D 410
10.06.10 LB
REV. 04

UNIVERSAL CONTROLLER

C←BUS

DRU 614 - DRU 618 C3 Eng.

- **Universal controller**
- **Communication systems :**
  – C-Bus for
- **Power supply: 24 V a.c. (DRU 614) and 230 V a.c. (DRU 618) or 240 V a.c. for UK market**
- **Installation on DIN rail**

CE

1. APPLICATION

DRU 614 - 618 is designed for the control of:

- a temperature measured by a passive sensor : - NTC 1kΩ (–30 … +40 °C)
  - NTC 10 kΩ (0 … 99 °C)
  - PT 1 kΩ (0 … 300 °C)

  or
- a physical measurement (pressure, level, etc) measured by an active sensor : - 0…10 V–
  - 4…20 mA

By the control of :

- 3-way modulating valve
  or
- On-Off electric switch with 1, 2, 3, 4 stages
  oppure
- convertor of 3-wire modulating signal to 0 ...10V– progressive signal

By means of C-Bus connection the controller can be inserted in a Telemanagement system.

2. FUNCTIONS

The principal functions of DRU 614 - 618 are :

- set point control
- 2 On-Off controls in relation to two controllable thresholds of the output signal or of the measurement range.
- adjustment of the value set by means of remote control
- Remote Control for switching on the controller and/or inversion of the control action..

3. SENSOR & ACCESSORIES

No.	Description	Model	Measurement range	Code	Data sheet
1	Immersion temperature sensor	**SIH 010**	0… 99 °C	B1	N 140
	Immersion temperature sensor	**SAF 001**	–40… +40 °C	B2	N 140
	Pressure sensor for liquids or vapour	**STH 001**	0… 300 °C	B3	N 140
	Relative humidity channel sensor (for pools)	**SUT 714**	10… 90 %	B6.1	N 222
	Relative humidity channel sensor	**SUR 704**	10… 90 %	B6.1	N 221
	Relative humidity and room temperature sensor	**SAU 914**	10… 90 %	B6.1	N 227
	Pressure sensor for liquids or air	**SPR 103**	0… 3 bar	B6.4	N 411
	Pressure sensor for liquids or air	**SPR 106**	0… 6 bar	B6.4	N 411
	Differential pressure sensor for liquids or vapour (with SPR 103)	**SPD 103**	0…5 / 0...10 m.c.a.	B6.4	N 421
	Differential pressure sensor for liquids or vapour (with SPR 106)	**SPD 106**	0…5 / 0...10 m.c.a.	B6.4	N 421
	Differential presssure sensor for air	**SDA 701**	0… 1 mbar	B6	N 430
	Differential presssure sensor for air	**SDA 703**	0… 3 mbar	B6	N 430
	Differential presssure sensor for air	**SDA 705**	0… 5 mbar	B6	N 430
	Differential presssure sensor for air	**SDA 730**	0… 30 mbar	B6	N 430
1	Setpoint adjuster	**CDB 100**	–	Rt	N 710
1	Convertor of modulating signal to 0…10 V.c.c.	**CSC 328**	–	Y.1-.2	D 653

1 mbar = 10 mmWG = 100 Pa

4. TECHNICAL DATA

• Electrical

Power supply:	
DRU 614	24 V a.c. ± 10%
DRU 618	230 V a.c. ± 10%
	or 240 V a.c. for UK market
Frequency	50 … 60 Hz
Consumption	5 VA
Protection	IP40
Radio disturbances	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 Electotech. Committee (CEI)
Software	Class A

• Mechanical

Enclosure	DIN 6E module
Installation	on DIN 35 rail
Materials:	
base	NYLON
cover	ABS
Ambient temperature:	
operation	0 … 45°C
storage	– 25 … + 60°C
Ambient humidity	Class F DIN 40040
Weight	0.5 kg

• Measurement ranges

Temperature :	
with B1 NTC10 kΩ	0…99 °C
with B2 NTC1 kΩ	–30…+40 °C
with B3 PT1 kΩ	0…300 °C
Pressure – liquids or vapour (B6)	0 … 16 bar
Differential pressure – liquids (B6)	0 … 6 bar
Differential pressure – air (B6)	0 … 30 mbar

• Setting ranges

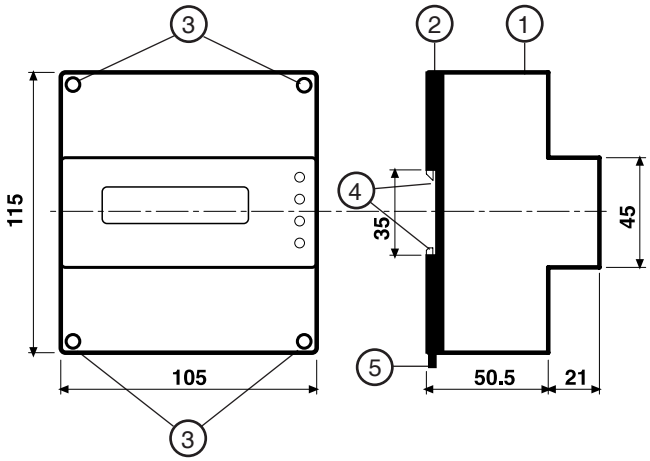
Control output :	– **3-wire modulating**
	– On-Off 2 stages
	– On-Off 3 stages
	– On-Off 4 stages
Actuator run time	30…**630** s
Proportional band	± 0.5…**10**…50 °C
Integral time	0…**20**…255 min.
Type of action outputs :	
	– **Normal** (e.g. Heating, humidifying)
	– Inverted (e.g. Cooling, dehumidifying)
Days for automatic sequence change	1…**15**…99

• Telemanagement (setting by PC)

Attempts to send alarms	1…**5**…255
Interval between sending alarms	2…**10**…255 min.

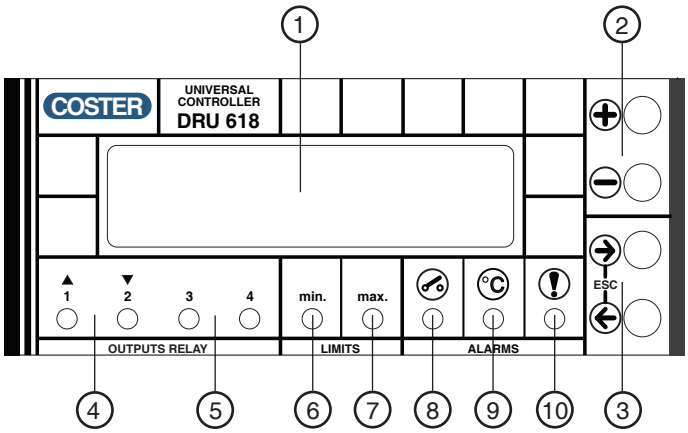
In the presence of disturbances the output signals of the controller may change status but will automatically return to normal.

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. FACIA



1 - Two-line illuminated alphanumeric display
2 - + and – operating keys
3 - ← and → operating keys
Indicating LEDs :
4 - 3-wire modulating output or On-Off in 2 stages
5 - On-Off output 3rd and 4th stage
6 - Minimum limit
7 - Maximum limit
8 - On-Off alarmsf
9 - Measurement alarms
10 - Fault alarm

7. SITING

The controller must be installed in a dry location that meets the permitted ambient conditions given under 4.TECHNICAL DATA. It must be housed in an electrical installation constructed according to standard IEC 79-14 (CEI EN 60079-14) and sited in a non-hazardous area which meets the standard IEC 79-10 (CEI EN 60079-14) in which there is not foreseen an explosive atmosphere due to the presence of gas in sufficient quantity to require special measures for the installation and use of the electrical constructions.
The controller can be mounted on a DIN rail and housed in a standard DIN enclosure.

8. ELECTRICAL CONNECTIONS

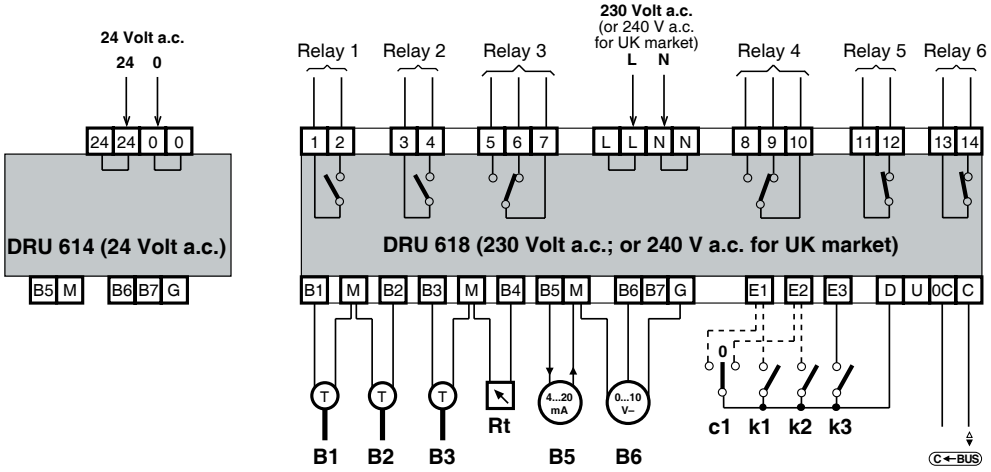
Proceed as follows :

- Separate base and cover
- Mount the base on the DIN rail and check that the securing elements (5.4) anchor it
- Make the electrical connections strictly according to the diagram and in respect of the safety regulations in force using the following cables :
  - 1,5 mm^2 for power supply and relay control outputs.
  - 1 mm^2 for sensor and the setting controller.
  - 1 mm^2 for C-Bus. For length limits see Technical Data Sheet T 021.
- Switch on power (230 V a.c. or 240 V a.c. for UK market) and check its presence at terminals L and N.
- Switch off power, replace the cover on the base/terminal block and secure it with the two screws supplied (5.3).

WARNING!

The controller, if on 24 V a.c., must be powered using a 230/24 V a.c. dedicated transformer; do not use any power from the auxiliary circuits on the electric switchboard.
It is advisable not to insert more than two cables in a single terminal and, if necessary, to use external cables.

9. WIRING DIAGRAMS

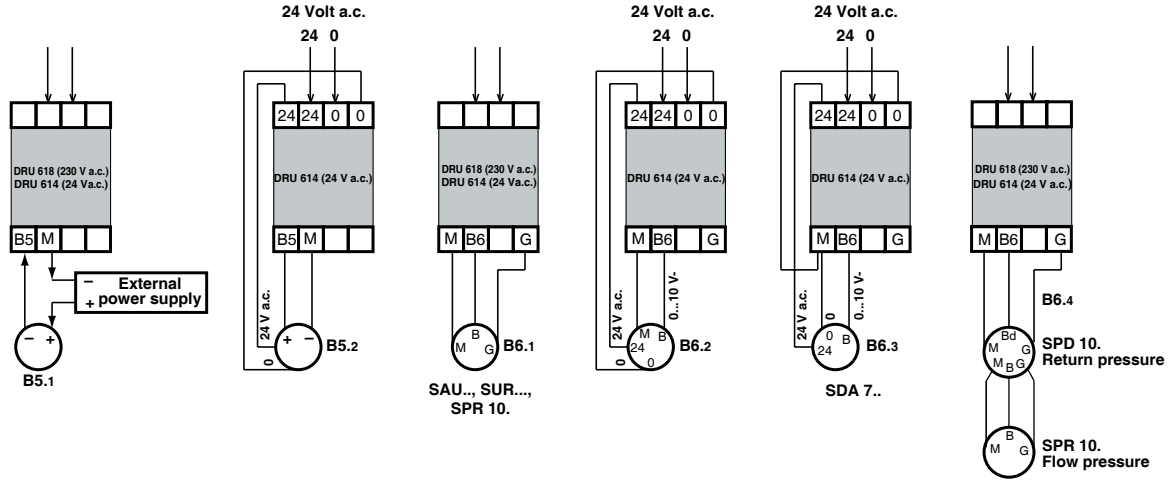


B1 – Temperature sensor NTC 10 kΩ (0 … 99 °C)
B2 – Temperature sensor NTC 1 kΩ (–30 … + 40 °C)
B3 – Temperature sensor PT 1 kΩ (0 … 300 °C)
Rt – Setpoint adjuster
B5 – 4...20 mA sensor
B6 – 0...10 V– sensor
G – 12 V– power supply output for sensor
M – 0 V– analogue for sensors
c1 – Remote Control (as alternative to alarm terminals k1 and k2)
Position 0 = controller not in operation
Position E1 = normal operation.
Increase controlled output = reduction of the power requested as output for the load (e.g. heating or humidifying)
Position E2 = inverted operation.
Increase controlled output = increase of the power requested as output for the load.
k1 and k2 – On-Off alarm switches (as alternative to c1 Remote Control)
k3 – On-Off alarm switch
D – 0 V– digital for inputs
C←BUS – Transmission data for Telemanagement
This function does not require enabling Plug-in

L - N – Line & neutral 230 V a.c. power supply = **DRU 618 = 230 V a.c. (or 240 V a.c. for UK market)**
24 - 0 – 24 V a.c. power supply : **DRU 614 = 24 V a.c.**

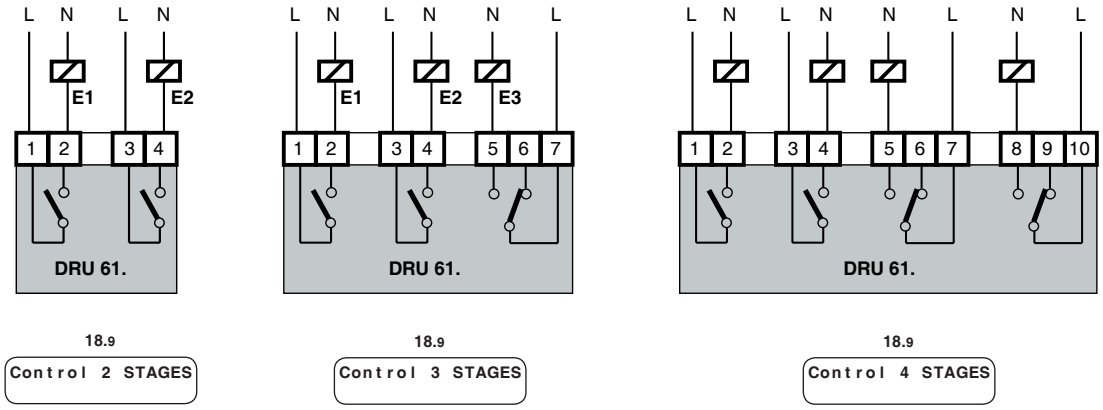
Relay 1 – Valve opens by 3-wire modulating control or
– First stage to control in1,2,3 or 4 stages
Relay 2 – Valve closes by 3-wire modulating control or
– Second stage to control in 2, 3 or 4 stages
Relay 3 – Third stage to control in 3 or 4 stages
Relay 4 – Fourth stage to control in 4 stages
Relay 5 – Minimum limit output
The minimum limit can be set as value and can be chosen on the value of the controlled output, or on the value of the load of the output action (power requested)
Relay 6 – Maximum limit output
The maximum limit can be set as a value and can be chosen on the value of the controlled output, or on the value of the load of the output action (power requested)

8.1 Examples of connecting sensors



B5.1 – 4…20 mA sensor with external power supply in series (standard mode of power supply for 4…20 mA sensors)
B5.2 – 4…20 mA sensor with separate 24 V a.c. power supply
B6.1 – 0…10 V– sensor with 12 V– power supply (e.g. SAU…; SUR…; SPR 10.)
B6.2 – 0…10 V– sensor with separate 24 V~ power supply
B6.3 – 0…10 V– sensor with 24 V a.c. power supply in common (e.g. SDA7…;)
B6.4 – 0...10 V– active sensor for differential pressure measurement (SPD 10. with SPR 10.)

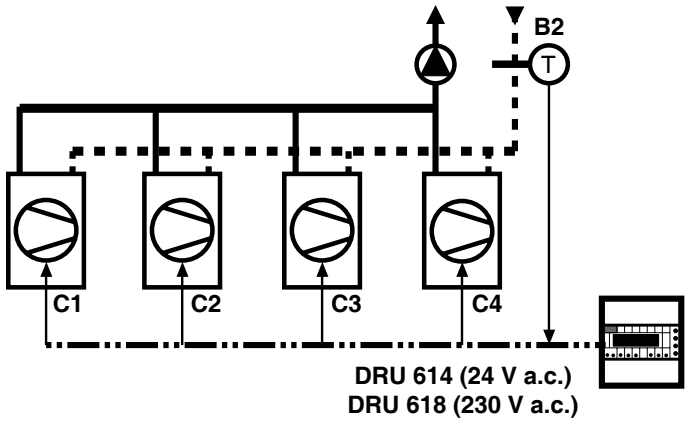
8.2 Example of On-Off Control

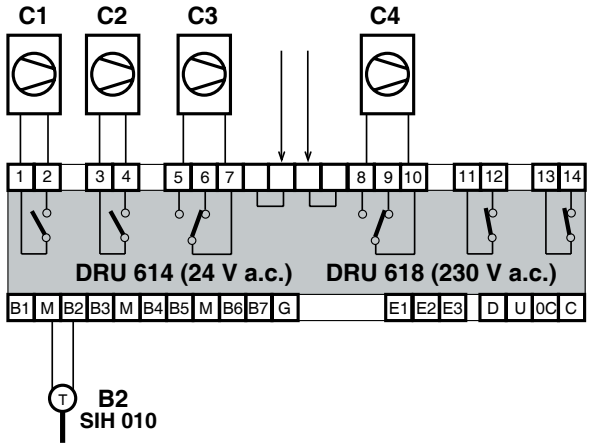


E1 – Relay control On-Off 1st stage
E2 – Relay control On-Off 2nd stage
E3 – Relay control On-Off 3rd stage
E4 – Relay control On-Off 4th stage

9. EXAMPLES OF SITES

9.1 Control of temperature of refrigerated water at fixed point with control of refrigerators in sequence

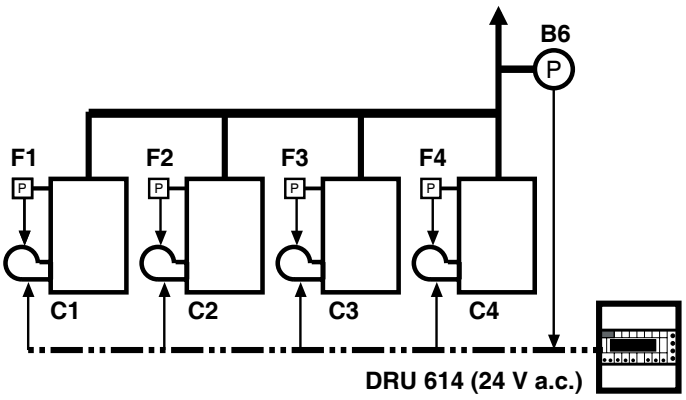


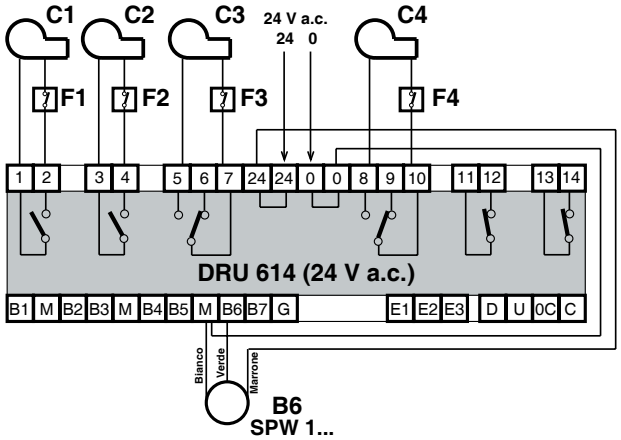


B2 – Temperature sensor NTC 1 kΩ (– 30…+ 40°C)
C 1…4 – Refrigerators

18.1	18.8	18.9
Detector Linked TEMP. NTC1kΩ	Control Action INVERTED	Control 4 STAGES

9.2 Control of vapour pressure at fixed point with boilers controlled in sequence

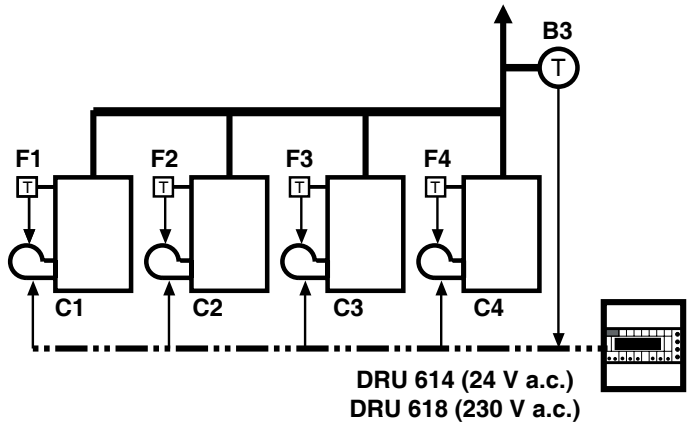


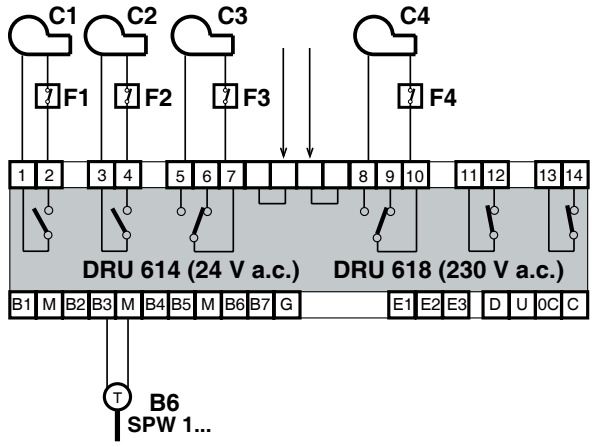


B6 – Pressure sensor 0…10 V–
C 1…4 – Boilers
F 1…4 – Pressure switch safety boilers

18.1	18.8	18.9
Detector Linked ACTIVE 0...10 V	Control Action NORMAL	Control 4 STAGES

9.3 Control temperature superheated water at fixed point with control boilers in sequence





B3 – Temperature sensor PT 1 kΩ (0 … 300 °C)
C 1…4 – Boilers
F 1…4 – Thermostats for safety boilers

18.1	18.8	18.9
Detector Linked TEMP. PT1kΩ	Control Action NORMAL	Control 4 STAGES

10. ELECTRICAL CONNECTIONS

Proceed as follows :
- Detach base from cover
- Mount base on DIN rail and check that the securing elements (5.4) hold it firmly in place.
- Carry out wiring according to the diagram and in observance of the relevent regulations in force, and using cables of:
  – 1.5 mm² for power and relay control outputs
  – 1 mm² for detectors and set-point adjuster
  – 1.5 mm² for the C-bus. For length limits, see data sheet T 021
- Switch on power (24 V~) and check voltage across terminals 24 and 0
- Switch off power, replace cover on base/terminal board and secure it with the four screws supplied (5.3).

Warning

The regulator must be energised using a dedicated transformer 230/24V a.c. (240 V a.c. for UK market).
Do not use the possible operating voltage of the auxiliary circuits in the electrical panel.

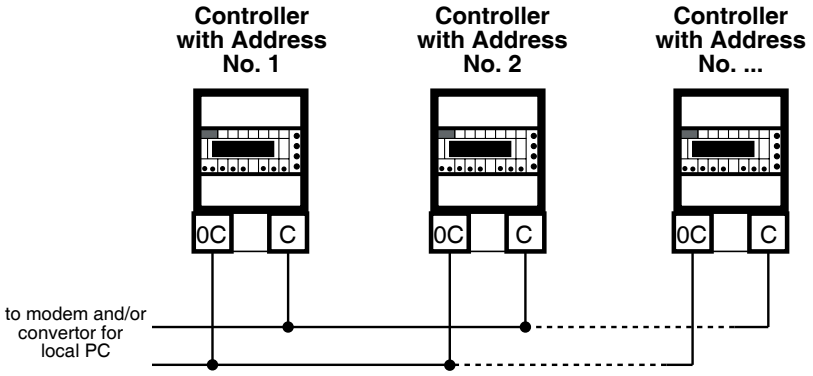
You are advise not to insert more than two cables in a single terminal of the controller. If necessary use external junction boxes.

11. COMMUNICATION

11.1 C-Bus communication for Telemanagement (for detailed information see data sheet T 021)

Via C-Bus output DRU614 - 618 can be Telemanaged (two-way transmission of data) using one or more local PCs and /or a central PC via telephone landlines.
From the PC(s) you can:
– see and/or modify the data/values on the display pages of the controller and the configuration data of the units dedicated exclusively to the Telemanagement (see “Technical Data”)
– status of the plant components (pumps, auxiliaries in general)
– acquire alarms coming from the plant
– leggere le misure della sonda

11.2 C-Bus electrical connection



11.3 Telemanagement address

18.15

```
Address :      –
Group   :      –
```

In Telemanagement, in order for the controllers to be identified by the central PC and/or by the local PCs, they must be assigned progressive address numbers:If required, the controllers can be divided into groups according to shared characteristics.

When telemanagement is not scheduled, leave the address in memory (–).
To cancel the values, keep + and – keys pressed at the same time.

11.4 Sending alarms

18.14

```
AlarmsSending:N
Password     :N
```

- Alarm sending : NO = alarms not transmitted.
  YES = alarms are transmitted to central PC & indicated by appearance of “ALARM” on display.
- Password : NO = password not entered.
  YES = password enabled.

12. OPERATION

DRU 614 - 618 is a digital controller with microprocessor which is able to operate at a fixed point on a quantity given by the utilised type of detector.

It is essential to set the type of detector connected to the controller:

18.1
Detector Linked
TEMP. NTC10kΩ

- connected detector: TEMPERATURE 1kΩ = detector NTC 1kΩ for temperatures – 30 … + 40 °C.
  TEMPERATURE NTC 10kΩ = detector NTC 10kΩ for temperatures 0 … 100°C.
  TEMPERATURE PT 1kΩ= detector PT 1kΩ for temperatures 0 … 300 °C.
  ACTIVE 0 to 10 VOLT= active detector 0to10 V for pressure, differential pressure, level, temperature, humidity and so on.
  ACTIVE 4 to 20 mA = active detector4to20 mA for pressure, differential pressure, level, temperature, humidity and so on.

Only when 18.1 Detector Linked ACTIVE..... you will be able to read :

18.2
Measure Unit:

Setting of the measurement unit for the controlled ... eg. bar, mbar, pa, cm, and so on.
Use keys + and – to replace the dashes with the letters of the alphabet.
To place the cursor use keys → and ←.

18.3
Choice of Decim.
00.0

Setting of the number in decimal: 0,00 ; 00,0 ; 000

18.4
MeasurementRange
fr --.- to --.-

Definition of the measurement range of the detector
from : – – . – = measurement at 0 V– or at 4 mA.
to : – – . – = measurement 10 V– or at 20 mA.

If 18.1 Detector linked TEMP. ..... the setting of the decimal and of the measurement range are automatically defined according to the type of detector. The measurement unit is °C

12.1 Set point

The Set Point entered can be:

18.9
Set Point
SINGLE

SINGLE : Single Set Point for Normal Action & for Reversed Action.
SEPARATED: Separate Set Points for Normal Action & for Reversed Action

17.2
Set Point :
00.0xxxx

If SINGLE, there will appear one page for entering Set Point valid both for Normal Action & for Reversed Action.

17.3
Set Point
Nor.Action: 00.0

17.4
Set Point
Rev.Action: 00.0

If SEPARATED, there will appear one page for entering Set Point for Normal Action & one page for entering Set Point for Reversed Action

The range of the Set Point, besides being defined by 18.4 MeasurementRange fr --.- to --.-

can be limited to prevent large setting errors 18.5 AdjustmentLimits fr --.- to --.-

From: - - . - = minimum limit of measurement range or setting
To: - - . - = maximum limit of measurement range or setting

By means of **+Rt** set-point adjuster you can adjust set point(s) by remote control
Setting range of adjuster can be limited by 18.6 Adjuster Limits ±00.0

17.5
Set Point
Adjust: 00.0xxxx

Display of the variation set on Rt adjuster

17.2
Set Point
Nor.Act:00.0xxxx

With Normal Action current.
Display of effective Set Point resulting from algebraic sum of values in 17.3 and in 17.5.

17.2
Set Point
Rev.Act:00.0xxxx

With Reversed Action current.
Display of effective Set Point resulting from algebraic sum of values in 17.4 and in 17.5.

12.2 Control

The controller compares the Set Point with the value measured by the sensor and responds with a control action according to the difference and the parameters Proportional Band & Integral Time set:

Parameters for Normal Action

18.11
P.B Nor: 00.0xxx
Integral T. :20m

- PB Nor : ± 10.0 xxxx = Proportional Band in ±°C or xxxx (18.2).
- Integral T : 20 m = Integral Time in minutes

18.12
P.B Rev: ±10xxxx
Integral T. :20m

- PB Rev : ±10.0xxxx = Proportional Band in ±°C or xxxx
- Integral T : 20 m = Integral Time in minutes

The control action can be given from the Remote-control c1 if 18.7 Inputs E1-E2: REMOTE CONTROL

position 1 (D-E1 closed; D-E2 open) = control action NORMAL
position 2 (D-E1 open; D-E2 closed) = control action INVERTED
position 0 (D-E1 and D-E2 open) = disconnected controller (closed actuator)

or it can be manually set in the display if 18.7 Inputs E1-E2: ALARMS

18.8
Control Action
NORMAL

- Control Action : NORMAL : increase of the measured value = decrease of the control value
  INVERTED : increase of the measured value = increase of the control value

12.3 On-Off control output

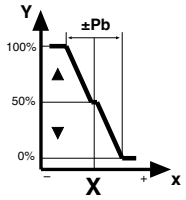
The On-Off control output can be:

18.9
Control MODULAT.
Time : 630sec

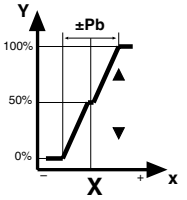
- MODULATING control = three-wire modulating control (outputs: 1-2; 3-4)
  2-WIRE control = On-Off two-stage control (outputs: 1-2; 3-4)
  3-WIRE control = On-Off three-stage control (outputs: 1-2; 3-4; 5-7)
  4-WIRE control = On-Off four-stage control (outputs: 1-2; 3-4; 5-7; 8-10)
- Time : 630 seconds = run time of the actuator valve, essential for the correct functioning of the regulator . It is shown only with MODULATING control.

Three-wire modulating output (1-2 ; 3-4) 18.9 Control MDDULAT. Time : xxxsec

18.8 Control Action: NORMAL

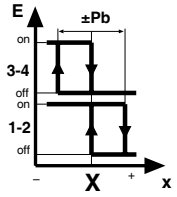


18.8 Control Action: INVERTED

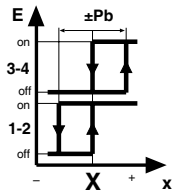


On-Off two-stage output(1-2 ; 3-4) 18.9 Control 2 STAGES

18.8 Control Action: NORMAL

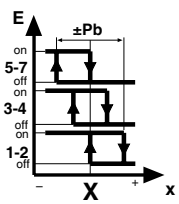


18.8 Control Action: INVERTED

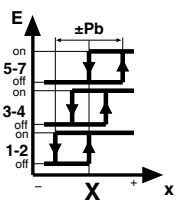


On-Off three-stage output (1-2 ; 3-4 ; 5-7) 18.9 Control 3 STAGES

18.8 Control Action: NORMAL

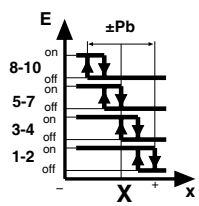


18.8 Control Action: INVERTED

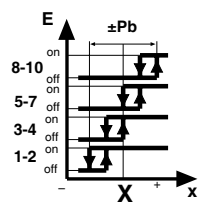


On-Off four-stage output (1-2 ; 3-4 ; 5-7 ; 8-10) 18.9 Control 4 STAGES

18.8 Control Action: NORMAL



18.8 Control Action: INVERTED



Pb – Proportional band or sequence differential
Pb / No. stages = stage differential
E – On-Off outputs

Y – Modulating output
x – Actual value
X – Adjustment point

12.4 Stage sequence

18.9 `Control ..STAGES` When it is this it is possible to modify the sequence of stages

17.5 `Sequence Choice AUTO. SWITCHING`

The sequence can be:

- Sequence choice : LEADS…= fixed sequence with choice of lead stage
  AUTO CHANGE OVER= automatic sequence change over

at set times 17.7 `Auto. Switching every: 15 days`

17.6 `Present Sequence BASE 1`

It is possible to modify, at any time, the set lead stage given by the auto change over without altering the sequence choice.
In case of change, the sequence will be valid for the remaining days before the auto change.

Example :

17.5 `Sequence Choice AUTO. SWITCHING` 17.6 `Present Sequence BASE 1` 17.7 `Auto. Switching every: 15 days`

For 15 days : Lead 1 and sequence = 1 - 2 - 3 - 4
After 15 days : Lead 2 and sequence = 2 - 3 - 4 - 1
After 30 days : Lead 3 and sequence = 3 - 4 - 1 - 2
After 45 days : Lead 4 and sequence = 4 - 1 - 2 - 3

When manually modify after 5 days from setting you will get 17.6 `Present Sequence BASE 3`

For the following 10 days : Lead 3 and sequence = 3 - 4 - 1 - 2
After 15 days : Lead 4 and sequence = 4 - 1 - 2 - 3
After 30 days : Lead 1 and sequence = 1 - 2 - 3 - 4
After 45 days : Lead 2 and sequence = 2 - 3 - 4 - 1

12.5 Limit controls

The controller can operate 2 On-Off relay controls to be used as minimum limit (11-12) and maximum limit (13-14) in relation to:

18.11 `Limit Action on MEASURAMENTRANGE`

- Limit activation on MEASUREMENT RANGE = measurement range of the adjusted value
  CALCULATED OUTPUT = value of control output 0... 100%

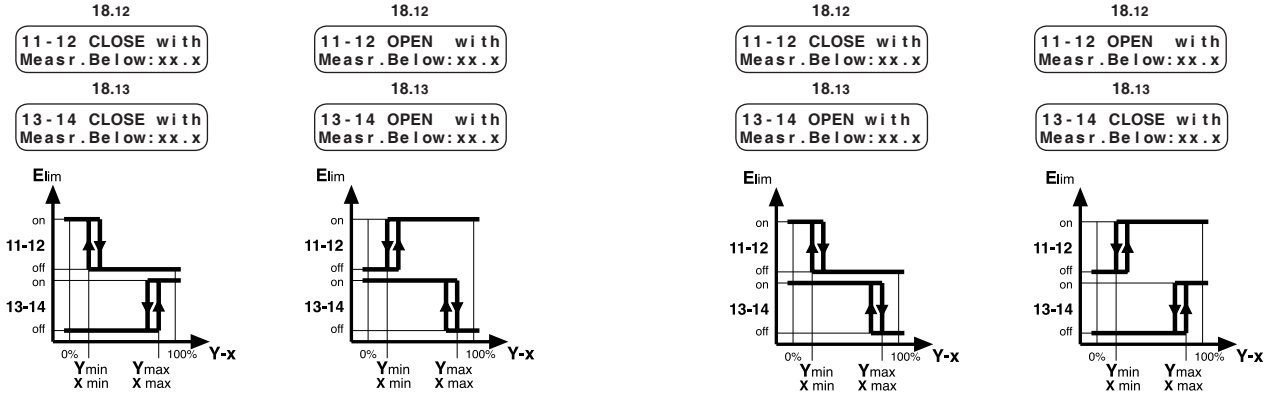
18.12 `11-12 CLOSE with Measr.Below:xx.x`

- Choice type of activation for minimum limit relay 11-12 : CLOSED ; OPEN
- Value setting (Output or Value) below which the minimum limit relay is switched on

18.13 `13-14 CLOSE with Measr.Below:xx.x`

- Choice type of activation for maximum limit relay 13-14 : CLOSED ; OPEN
- Value setting (Output or Value) above which the maximum limit relay is switched on.

The possible combinations are :



Elim – On-Off limit outputs
Y – Output control range
x – Measured value range

Y_{min} – Minimum limit control output
Y_{max} – Maximum limit control output
X_{min} – Value minimum limit
Y_{max} – Value maximum limit

13. OTHER FUNCTIONS

13.1 Key number

18.19

```
Password choice
      ----
```

The choice and activation of key number, unables the use of + and – keys and therefore the altering of values. Enter the number (1900 ... 1999) using the + and – keys.
To cancel the key number press + and – keys at the same time until dashes reappeared in the display.

```
Password
      ----
```

Once the key number has been entered in the system if you press + and – keys you will be asked to insert the key number in the display. Only after you have entered the correct key number you will be able to use the + and – keys. If no key is press within the following 15 minutes the key number will automatically be activated

13.2 Plant name

18.20

```
Site name
----------------
```

Entering of plant name and/or type of control which is shown on the first page of the display. By using + and – keys, each dash can be replaced by a letter of the alphabet (A...Z) or by a number (0...9).
Il tasto → key must be used to place the cursor.

13.3 Value display

The controller displays the useful value to help you understand the state of the plant.:

17.1

```
----------------
Mesure: 00.0xxxx
```

- Plant name and/or type of control
- Real value of the measured value by detector.

17.4

```
CalculatedOutput
     00.0%
```

- Output control value measured by controller

17.8

```
Stage 1:00000 h
Stage 2:00000 h
```

- working hours calculation Stage 1
- working hours calculation Stage 2

17.9

```
Stage 3:00000 h
Stage 4:00000 h
```

- working hours calculation Stage 3
- working hours calculation Stage 4

14. ALARMS

The alarms connected to the controller are of three types:
- alarms for functioning faults of the controller (led 6.10) and of the controlled plant (led 6.9)
- alarm for short circuit or open circuit of the connected temperature detector (led 6.9)
- alarms from external contact (led 6.8)

The type of alarm is shown by the leds placed on the facia of the controller and by ALARM written in the display when the alarm is sent to the PC and it is identified on the configuration page by the alternation of the letter 'A' with the alarm number in question.
Via a C-Bus connection the alarms can be sent to a local PC and/or to the main telemanagement one.

14.1 Operational Alarms

The operational alarms occurs when the difference between the real and desired values remains so for a certain period of time.
The operational alarms do not interfere with the normal function of the controller.
"All the operational alarms are disabled when 'Factory setting'.
To set the various alarms use + and – keys and substitute dashes with numbers.
When the number flashes: Alarm trigged.
The limit values and waiting times for the alarm sending can only be altered via PC.

18.16
```
Function Alarms
– – –
```

Type of alarms and reasons:
1 = difference between real value and desired value
– the alarm is sent whether the difference between the values is higher or lower than set one
2 = minimum limit active
– sent when relay contact 11-12 is closed
3 = maximum limit active
– sent when realy contact 13-14 is closed.

14.2 Detector alarm

The display page is shown only if 18.1
```
Detector Linked:
TEMP.  .......
```

The detector alarm is trigged when there is an open circuit or a short circuit of the temperature detector. The alarm result is postpone by a minute.
"'Factory setting' is disabled.
Enable the alarm using + and – keys.

18.17
```
Detector Alarm
–
```

Type of alarm and effect:
1 = temperature detector : the valve stops at that stage.

14.3 Alarms or status by external contact (K)

Alarms caused by the closing of contacts k 1...3, without potential, of plant equipments. (pumps, burner ect.)

11 and 2 are shown only if 18.7
```
Input    E1-E2:
ALARMS
```
is set

The alarm signal is set after about 60 seconds
"'Factory setting' are disabled.
Enable the alarm in question by using + and – key to substitute the dashes with numbers
If the inputs are not used as alarms they can be used as state signals (only if there is C-Bus connection to PC).

18.18
```
K Alarms
– – –
```

15. TESTING

Testing can only be carried out when the installation, electrical connections and configuration have been completed and checked.

15.1 Output testing

19.1

```
Output :MODULAT.
Status: IDLE
```

Using + and – keys choose:

- the output to be tested:
  - – MODULATING (only if **18.9** is MODULATING);
  - – STAGE 1 ; STAGE 2 ; (if **18.9** is 2 or 3 or 4 STAGES);
  - – STAGE 3 (if **18.9** is 3 STAGES);
  - – STAGE 4 (if **18.9** is 4 STAGES);
  - – LIM. MIN ; LIM. MAX (always);
- the status :
  - – with MODULATING ; IDLE ; CLOSES ; OPENS
  - – with STAGE ...; LIM... ; OPEN ; CLOSE.

Check the result.

15.2 Testing active detector

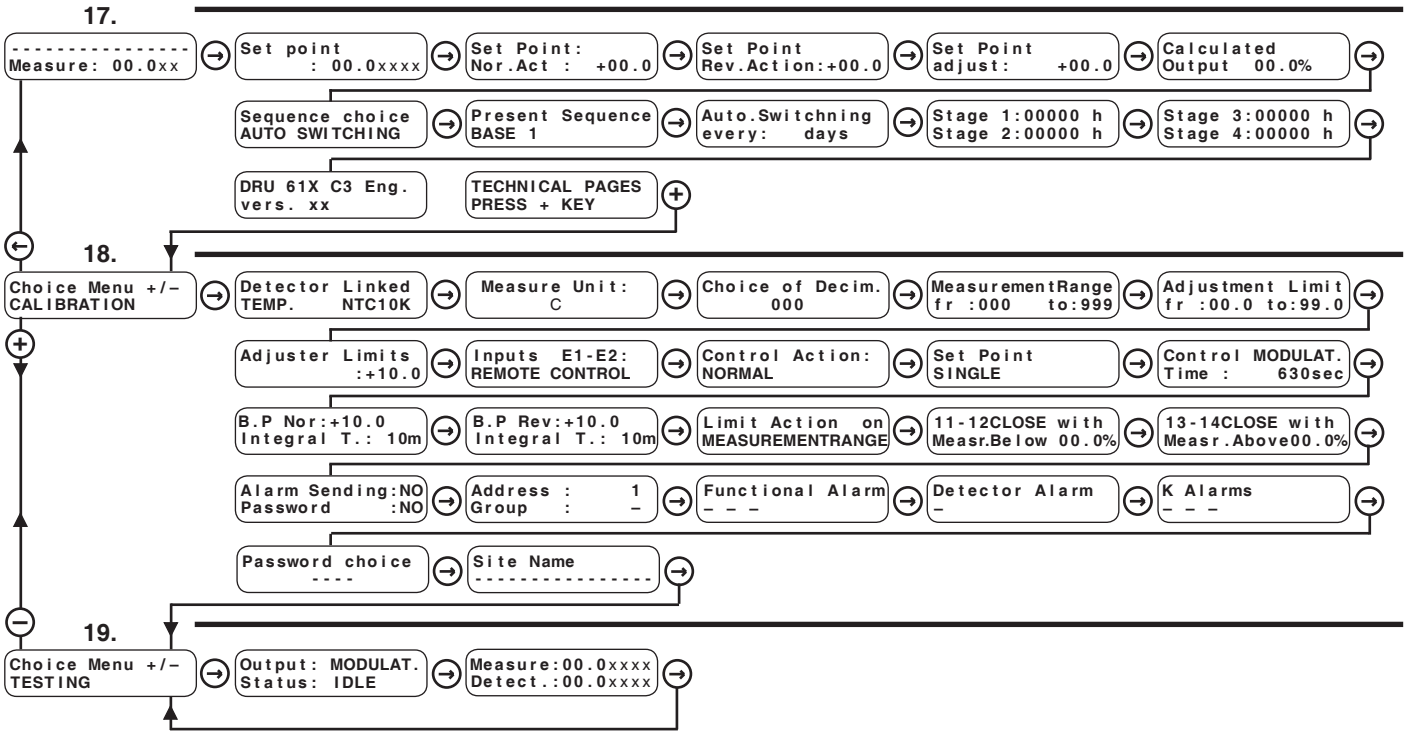
19.2

```
Measur.   : 00.0
Detector  : 00.0
```

It is possible to check the correspondence of the detected values by the active detector, using the adjustment setting:

- value detected by detector transformed into quantity given by the ‘adjustment’ data
- value of the signal 0...10 V– or 4...20 mA of the active detector.

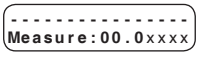
16. SEQUENCE OF DISPLAY PAGES (the data and functions are those set at factory)



⊖ ⊕ Keys for scrolling the display pages and positioning the cursor on adjustable data on the pages.

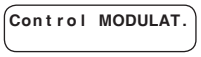
The adjustable data, in the following descriptive tables of display pages are highlighted by

By pressing these keys together, or in any event after 15 minutes, the first page returns to the display

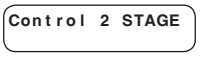


⊖ ⊕ Keys for : – adjusting the values highlighted by the cursor

– displaying the configuration options of a function, e.g. :



or



– switch directly from one menu (block of pages) to another.

17. NORMAL USE

REf.	Display	Description	Notes	Sect
17.1	---------------- Measure:00.0xxxx	Name site and / or type of control Actual measurement of output controlled.	Set in **18.20** If **18.1** is TEMPERAT. the measurement unit is °c If **18.1** is ACTIVE..... the measurement unit is that entered in **18.2**	13.3
17.2	Set point Nor.Act: 00.0xxxx	Display of Set Point & of action in use. xxxx = °C or measurement unit (18.2)	**Nor Act:** with Normal action current. Algebraic sum of values **17.3** & **17.3** **Rev Act**: with reversed action current. Algebraic sum of values **17.4** & **17.3**	12.1
	Control OFF:	Appears when controller is off. Input switches E1-D & E2-D open.		
17.3	SetPoint: 00.0xxxx	Entering set point for Normal action & Reversed action.	Appears with SetPoint: SINGLE **18.9**.	12.1
	SetPoint: Nor.Act +00.0	Entering set point for Normal action.	Appears with SetPoint: SEPARATED **18.9**.	12.1
17.4	SetPoint: Rev.Act +00.0	Entering set point for Reversed action.	Appears with SetPoint: SEPARATED **18.9**.	12.1
17.5	SetPoint: Adjust +00.0	Display of variation set on Rt set point adjuster.	Appears only if Rt connected. Range limited by settings in **18.4** & **18.5**.	12.1
17.6	Calculated Output 00.0%	Value calculated by controller for control output.		13.3
17.7	Sequence choice AUTO. SWITCHING	type of sequence choice : AUTMAT. SWITCHING; BASE 1 ; BASE 2 ; BASE 3 ; BASE 4 .	It shows only if **18.9** is 2, 3, 4 STAGES	12.4
17.8	Present Sequece BASE 1	Current type of sequence The basic stage can be modified using + and – keys.	It shows only if **18.4** is AUTO SWITCH	
17.9	Auto. Switching every: 15 days	Number of days for switching of automatic sequence	It shows only if **18.4** is AUTO SWITCH	12.4
17.10	Stage 1:00000 h Stage 2:00000 h	Hours count for stage 1 operation Hours count for stage 2 operation	It shows only if **18.9** is 2, 3, 4 STAGES	13.3
17.11	Stage 3:00000 h Stage 4:00000 h	Hours count for stage 3 operation Hours count for stage 4 operation	It shows only if **18.9** is 3, 4 STAGES.	13.3
17.12	DRU 61X C3 Eng. Vers.xx	Controller identity data.		

18. CALIBRATION

Ref.	Display	Description	Notes	Cap.
18.1	Detector Linked: TEMP. NTC10k	Used detector: TEMP.NTC1k; TEMP. NTC10K; TEMP.PT1k;ACTIVE 0÷10VOLT; ACTIVE 4÷20mA		12.
18.2	Measure Unit: c	Types of measure Examples: c; bar; mbar; Pa; cm; ecc.	It shows only if **18.1** is ACTIVE ..... Use + and – to insert characters or numbers Use ← and → to change cursor position	12.
18.3	Choice of Decim. 000	Choice of decimals of the measure: 0,00 ; 00,0 ; 000.	It shows only if **18.1** is ACTIVE	12.
18.4	MeasurementRange Fr :000 to: 999	Measurement range for the connected detector. From : - - . - = measure from 0 V– o to 4 mA. to : - - . - = measure from 10 V– o to 20 mA.	It shows only if **18.1** is ACTIVE	12.
18.5	AdjustmentLimits Fr :000 to: 999	Set limits for the Adjustment Point. From : - - . - = minimum value to : - - . - = maximum value	It prevents setting errors of the Adjustment Point.	12.1
18.6	Adjuster Limits +10.0	Variation limits allowed to set-point adjuster Rt		12.1
18.7	Inputs E1-E2: ALARMS	Input setting E1-E2 : REMOTE CONTROL; ALARMS.	REMOTE CONTROL = when c1 is connected c1. ALARMS = when k1 and/or k2 are connected.	12.2 14.3
18.8	Control Action: NORMAL	Type of action of the output control: NORMAL: measure increase = output decrease. INVERTED: measure increase = output increase.	It shows only if **18.7** is ALARMS eg : NORMAL for Heating; INVERTED for Cooling	12.2
18.9	SetPoint: SINGLE	Type of action of control output: SINGLE: Single Set Point for the two actions. SEPARATED: Separate Set Points for the two actions.		12.2
18.10	Control MODULAT. Time: 630sec	Type of control : MODULATING ; 2 STAGES ; 3 STAGES; 4 STAGES ; Run time of the valve actuator.	Run time shows only if MODULATING	12.3
18.11	B.P Nor: +10.0 Integral T.: 20m	Proportional Band & Integral Time of NORMAL action xxxx = °C or measurement unit (**18.2**)	To eliminate Integral Time press + and – at same time until – – –.	12.2
18.12	B.P Rev: +10.0 Integral T.: 20m	Proportional Band & Integral Time of REVERSED action xxxx = °C or measurement unit (**18.2**)	To eliminate Integral Time press + and – at same time until – – –.	12.2
18.13	Limit Action on MEASUREMENTRANGE	Action range of the limit controls: MEASUREMENT RANGE: described in **18.4** CALCULATED OUTPUT: output control value calculated by the controller (0…100 %).		12.5
18.14	11-12 CLOSE with Measr.Below: 00.0	Minimum limit operation : : – contact operation 11-12 : CLOSED or OPEN – Measure or Output : it depends on **18.11** – Operation with value under xx.x ;	If Measure : decimals described in 18.3 with range described in **18.4** If Output: xx.x in % of the calculated output	12.5
18.15	13-14 CLOSE with Measr.Above 99.0	Maximum limit operation : – contact operation11-12 : CLOSED or OPEN – Measure or Output : it depends on**18.11** – Operation with value above xx.x;	If Measure : decimals described in**18.3** with range described in **18.4** If Output : xx.x in % of the calculated output..	12.5
18.16	Alarm Sending: N Password : N	Enabling alarms to be sent to Telemanagement PC Enabling Telemanagement password.	Necessary only if it is C-Bus connected.	11.4
18.17	Address : --- Group : -	Telemanagement address of the equipment Group of the equipment	Necessary only if it is C-Bus connected.	11.3
18.18	Function Alarms – – –	Enabling functional alarms Factory setting: all disabled	1 : Difference between actual and desired measures 2 : Minimum limit operation 3 : Maximum limit operation	14.1
18.19	Detector Alarm –	Enabling short circuit alarm or open circuit temperature detector. Factory setting: disabled	It shows only if **18.1** is TEMPERATURE.....	14.2
18.20	K Alarms – – –	Enabling On-Off alarms Factory setting : all disabled	1…3 : inputs E 1…3, alarms from contacts k1…3. 1 e 2 : can be enabled only if it shows ALARMS in **18.7**	14.3
18.21	Password Choice ----	Password choice for + and–- keys prevention: 1901…1999	To cancel password press + and – together.	13.1
18.22	Site Name ----------	Site name and/or type of control	Use + and – to insert characters or numbers Use ← and → to change cursor position	13.2
18.23	Coeff. K1 010 Coeff. K2 008	Setting of the 1st order filter coefficients on 0-10V or 4-20 mA input signal	Always leave factory settings. Any changes to these parameters must be agreed with COSTER technical service	13.2

19. TESTING

Ref.	Display	Description	Notes	Sect.
19.1	Output : MODULAT. Status : IDLE	Choice of outputs to be tested Choice output status	Choice of output : MODULATING (only if **18.9** is MODULATING); STAGE 1 ; STAGE2 ; (if **18.9** is 2 or 3 or 4 STAGE); STAGE 3 (if **18.9** is 3 STAGES); STAGE 4 (if **18.9** is 4 STAGES); MIN LIMIT ; MAX LIMIT (always); Choice of Status: with MODULATING : IDLE ; OPEN ; CLOSED. with STAGE .. ; LIMIT .... : OFF ; ON	15.1
19.2	Measr. : 00.0 Detct. : 00.0xxxx	Value measured by detector Signal value 0...10 V or 4...20 mA of the detector	It shows only if 18.1 is ACTIVE	15.2

Amendment data sheet

Data	Revision No.	Page	Section	Amendments description	Firmware version	Software version
09.11.05 LB		1	3	Updated the detector model (Immersion temperature detector SAF001 intead of SIH 001).		
26.07.06 LB		6 7	12.1 12.2	Option of entering Set Point for Normal and Reversed Action. Setting Proportional Band and Integral Time separately for Normal and Reversed action.		
12.02.08 LB	**01**	1, 12, 13	16, 17	New C3 version (Reduced number of recordings)	= 04	≥ 098.23.40
25.02.08 LB	**02**	14	18	New display page 18.23	= 04	≥ 098.23.40
12.05.09 AM	**03**	all 14	all 17	ADD 230 Volt version (DRU 618) Update screen shot 17.12	= 04	≥ 098.23.40
10.06.10 VM	**04**	1 4	3. SENSOR AND ACCESSORIES 9.2 Active sensor connection examples	Add new sensor SPD 10. and SPR 10.		

COSTER
CONTROLLI TEMPERATURA ENERGIA
COSTER TECNOLOGIE ELETTRONICHE S.p.A.
Sede Legale: 20132 Milano - Via San G.B. De La Salle, 4/a

Head Office & Sales
Via San G.B. De La Salle, 4/a Tel. +39 022722121
20132 - Milano Fax +39 022593645
Orders Fax +39 0227221239
Reg. Off. Central & Southern
Via S. Longanesi, 14 Tel. +39 065573330
00146 - Roma Fax +39 065566517
Shipping
Via Gen. Treboldi, 190/192 Tel. +39 0364773200
25048 - Edolo (BS) Tel. +39 0364773202

E-mail: info@coster.info Web: www.coster.eu

D 33158