the controller programming by the closure of external voltage-free switches. e.g. boiler, with compensated control, which has to operate at higher temperature because of demand from DHW storage.

The functions are :
– Input CC - M = boiler OFF with priority over all other programming.
– Input 1 - M = not used
– Input 2 - M = boiler controlled on FROSTPROT
– Input 3 - M = boiler controlled on SETBACK 1 room temp.
– Input 4 - M = boiler controlled on NORMAL 1 room temp.
– Input 5 - M = boiler controlled on FLOW 1 fixed temp.

The input CC-M “OFF” has absolute priority over all the other programmes and consequently when CC is switched to M it does not matter if some other switch is closed.
All the other controls (2…5) are exclusive and two switches cannot be closed at the same time.
With all the switches open the controller programming is operative.

15. CONTROLS

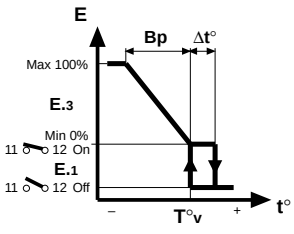
The controller is able to control the modulating burner (E), the boiler shut-off valve (Y) if present and the pump (M) for the boiler, manifold or heating plant.

15.1 Control burner E

To control the burner the controller uses output switches 1-2 and 3-4 for burner modulation and switch 11-12 for On-Off.

The controller compares the desired temperature (T°d) of the current mode with the temperature measured by the boiler detector (B4) and produces the PI mode control action in relation to the temperature deviation and the following parameters:

- Proportional Band: fixed value equal to detector measurement range
- Integral Time: value fixed at 20 minutes
- **T**ime for modulating actuator to go from minimum to maximum power. Enables controller to calculate the control times "Increase and "Decrease".
- Temperature differential On-Off of modulating burner when it is at minimum power.



M5.1

Burner Modulation time : xxx s

M5.2

On-Off Different Burner :xx.xc

15.2 Control shut-off valve Y

When several boilers use a single manifold it often happens that the boilers are shut off by valves that allow isolating the unused boilers. DTC 618 can control the shut-off valve by means of SPDT switch 5-6-7.

M4.6

Boiler Valve:AUT Delay Off:xxmin

- Boiler valve : – *MAN* : valve is always open (6-7closed; 5-7 open).
  – *AUT* : valve is closed (6-7 open; 5-7 closed) in Off mode and is opened (6-7 closed; 5-6 open) in any other mode.
- Delay Off : *xx* min : delay in closing valve (after switching off burner) to avoid overheating of boiler because of residual heat in the combustion chamber.

15.3 Control pump for recycle boiler, manifold or heating plant M

The SPDT switch 8-9-10 can control the boiler recycle pump or the manifold pump (with several boilers use the switches of the various DTC 618 in parallel between them) or the heating plant pump (Examples Plant 12.1).
Pump On (9-10 closed; 8-10 open) when desired boiler temp. > 10 °C.
Pump Off after Delay Off (9-10 open; 8-10 closed) when desired boiler temp < 10 °C.

M4.7

Pump Delay Off : NO

- Delay Off : – *NO*: switching off without delay.
  – *YES* : switching off with delay of 5 minutes.

16. PROGRAMMES & PERIODS WITH DATES

It is possible to program the boiler control operation according to consumer requirements by means of:

– 7 24hour programmes
– 2 7day programmes
– 25 holiday periods
– 1 special period
– heating season

16.1 Assigning programme

M0.2

```
Program :
24 HOUR      1
```

• Programme = programme assigned:
– *7 DAY 1-2* = with one of the two 7day programmes(**M2.9...15**) ;
– *24 HOUR 1-7* = with one of the seven 24hour programmesi(**M2.2...7**) ;
– *NORMAL 1…5* *xx.x c* = with one of the 5 Compensated Normal room temp. (**M1.1...5**) ;
– *SETBACK 1-2* *xx.x c* = with one of the 2 Compensated Setback room temp. (**M1.6-7**) ;
– *FROSTPROT* *xx.x c* = with one othe two Fixed Point flow temp. (**M1.8**) ;
– *FLOW 1-2* *xx c* = with one othe two Fixed Point flow temp. (**M1.9-10**) ;
– *OFF* = always Off.

16.2 24hour programmes

In each 24hour programme you can set a maximum of six event start times assigning to each the desired mode:

M2.1

```
How many 7 day
programmes  ?  1
```

• Number of 24hour programmes (1…7) you wish to use.

M2.2...7

```
P1 Event 1 6.00
NORMAL  1  20.0C
```

• Day xx : prog number. (1…7); • hx : Event : number Event (1…6); • From xx.xx Event : start time
• XXXXXX = mode assigned to period:
– *NORMAL 1…5* *xx.x c* = with one of the 5 Compensat. normal room temp. (**M1.1...5**) ;
– *SETBACK 1-2* *xx.x c* = with one of the 2 Compensat. setback room temp.(**M1.6-7**) ;
– *FROSTPROT* *xx.x c* = with the Compensated Frostprot room temp. (**M1.8**) ;
– *FLOW 1-2* *xx c* = with one of the 2 Fixed Point flow temp. (**M1.9-10**) ;
– *OFF* = always off

The Event start times must be entered in increasing order.
Unused times must be excluded by pressing + and – keys at the same time
Unused times (– – –) must not be left between Event times.

16.3 7 day programmes

In each 7day programme you can assign a programme to each day of the week.

M2.8

```
How many 7day
programmes  : 0
```

• Number of 7day programmes (0…7) you wish to use

M2.9...15

```
7day 1-MONDAY
24 HOUR      1
```

• 7day x: Number of programme 1-2 ; • XXXXXXXXX : day of the week;
• XXXXXXXXXXXX = prog. assigned to day of week;
– *24 HOUR 1-7* = with one of the seven 24hour programmes **(M2.2...7)** ;
– *NORMAL 1…5* *xx.x c* = with one of the 5 Compensat. normal room temp. (**M1.1...5**) ;
– *SETBACK 1-2* *xx.x c* = with one of the 2 Compensat. setback room temp. (**M1.6-7**) ;
– *FROSTPROT* *xx.x c* = with the Compensated Frostprot room temp. (**M1.8**) ;
– *FLOW 1-2* *xx c* = with one of the 2 Fixed Point flow temp. (**M1.9-10**) ;
– *OFF* = always off

16.4 Holidays periods

Each holiday period, defined by the start and end dates, sets an operating programme, the same for all holiday periods, which replaces that in use.
Alla fine di ogni periodo il regolatore ritorna a quello in uso.

M2.16

```
How many holiday
periods   ?    0
```

• Number of holiday periods you wish to use (1…25).

Choose the programme to be used during all the holiday periods;

M2.17

```
Holiday program
FROSTPROT    6.0c
```

– *7 DAY 1-2* = with one of the 2 7day programmes (**M2.9...15**) ;
– *24 HOUR 1-7* = with one of the 7 24hour programmes(**M2.2...7**) ;
– *NORMAL 1…5* *xx.x c* = with one of the 5 Compens. normal room temp. (**M1.1...5**) ;
– *SETBACK 1-2* *xx.x c* = with one of the 2 Compens. setback room temp. (**M1.6-7**) ;
– *FROSTPROT* *xx.x c* = with the Compensated Frostprot room temp. (**M1.8**) ;
– *FLOW 1-2* *xx c* = with one of the 2 Fixed Point flow temp. (**M1.9-10**) ;
– *OFF* = always Off.

Enter the data for each single period:

M2.18

```
Hol 01 Start  NO
Fr:--.--to:--.--
```

• Hol xx : number period (1…25) ; • Start : XX : sets start time of period :
– NO = period not used;
– 00 = start at 00 hours
– 12 = start at 12 hours
• Fr : *xx.xx* to : *xx.xx* : day and month of start and end of holiday period,
For a period of a single day set the same date for start and end.
To cancel dates of holiday period keep + and – keys pressed at the same time.

16.5 Special period

Period in which an operating progtamme is set to meet special requirements and which temporarily replaces the programme set in **M0.2** :

M0.5

```
Special program
24 HOUR      1
```

• Special programme :
– *7 DAY 1-2* = with one of the 2 7day programmes (**M2.9...15**) ;
– *24 HOUR 1-7* = with one of the 7 24hour programmes(**M2.2...7**) ;
– *NORMAL 1…5* *xx.x c* = with one of the 5 Compens. normal room temp. (**M1.1...5**) ;
– *SETBACK 1-2* *xx.x c* = with one of the 2 Compens. setback room temp. (**M1.6-7**) ;
– *FROSTPROT* *xx.x c* = with the Compensated Frostprot room temp. (**M1.8**) ;
– *FLOW 1-2* *xx c* = with one of the 2 Fixed Point flow temp. (**M1.9-10**) ;
– *OFF* = always Off.

M0.6

```
Special period
Fr --.--to --.--
```

• Fr - - . - - to - - . - - = day and month of start and end of special period.

To cancel the dates of the special period keep + and – keys pressed at the same time.

16.6 Heating season period

Sets the winter season heating period.

M2.19

```
Heating Season
Fr:--.--to:--.--
```

• Heating season
Fr - - . - - to - - . - - = day and month of start and end of heating season.

In summer period the boiler remains OFF. Only the remote control (A) can switch the boiler on again.

To cancel the period keep pressed + and – keys at the same time.

16.7 British Summer Time (BST)

The controller automatically changes the current time according to the BST period.

M2.20

```
Summer time(BST)
Fr:29.03to:26.10
```

• Fr - - . - - to - - . - - = day and month of start and end of BST period,

To cancel the period keep pressed + and – keys at the same time.

17. COMPLEMENTARY FUNCTION

17.1 Access keynumber

M6.7

```
Choice keynumber
      ----
```

Choice and enabling of access keynumber which prevents the use of + and – keys and thereby any modification of the data. Enter the number (1900 … 1999) using + and – keys.
To cancel keynumber press + and – at the same time until the dashes re-appear.

```
Keynumber
      ----
```

When the keynumber is enabled, if you press + or – keys there will appear on the display the request to enter the keynumber.
Only after having entered the keynumber correctly can you use + and – keys.If for 15 minutes no key is pressed the keynumber is re-enabled automatically.

17.2 Name of plant site

M6.8

```
Site Name
  ----------
```

Entering name of plant site which appears on first page of display.
Using + and – keys, each dash can be replaced by a letter of the alphabet (A…Z) or by number (0…9). The ← and → keys serve to position the cursor..

17.3 Display measurements

The controller displays all the values measured by the detectors and the data that serves to monitor the operation of the plant. If the detectors are not connected or are damaged - - - -will appear.

M3.1

```
Outside Temp
actual   :– 2.0c
```

• Actual outside temperature.

M3.2

```
Boiler temp.
V:60.0c  R:60.0c
```

• Boiler temperature desired by current mode and actual measured by B4 detector.

M0.10

```
B6:          REMOTE
Flugas Max: 180c
```

• Maximum temperature flue gases measured by B7 detector after last re-set.
To cancel the recording press + and – keys at the same time.

18. ALARMS

The alarms processed by the controller are of four types:
- alarms for malfunctioning of the controller, signalled by LED 6.11.
- functional alarms (measurement deviations), signalled by 6.10.
- alarms for short or open detector circuits, signalled by LED 6.10.
- alarms from external switches, signalled by LED 6.9.

The alarm status is signalled by the LEDs on the front panel of the controller and by the word ALARM appearing on the display when the alarm is transmitted to the PC and is identified, on the configuration page, by the alternating appearance of the letter A with the number of the alarm concerned.

With C-Bus connection the alarms can be transmitted to a local PC and/or to the Telemanagement central control PC.

18.1 Functional alarms

The functional alarms are triggered in the presence of prolonged differences between the actual and desired measurements (LED 6.10 lit).
With the exception of the timer alarm (8) they do not affect the normal operation of the controller.
Factory setting: only the timer alarm (8) is enabled.
Using + key, enable the alarms of interest by replacing the dashes with numbers.
The limit or deviation values and the wait times for sending the alarms can be adjusted only by means of the PC.

M6.4

```
FunctionalAlarms
  2    4      7 8
```

Type of alarm:
2 = difference boiler temperature (B4)
- transmitted when actual temperature below that desired.

4 = boiler temperature too high (B4)
- transmitted when actual temperature above maximum limit.

7 = maximum flue gases temperature (B7)
- transmitted when actual temperature higher than maximum (set on Telemanagement PC).

8 = internal timer fault; cannot be disabled.
- transmitted when timer assumes meaningless values.

18.2 Detector alarms

The detector alarms are triggered in the event of short or open circuits to the detectors connected.
The effect is delayed by a minute and takes place only if the relative alarms are enabled (LED 6.11 lit).
Factory setting: all disabled.
With + key enable the required alarms by replacing the dashes with numbers.

M6.5

```
Detector Alarms
  2    4      7 8
```

Type of alarm :
2 = outside alarm (B2).
- result: uses last value measured.

4 = boiler detector (B4).
- result: burner at minimum and controlled by boiler thermostats (11-12 closed ; 1-2 and 3-4 open).

7 = flue gases detector (B7). Only for interruption (short circuit and boiler lock-out alarm)
8 = C-Ring: break in electrical connection or faulty controller in ring.

The effect of the alarm situations is delayed by a minute only if the relative alarms are enabled.

18.3 Alarm or status

Alarms triggered by the closure of voltage-free switches k1, k2, k3 and k5 by plant components (pumps, burners, etc).
The presence of the alarms is indicated after about 60 seconds 6.10 lit).
Factory setting: all disabled.
With + key enable the required alarms by replacing the dashes with numbers.
If not enabled as alarms they can be used as status indicators.

M6.6

```
K Alarms
1 2 3    5
```

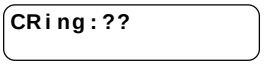
Type of alarm:
1 = alarm with k1 switch closed.
2 = alarm with k2 switch closed.
3 = alarm with k3 switch closed.
5 = alarm for boiler lockout with k5 switch closed.
- result: burner off, valve closed and pump off.

19. COMMISSIONING

Testing to be carried out when installation has been completed and the electrical wiring and configuration carried out and tested.

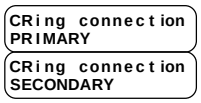
19.1 Testing C-Ring

M7.1



The C-Ring testing page appears only if PRIMARY is configured.

M6.1

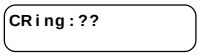


Ensure that the controllers connected in C-Ring:

– are correctly powered from the mains at (230 V~).

– one controller only is configured as 

– all the other controllers are Slave or configured as 

– all the controllers are selected on the testing page 

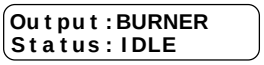
DTC 618 sends via C-Ring a signal every 5 seconds. On all appears. If the connection if satisfactory the word “YES” replaces “??” on all the displays. If on one or more displays “YES” does not appear this means that there is a break between the last controller with “YES” and the first with “??”:

Examples of testing a C-Ring with four controllers:
– Cont.1 "YES" – Cont..2 "YES"– Cont..3 "YES"– Cont. 4 "YES" : Connection OK
– Cont.1 "??" – Cont. 2 "YES" – Cont. 3 "YES" – Cont. 4 "YES" : Break between 4 and 1
– Cont.1 "??" – Cont..2 "YES"– Cont. 3 "??" – Cont. 4 "??" : Break between 2 and 3
– Cont.1 "??" – Cont..2 "??" – Cont. 3 "??" – Cont. 4 "??" : Break between 1 and 2

19.2 Testing control ouputs

M7.2

With + and – keys select:



- Output : - *BURNER* = On-Off control burner
- Status : - *OFF*; - *ON*.

- Output : - *MODULAT* = modulating control burner
- Status : - *IDLE*; - *LOWER; RAISE*.

- Output : - *VALVE* = On-Off control shut-off valve.
- Status : - *OPEN*; - *CLOSED*.

- Output : - *PUMP* = On-Off control pump.
- Status : - *ON*; - *OFF*.

Check result of each operation.

19.3 Testing detector connections

Each individual detector can be tested by reading the temperature indicated by the controller in the “MEASUREMENTS” menu and deciding if the value is reasonable.

20. SEQUENCE OF DISPLAY PAGES (data and functions are those in memory at delivery)

⊖ ⊕ Keys for scrolling the display pages and positioning the cursor z on adjustable data on these pages.
The adjustable data, in the following descriptive list of display pages, are highlighted thus

By pressing these keys at the same time, or in any event after the elapse of 15 minutes, the first page appears

```
Site----------
12.18 MONDAY
```

⊖ ⊕ Keys for : – adjusting the values indicated by the cursor z
– seeing the possibility of configuring a function, e.g. :
– passing directly from one menu (series of pages) to another.

```
Heat emitters
RADIATORS
```

oppure

```
Heat emitters
PANELS
```

M0. NORMAL USE

Ref.	Display	Description	Notes	Sect.
M0.1	Site---------- 12.18 Monday	Name plant site Current time and day of week	Set in **M6.8** Set in **M0.4**	
M0.2	Programma: 24 HOUR 1	Choice programme : – *7 DAY 1-2* : set in **M2.9...15** ; – *24 HOUR 1...7* : set in **M2.2...7** ; – *NORMAL 1...5 xx.x c* : set in **M1.1...5** ; – *SETBACK 1-2 xx.x c* : set in **M1.6-7** ; – *FROSTPROT xx.x c* : set in **M1.8** ; – *FLOW 1-2 xx c* : set in **M1.9...10** ; – *OFF* : boiler off;	Instead of programme can appear: SUMMER : summer period current (dates in **M2.19**). HOLIDAY : one of holiday period is current SPECIAL : special period current. REMOTE NORMAL1: remote control **A** in "NORMAL 1". REMOTE SETBACK 1 : remote control **A** in "SETBACK 1". REMOTE FLOW 1: remote control **A** in "FLOW 1". REMOTE FROSTPROT : remote control **A** in "FROSTPROTECTION". REMOTE OFF : Remote control **A** in "OFF".	**14.4** **16.1**
M0.3	Mode :Normal Td20.0c Var±0,0c	Current mode. Td : desired temp. for mode in use. Var : Variation desired temp. (max ± 3 °C). Valid only for normal & setback room.	Modes : – Normal : temp. Normal 1…5 (**M1.1...5**) ; – Setback : temp. Setback 1-2 (**M1.6-7**) ; – Flow : temp.Flow 1-2 (**M1.9-10**) ; – Frostprot: temp. Frostprot (**M1.8**) ; – Off	**14.4**
M0.4	12.18 MONDAY 30.08.00 BST	Settings: Time, day of week and date. Current time period: GMT or BST	.	
M0.5	Special program 24 HOUR 1	Choice programme for Special period.: – as for **M0.2**.	.	**16.5**
M0.6	Special period Fr:--.--.--to:--.--.--	Date of start and end of Special period	.	**16.5**
M0.7	DTC 618 Eng. Vers.xx	Identity data of controller	.	

M1. TEMPERATURES & CONTROLS

Ref.	Display	Description	Notes	Sect.
M1.1	Desired temp NORMAL 1 20.0c	Value of desired room temp**. NORMAL** 1	To be used in timed events programmes	**14.4** **16.2.3**
M1.2	Desired temp NORMAL 2 20.5c	Value of desired room temp**.** NORMAL 2	To be used in timed events programmes	**14.4** **16.2.3**
M1.3	Desired temp NORMAL 3 21.0c	Value of desired room temp**.** NORMAL 3	To be used in timed events programmes	**14.4** **16.2.3**
M1.4	Desired temp NORMAL 4 19.5c	Value of desired room temp**.** NORMAL 4	To be used in timed events programmes	**14.4** **16.2.3**
M1.5	Desired temp NORMAL 5 19.0c	Value of desired room temp**.** NORMAL 5	To be used in timed events programmes	**14.4** **16.2.3**
M1.6	Desired temp SETBACK 1 16.0c	Value of desired room temp**.** SETBACK 1	To be used in timed events programmes	**14.4** **16.2.3**
M1.7	Desired temp SETBACK 2 14.0c	Value of desired room temp. SETBACK 2	To be used in timed events programmes	**14.4** **16.2.3**
M1.8	Desired temp FROSTPROT 06.0c	Value of desired room temp. FROSTPROT.	To be used in timed events programmes	**14.4** **16.2.3**
M1.9	Desired temp FLOW 1 70,0c	Desired temp. boiler FIXED POINT 1	Can be used in timed events programmes. Used by controller when C-Ring broken.	**14.4** **16.2.3**
M1.10	Desired temp FLOW 2 80,0c	Desired temp. boiler FIXED POINT 2	Can be used in timed events programmes.	**14.4** **16.2.3**
M1.11	Pump Summer :YES ALWAYS ON	Use of pump in summer period : – *YES* ; – *NO.* Programme to use : – *7 DAY 1-2* : set in **M2.2...7** ; – *24 HOUR 1...7* : set in **M2.9...15** ; – *FOLLOWS BOILER* : follows programme set in **M0.2** ; – *ALWAYS ON* : pump always on; – *ALWAYS OFF* : pump always off;	Summer: period defined by heating season(**M2.19**). With 7 DAY 1-2 or 24 HOUR 1…7 or FOLLOWS BOILER : when programme includes Off the output is Off; in other cases On.	**15.3**
M1.12	Burner Off : NO Outside T: 3,0c	Switching off burner (valve closed & pump idle) when outside temp. exceeds value set.	.	**14.5**

M2. TIMED EVENTS & PERIODS

Ref.	Display	Description	Notes	Sect.
M2.1	**How many 24hour programms ? 1**	Choice number of 24hour programmes to be used (1…7).	Cancel unrequired display pages.	**16.2**
M2.2 ⇓ ⇓ **M2.7**	**P1 Event 1 6.00 NORMAL 1 20,0c** **P1 Event 6 22.00 OFF**	Day *xx*: number of 24hour prog.(1…7) ; h*x*: number of Event (1…6) ; From *xx.xx*: event start time: Choice of mode to assign to period: – *NORMAL 1…5* *xx.x c*: set in **M1.1...5** ; – *SETBACK 1-2* *xx.x c*: set in **M1.6-7** ; – *FROSTPROT* *xx.x c*: set in **M1.8** ; – *FLOW 1-2* *xx c*: set in **M1.9...10** ; – *OFF* : boiler off; **Other sets of 6 pages according no. in M2.1**	Max 6 events. To cancel an unused event press + and – togeteher **- - . - -** appears Events must be in increasing order. Do not leave **- - . - -** between programmed events**.**	**16.2**
M2.8	**How many 7day programmes ? 0**	Choice of number of 7day programmes to be used (0…2).	Cancel unrequired display pages.	**16.3**
M2.9 ⇓ ⇓ **M2.15**	**7day 1-MONDAY 24HOUR 1** **7day 1-SUNDAY 24HOUR 1**	7 day *x*: nnumber of 7day programme to be used (1-2) ; day of week. Choice of programme for each day of week: – *24 HOUR 1…7* : set in **M2.2...7** ; – *NORMAL 1…5* *xx.x c*: set in **M1.1...5** ; – *SETBACK 1-2* *xx.x c*: set in **M1.6-7** ; – *FROSTPROT* *xx.x c*: set in **M1.8** ; – *FLOW 1-2* *xx c*: set in **M1.9...10** ; – *OFF* : boiler off; **Other pages according to number in M2.8**	Appears only if **M2.8** is not 0.	**16.3**
M2.16	**How many holiday periods ? 0**	Choice of number of holiday periods to be used (0 … 25).	Cancel unrequired display pages.	**16.4**
M2.18	**Holiday program FROSTPROT 6,0c**	AP *xx*: numero del periodo annuale (1…25) ; Choice programme assigned to period: – *7 DAY 1-2* : set in **M2.9...15** ; – *24 HOUR 1…7* : set in **M2.2...7** ; – *NORMAL 1…5* *xx.x c*: set in **M1.1...5** ; – *SETBACK 1-2* *xx.x c*: set in **M1.6-7** ; – *FROSTPROT* *xx.x c*: set in **M1.8** ; – *FLOW 1-2* *xx c*: set in **M1.9...10** ; – *OFF* : boiler off; **Other pages asM2.2.3 according number M2.1**	Appears only if **M2.1** greater than 0.	**16.4**
M2.17	**Hol 01 Start NO Fr:--.--to:--.--**	AP xx : number of annual period (1…25) ; Start : – *NO* = unused period ; – *00* =start at 00 hours ; – *12* =start at 12 hours. Fr : xx.xx : date of start of annual period. to : xx.xx : date of end of annual period.	Appears only if **M2.1** greater than 0	**16.4**
M2.19	**Heating season Fr:15.10to:15.04**	Dates of start and end of heating season.		**16.7**
M2.20	**Summer time(BST) Fr:--.--to:--.--**	Dates of start and end of BST..	.	**16.8**

M3. MEASUREMENT

Ref.	Display	Description	Notes	Sect.
M3.1	**Outside temp Actual : – 2.0c**	Outside temp. measured by B2, C-Ring: coming from C-Ring (if B2 not configured).	C-Ring instead of actual if value comes from C-Ring	**17.3**
M3.2	**DesBoilerT:60.0c ActBoilerT:58.0c**	Boiler temp. desired by current mode. Temp. measured by boiler detector B4.	.	**17.3**
M3.3	**B6: REMOTE Flugas Max :185c**	Input B6 for remote control. Max temp. monitored by flugas detector B7. To reset press + and – keys at same time.	.	**17.3**

M4. SETTING HEATING & PUMP

Ref.	Display	Description	Notes	Sect.
M4.1	Heat emitters RADIATORS	Choice type of heat emitters: – *RADIATORS* ; – *PANELS;* – *FAN COILS*.		14.1
M4.2	Design outside temp :– 5.0c	Value of design outside temp. for compensated control.		14.1
M4.3	Design flow temp : 70.0c	Value of design outside temp. for compensated control.		14.1
M4.4	CurveOrigin TO20 T FLOW : 20.0c	Correction of heating curve origin.		14.1
M4.5	Limits T Flow Min: 1c Max:99c	Value of minimum and maximum limits of flow temperature.	.	14.3
M4.6	Boiler valve:AUT Delay Off:30min	Type of plant pump control : – *MAN* ; – *AUT*. Delay closure valve.	– MAN : always on ; – AUT : on with programme times in use.	15.3
M4.7	Pump Delay Off: NO	Delay switching off pump.	– NO : without delay ; – YES : 5 minutes delay.	15.2

M5. SETTING BURNER

Ref.	Display	Description	Notes	Sect.
M5.1	BurnerModulation time : 75s	Time required by modulating control to go from minimum to maximum power..	Only if connected in C-Bus.	15.1
M5.2	On-Off different burner : 5.0c	Differential between switching modulating burner On and Off when it is at minimum power.	.	15.1

M6. CONFIGURATION CONTROLLER

Ref.	Display	Description	Notes	Sect.
M6.1	Send alarms :NO PassWTeleman :NO	Enabling alarms to send to Teleman. PC. Enabling Telemanagement keynumber.	Only if connected in C-Bus.	11.3
M6.2	Address : --- Group : –	Telematic address of controller. Group to which controller assigned.	Only if connected in C-Bus.	11.2
M6.3	CRing connection NO	Definition of C-Ring connection: – *NO*: without C-Ring connection. – *PRIMARY*: pilot controller of C-Ring. Only one of controllers connected in C-Ring can be PRIMARY". – *SECONDARY*:	DTC controllers cannot receive, via C-Ring, the desired temp. from the plant controllers.	10.
M6.4	FunctionalAlarms – 2 – 4 – – 7 8	Enabling functional alarms. Factory setting: only 8 enable (cannot be disabled).	3 : boiler temperature **B4**. 4 : boiler overtemperature **B4**. 7 : flue gases overtemperature **B7**. 8 : fault internal timer.	18.1
M6.5	Detector alarms – 2 – 4 – – 7 8	Alarms enabled for short or open detector. Factory setting: all disabled	2 : Outside detector **B2**. 4 : Boiler detector **B4**. 7 : Flue gases detector **B7** (only for break). 8 : C-Ring alarm.	18.2
M6.6	K Alarms 1 2 3 – 5	Enabling On-Off alarms and lockout burner. Factory setting: all enabled.	1 : alarm with **k1** closed. 2 : alarm with **k2** closed. 3 : alarm with **k3** closed. 5 : alarm burner lockout with **k5** closed..	18.3
M6.7	Choice keynumber ----	Choice keynumber to prevent use of + and – keys – *1901 ... 1999*	To cancel keynumber press + and – together.	17.1
M6.8	Site Name ----------	Entering name of plant site.	Use + and – to enter letters & numbers Use ← and → to change position.	17.2

M7. TESTING				
Ref.	Display	Description	Notes	Sect.
M7.1	**CRing:??**	Page of testing C-Ring connections. *??*= C-Ring test in progress or test negative YES = test positive	Appears only if in **M6.3** is PRIMARY or SECONDARY	**19.1**
M7.2	**Output:MODULAT** **Status:IDLE**	Choice output to test. – *BURNER*: Control On-Off burner Status : – *ON*; – *OFF* – *MODULAT.* : Modulating control burner. Status : – *IDLE* ; – *LOWER* ; – *RAISE* – *VALVE* : On-Off control boiler valve Status : – *OPEN*; – *CLOSED.* – *PUMP*: On-Off control pump Status : – *ON* ; – *OFF.*	.	**19.2**

COSTER
CIE CONTROLLI TEMPERATURA ENERGIA

20132 Milan	Head Office & Sales
Via San G.B. De La Salle, 4/a	Tel. +39.02.2722121 (TI) Tel. +39.02.45476193 (FW) Fax +39.02.2593645
00146 Rome	Reg. Off. Central & Southern
Viale G. Marconi, 437	Tel. +39.06.5573330 Fax +39.06.5566517
25048 Edolo (BS)	Orders and Shipping
Via Gen. Treboldi 190/192	Tel. +39.0364.7732.00/02 Fax +39.0364.770016
Web: www.coster.info	E-mail: info@coster.info

UNI EN ISO 9002
IQNet
CISQ/CSQ cert.n°9115.COEE

D 33209