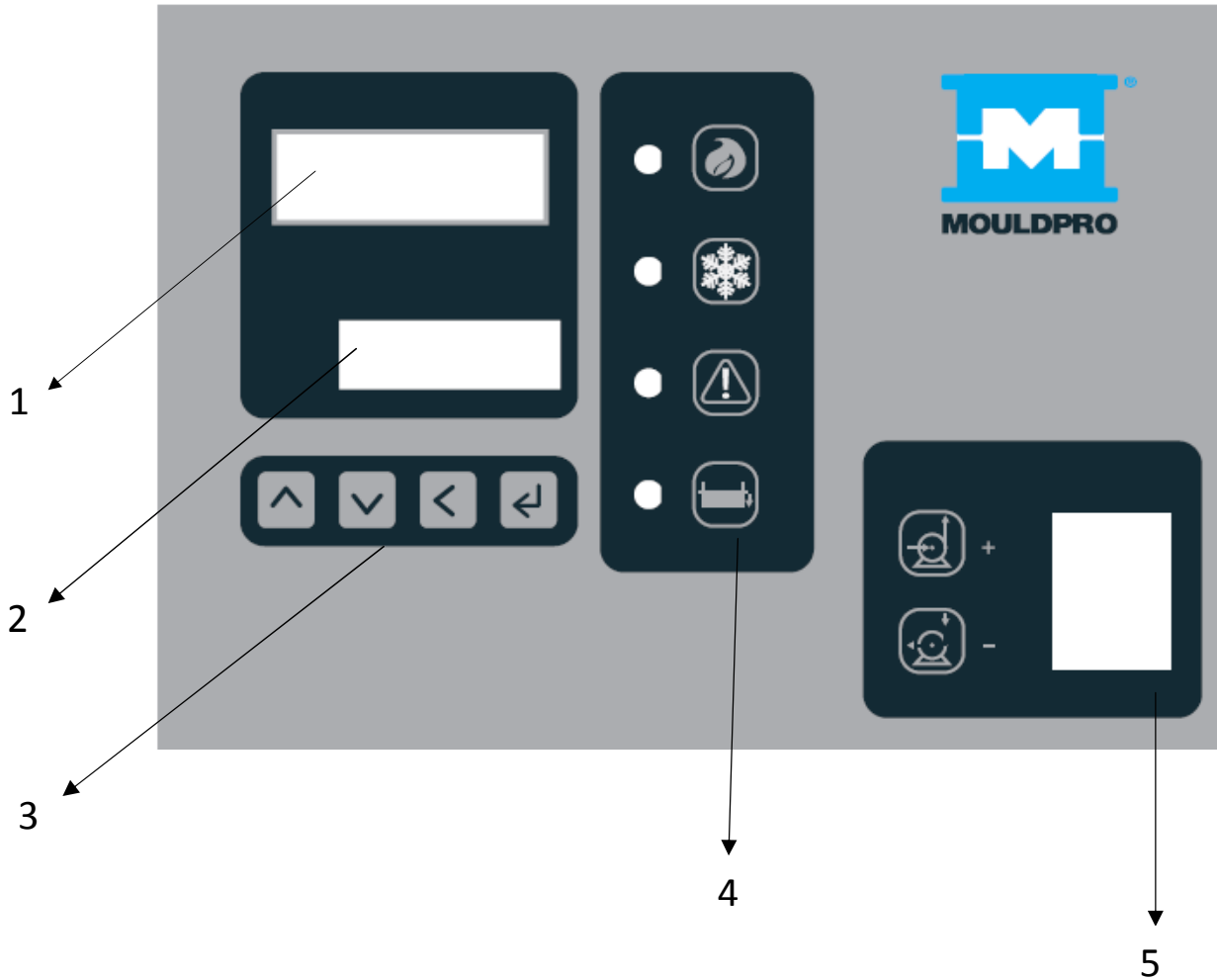


Index

1. Overview front.
2. Information on the screen.
3. Viewing alarms and their performances in the process.
4. Operation of the keyboard.
5. LEDs process information and start pump.
6. Sets control programming.
7. Leak monitoring process.
8. Control relays configurable to user and application examples.
9. Description card connectors.

1. Overview front



- 1- Outlet temperature to process.
- 2- Set point
- 3- Function keys.
- 4- LED's process information.
- 5- Switch pump and heating operation.


2. Information on the screen



A Outlet temperature to process.

B Set point

More information pcb card can show us in the screen

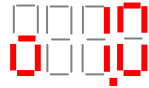
By default, leak monitoring is activated, showing  in B area.
“ L ” stop flashing when leak monitoring enters surveillance.

Depending on TCU model and activated options, pressing the key

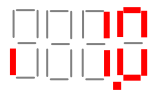


Will be shown on the display in B area.

Pressure pump outlet



Return pressure process



Process flow in return




Return temperature

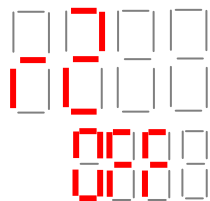


Return process thermocouple open

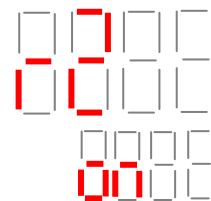


Other messages can be seen in A-B area pressing  if TCU unit has activated configurable relays (R2 or R3).

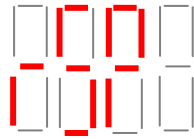
Configured relays



Activated relays



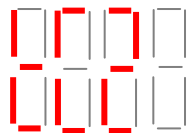
If REMOTE SET POINT function is activated by a signal 4..20mA or external 0..10Vdc, in B area will show in cycles of 3 seconds



If TCU unit is working through RS485 or 0..20mA communications in B area will show in cycles of 3 seconds



If we had more machines linked, second TCU unit will show in cycles of 3 seconds



3. Alarm display

In A-B zone will show all alarm situations, which can be:

Maximum process start time. User adjustable. Restarts TCU unit

00:00
00:00

Minimum return flow alarm. User adjustable. Disables heating.

0000
0000

Connection between flow meter and PCB card is open.
Disables heating.

0000
0000

Connection between process pressure transducer and PCB card is open.

0100
0100

Connection between return process pressure transducer and PCB card is open

0000
0000

Connection between Remote set point signal 4..20mA o 0..10Vdc is open . Holds last Setpoint value

No connection between PCB card and RS485 o 0..20mA.
Holds last Setpoint value

Thermocouple open.

Disable the heating and pump. Restarts activation leak monitoring

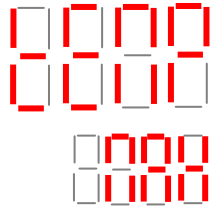
Overload pump protection.

Disable heating and pump. Restarts activation leak monitoring

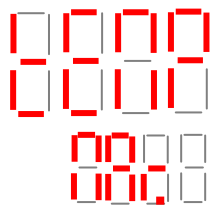
Maximum drive pump. User adjustable.

Disable heating and pump. Restarts activation leak monitoring

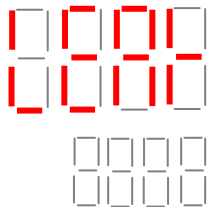
Maximum temperature difference between process and setpoint.
User adjustable



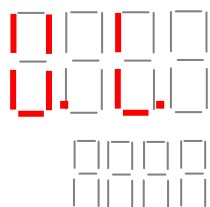
Maximum and minimum temperature difference between process and setpoint. User adjustable.




Possible water leaking problem in the process.
Disable heating and pump. Restarts TCU unit.

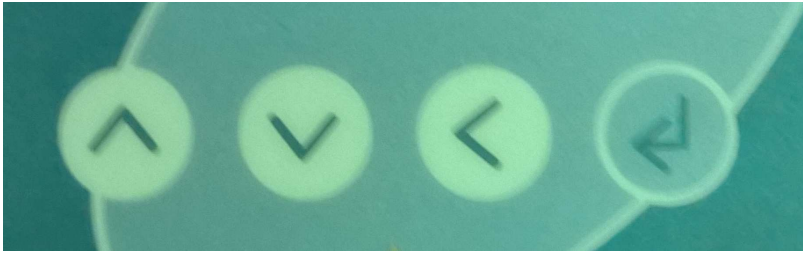





Low water level for more than 10 seconds continuously in the TCU unit tank. Disable heating and pump. Restarts TCU unit.





Press  to validate the alarm. If the alarm condition persist message will appear in the display and will act again.



4. Keyboard operation.



To change set point press . Digit on the right side will flash, to change the value press  or .

In order to change the digit press .





Press  to save changes.

To enter the programming SETS, hold the key  and then hold simultaneously the key .

Then in A zone of the display will show ST-0 :

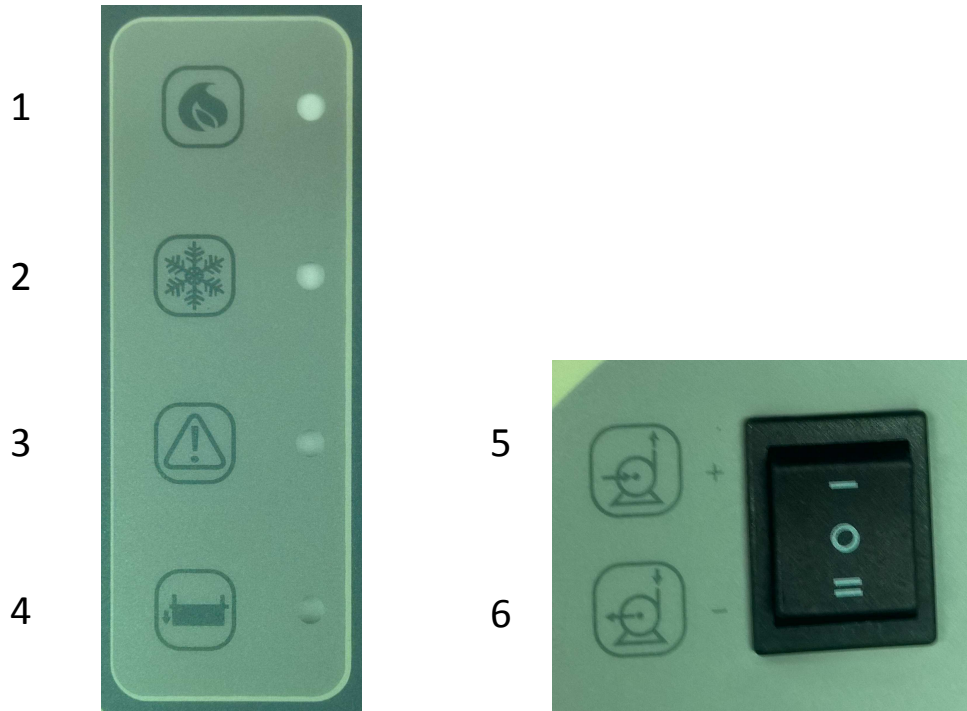
To go to the desired ST press .

Once in the desired ST, press  We visualize the first parameter in the ST.

To change the parameter press , to change the parameter value press the keys  or  to change the digit press .

To save changes press .

5. LEDs process information and start pump.



1 Heating led

2 Cooling led.

3 Overload TCU pump led.

4 Low fluid level led.

5 Pump pressure function.

6 Pump depression function.

IMPORTANT:

Check pump rotation, it must be clockwise.

6. Programming Sets.

To view and modify programming sets.

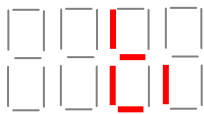
(See page 10).

Depending on the type of PCB card, and incorporated options into the TCU unit, there are parameters that are not activated.

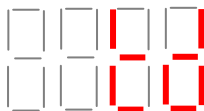
ST-0



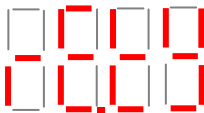
Proportional band of the PID control. Self-adjusting.



Integral time of PID control. Self-adjusting.



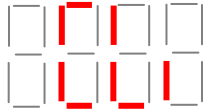
Derivative time process. Self-adjusting.



Relay type heating. Not modifiable by the user.

SSR- Enables heating through solid state relays.

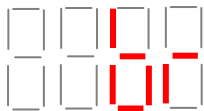
Cont- Activates the heating through the contactor KM3.



Heating ramp. Do not change without consulting the manufacturer.

This parameter is activated when entering the PID control.

In cycles 10 seconds, if the temperature has not exceeded this value in degrees, will activate again heating. If on the contrary it has exceeded, heating is not activated until the next cycle, which will return him to look.



Heating Brake. Do not change without consulting the manufacturer.

Heating gives 100% less the value of "**br**". When it comes down to this value, start the PID control.

In pressurized water machines when set point is more than 105 °, PID control began at 95 °.

ST-1



Cooling proportional value. Self-adjusting.

Do not change without consulting the manufacturer.

It is no unit of measure (proportional value that multiplies the time the cooling solenoid valve is connected. This time is given by the PID).



Cooling Brake . Do not change without consulting the manufacturer.

Cooling gives 100% to the working temperature plus "**CL.br**" value. When it comes down to this value, start the PID control.

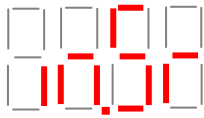


Cooling ramp. Do not change without consulting the manufacturer.

This parameter is activated when entering the PID control.

In cycles of 8 seconds, if the temperature has not exceeded this value, it will activate again cooling. If on the contrary it has exceeded, cooling is not activated until the next cycle, which will return him to look.

ST-2



Type of thermocouple. Do not change without consulting the manufacturer.

We choose if the thermocouple is J type (TC 1) or Pt1000 (Pt1).



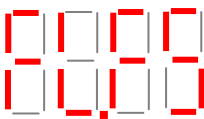
Flow meter activation.

Activate or not the flowmeter. On-OFF.



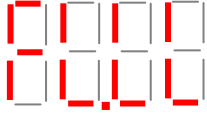
Flowmeter signal. Do not change without consulting the manufacturer.

Flow meter signal is done by 4..20mA (SrC.A) or 0..10Vdc (SrC.u).



Full scale of the flow meter. Do not change without consulting the manufacturer.

Maximum value in l/min. According flow meter specifications.



Flow meter initial scale. Do not change without consulting the manufacturer.

Minimum value in l/min. According flow meter specifications.



Alarm flow meter. User adjustable.

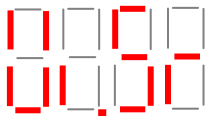
Minimum value in l/min flow meter to activate the alarm.



Activation return sensor.

Activate or not in the display the return / external thermocouple

On-OFF.



Type of return / external thermocouple

We choose if the thermocouple is J type (TC 1) or Pt1000 (Pt1).

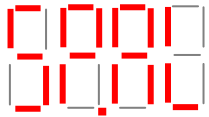
ST-3



Temperature type alarm.

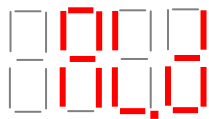
rEL: relative on the set point. Just above value as "SP.AL" parameter.

GAP: on the set point above and below value as "SP.AL" parameter. Activatable when TCU unit reached the set point.



Overtemperature alarm.

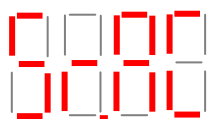
It is the alarm value in degrees will act respect to the set point.



Alarm relay action.

dir: Connector CNM1 activates the signal alarm by NO contact .

rEu: Connector CNM1 activates the signal alarm by NC contact.



Enabling remote set point.

Activate or not the remote set point On-OFF.



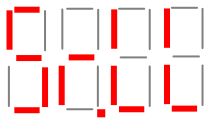
Remote set point.

Remote set point signal "SrC.A" 4..20mA or "SrC.u" 0..10Vdc



Full scale remote set point.

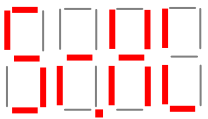
It is the value in degrees of the maximum temperature of the remote set point.



Minimum scale remote set point.

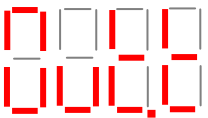
It is the value in degrees of the minimum temperature of the remote set point.

IMPORTANT: If TCU unit has selected the entry "Sr.SC" as "SrC.u" (input 0..10Vdc) the minimum range may not be the value in degrees 0Vdc.



Maximum value of remote set point.

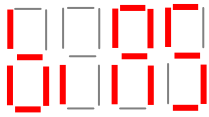
Maximum value in degrees TCU unit can be set by remote set point.



Outlet process temperature.

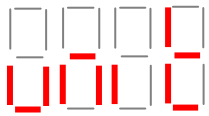
Type of Input /Output temperature, is done through mA "out.Â" (4-20 mA) or volts "Out.u" (0-10 Vdc). These values will always be proportional between the values in degrees that have been made to the parameters of St-4 "SP.LL" (4 mA-0 Vdc) and "SP.HL" (20 mA-10 Vdc).

ST-4



Offset temperature correction.

It used to correct the reading of temperature for above and below respect to an external measurement probe.



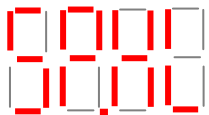
Unit temperature.

We choose if we want the temperature in degrees Celsius "° C" or degrees Fahrenheit "F".



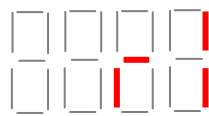
Minimum set point setting.

It is the minimum temperature machine can be set.



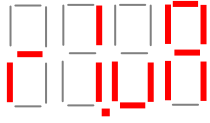
Maximum set point setting.

It is the maximum temperature machine can be set.



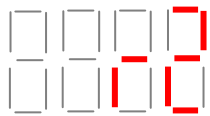
Relay 1 configuration.

Not configurable by the user.



Value in degrees, bars, liters/minute, depending on the configuration of the previous parameter "r1".

Not configurable by the user.



Relay 2 configuration

Configurable as:

OFF: Disabled

tP1: Output temperature to the process.

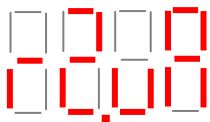
tP2: Return temperature process.

P1: Pump pressure.

P2: Return process pressure.

FM1: Return process flow.

AL: General alarm.



Value in degrees, bars, liters/minute, depending on the configuration of the previous parameter "r2".



Relay 3 configuration

Configurable as:

OFF: Disabled

tP1: Output temperature to the process.

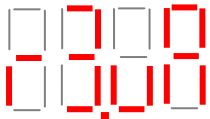
tP2: Return temperature process.

P1: Pump pressure.

P2: Return process pressure.

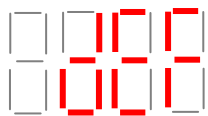
FM1: Return process flow.

AL: General alarm.

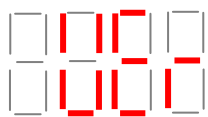


Value in degrees, bars, liters/minute, depending on the configuration of the previous parameter "r3".

ST-5

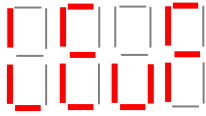


By entering the value 1562, let us enter the St-0 and St-1.



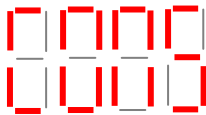
Software version.

ST-6



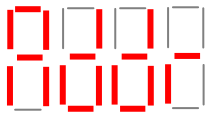
Value to 0, the time to enter the programming SETS is 5 seconds.
With value 1, the time to enter the programming SETS is 15 seconds.

ST-7



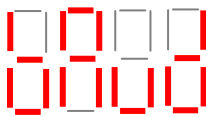
Enabling communications.

Activate or communications On-OFF.



Address assigned to the TCU unit.

The first TCU unit will be address 1, if more linked machines the following would be address 2 and so on.



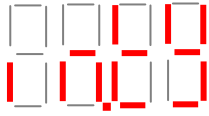
Transmission speed.

"0" (2400bauds), "1" (4800 baud) and "2" (9600 baud).



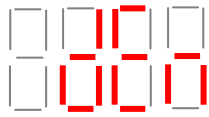
Parity bit.

"0" (no parity), "1" (non parity) i "2" (even parity).



Interface type. "420" (4-20mA) or "485" (RS485).

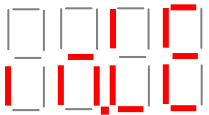
When you select "485", the following parameter dEn not appear.



Data enable.

When the interface type is 420 and only have one TCU linked to the MASTER machine, **dEn** parameter value is "1" (close circuit); if more than one TCU linked all will have **dEn** value "0" less the last one it will have **dEn** value "1".

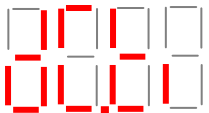
ST-8



Fluid level setting.

Not modifiable by the user.

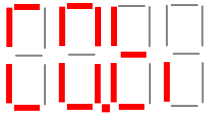
Select if the level control is done by electrode "ELEC" or buoy "BuOY".



Extra time level detection.

Water filling valve retard disconnection time. Value in seconds.

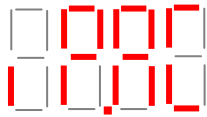
NO CHANGE WITHOUT CONSULT THE MANUFACTURER



Extra time no level detection.

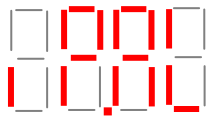
Water filling valve retard connection time. Value in seconds.

NO CHANGE WITHOUT CONSULT THE MANUFACTURER



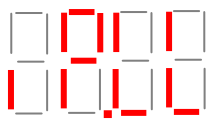
Display activation drive pump.

Activate or not the on-off display.



Alarm output drive pump.

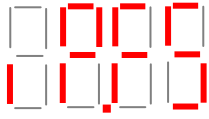
Value in bars.



Initial scale transducer drive pump.

Value in bars.

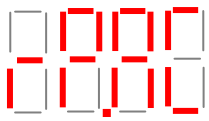
NO CHANGE WITHOUT CONSULT THE MANUFACTURER



Full escale transducer drive pump.

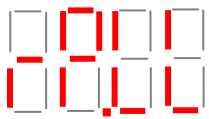
Value in bars.

NO CHANGE WITHOUT CONSULT THE MANUFACTURER



Display Activation return pressure.

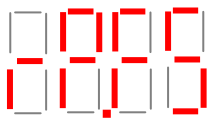
Activate or not the display. On-off



Initial scale return transducer drive pump.

Value in bars.

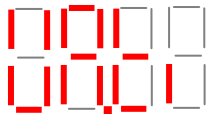
NO CHANGE WITHOUT CONSULT THE MANUFACTURER



Full escale return transducer drive pump.

Value in bars.

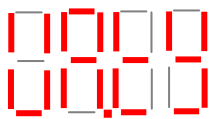
NO CHANGE WITHOUT CONSULT THE MANUFACTURER



Maximum process start time.

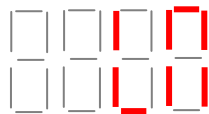
Value in minutes.

NO CHANGE WITHOUT CONSULT THE MANUFACTURER



Contact NO or NC input level.

Not modifiable by the user.



Leak monitoring.

Activate or not the monitoring control. On-OFF.

See page 26.

7. Leak monitoring.


Default leak monitoring is enabled, and can be disabled by LM parameter in the St-8 menu.


The process works as follows:

Water / oil TCU units:


When process start , letter L (zone B) will flash. When the TCU pump is more than 2 minutes running in continuous (this will mean that there is no demand for water/oil in the process), the letter L will stop flashing. From this moment, leak monitoring is enabled.


Leak detection:

Once monitoring is enabled (in water process) if we demand for water more than once in an hour, or repetitive demands on for 4 consecutive hours, in zone A message is displayed  will activate the audible alarm by turning off the pump and heating temperature control unit.

Once the user has disconnected the pump switch and confirmed the alarm by pressing . Fix the leakage problem, fixed the leakage connect again the pump switch TCU unit will restart automatically.

Another leak detection (designed for oil TCU units) is:


if the process is more than 10 seconds in oil demand (this may be due to a loss level in the TCU unit) because filling is manual and not incorporating automatic filling in area A the message displayed will be  will activate the audible alarm by turning off the pump and heating temperature control unit.

Once the user has disconnected the pump switch and confirmed the alarm by pressing . Fix the leakage problem, fixed the leakage connect again the pump switch TCU unit will restart automatically.

Deactivation leak monitoring :

If the user disables leak monitoring, the letter L (zone B) will not appear.

The alarm  never act.

Alarm  can act, whether the process is water or oil but, pump must be running in continuous for 2 minutes.

8. Configurable relays.

Depending on TCU model, can add up to 2 configurable relays for user process automation. Making the TCU unit in a process control system.

These switched relays with potential free contacts (support up to 6A), listed as **r2** and **r3** in the St-4 menu, can be configured to work with the control signals incorporating the TCU unit (which are activated by exceeding the value programmed), are:

- a) Pump pressure.
- b) Return pressure.
- c) Outlet process temperature.
- d) Inlet process temperature.
- e) Flow lit/min in return process.
- f) General alarm.

Examples:

The user needs to know when the mold temperature has reached the value he wants to start the process.

Through external thermocouple located in the mold provided by the user to the TCU unit, will control the temperature using the r3 relay.

When the temperature exceeds the set value, the relay r3 provide the user a signal it allow to start the application.

If the mold had no thermocouple could be done as follows:

We will control the temperature of the return process by the thermocouple at the temperature control unit with relay r3.

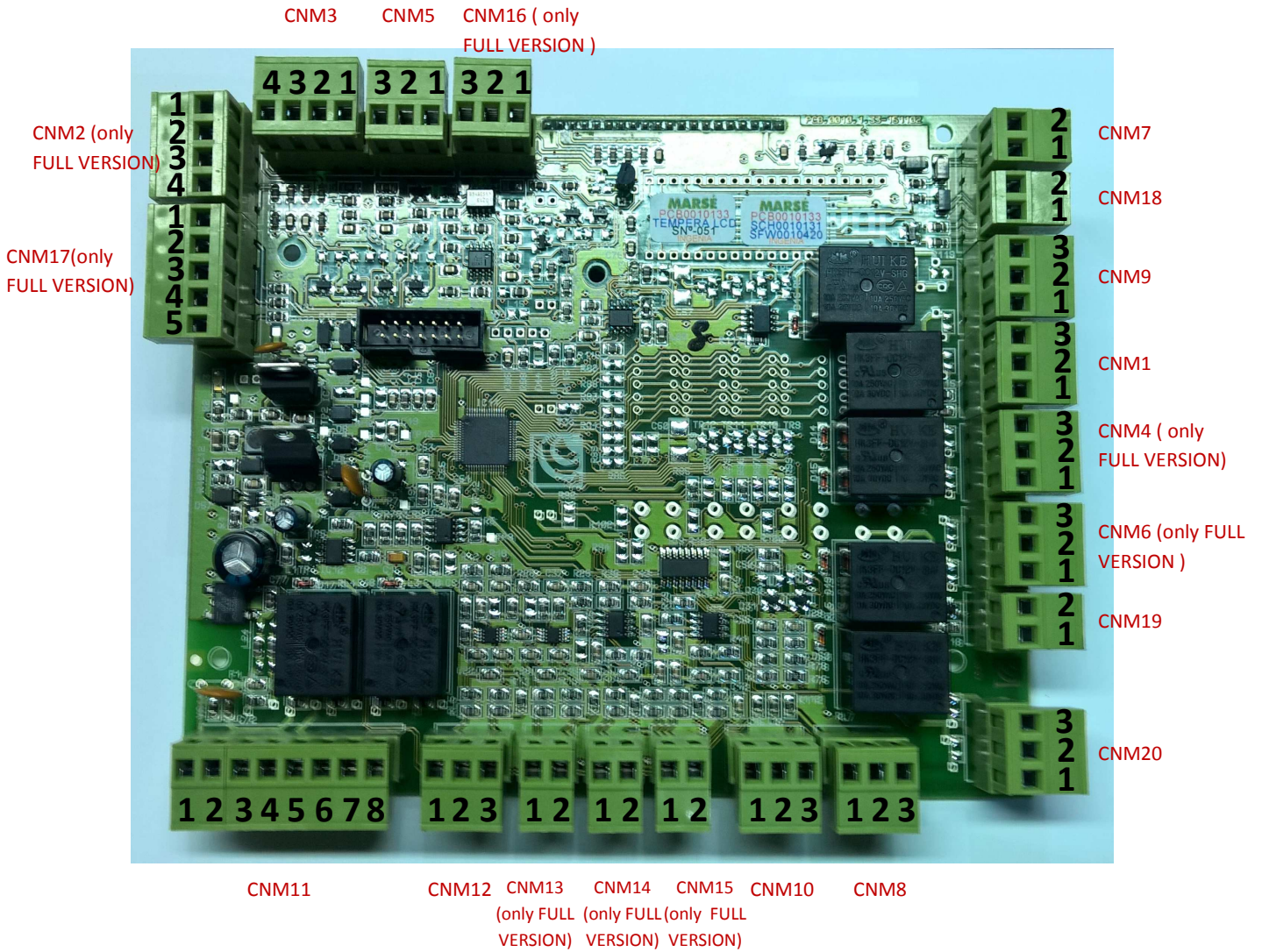
Check externally (contact thermocouple, laser gun) when the mold is at optimum operating temperature, and display on the screen which is the return temperature at that time. In this way we could set the value in the relay r3, which will provide the user for future occasions, the signal to start its application in this mold.

Prevent overpressure in inlet mold.

This application could be interesting when our mold has parts that can not withstand high pressures and need early detection to prevent possible damage.

We will control the pump discharge pressure to the entrance of the user process by r2 with a value (example 3 bar). If this pressure is higher than the preset in r2, this will provide signal to the user, which could perform a bypass between inlet and outlet of the mold and an alarm.

9. Description PCB card connectors.



- CNM1:** General alarm relay.
- CNM2:** Inputs pressure transducers.
(only FULL version PCB card)
- CNM3:** Input flow meter
- CNM4:** Configurable relay (R3).
(only FULL version PCB card)
- CNM5:** Thermal relay pump alarm.
- CNM6:** Configurable relay (R2).
(only FULL version PCB card)
- CNM7:** Input level detection (magnetic buoy).
- CNM8:** Output power SSR 24 Vdc.
- CNM9:** Level control relay.
- CNM10:** Input external RSP.
- CNM11:** Input 24 Vac power / control of heating and cooling.
- CNM12:** Input process thermocouple J type control.
- CNM13:** Input return/external thermocouple J type only read.
(only FULL version PCB card)
- CNM14:** Input process thermocouple PT1000 type control.
(only FULL version PCB card)
- CNM15:** Input return/external thermocouple PT1000 type only read.
(only FULL version PCB card)
- CNM16:** Analog output process temperature.
(only FULL version PCB card)
- CNM17:** Inlet / outlet communications.
(only FULL version PCB card)
- CNM18:** Input water level detection (electrode).
- CNM19:** Input control pump.
- CNM20:** Authorization running pump and heating.