



CCS 3.0 – CCS 3.0C

Compressor Control System

User Manual



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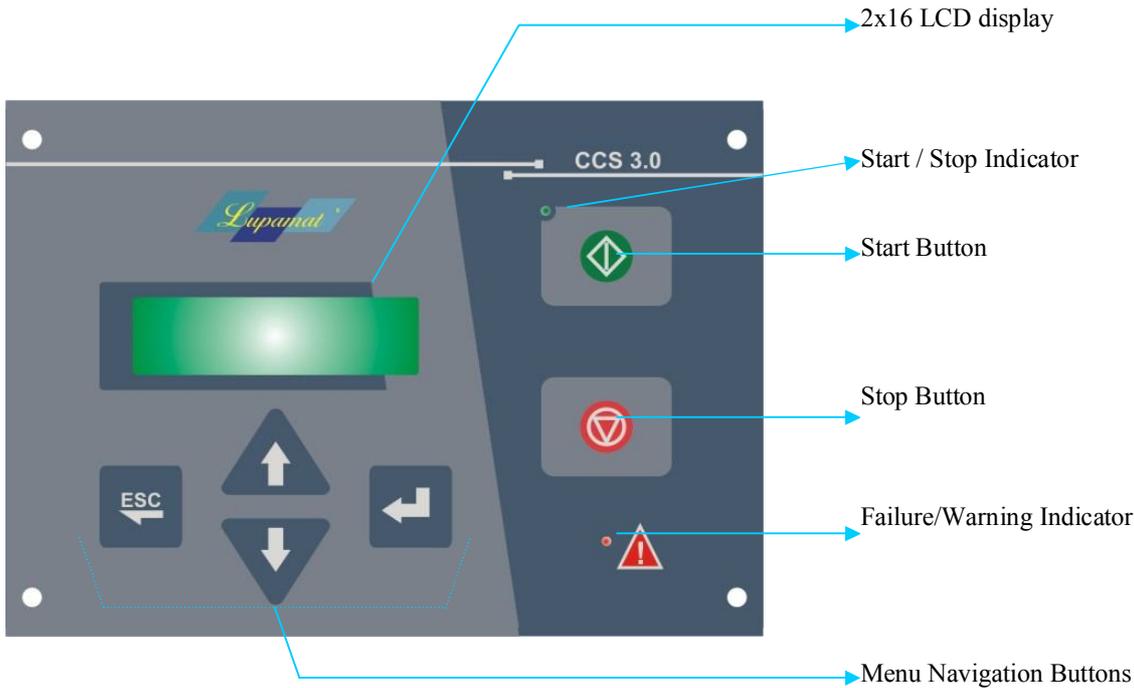
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CCS 3.0 Introduction

1 - General

CCS 3.0 Compressor Control System has been designed for screw and reciprocating compressors. CCS 3.0 is a microprocessor-based controller which starts and stops the compressors, makes pressure regulation, temperature control and protects the compressor against the failures. CCS 3.0 is a single unit which comprises control module and control panel.



2- INTRODUCTION TO SYSTEM

| Button Functions | |
|--|--|
|  | <ul style="list-style-type: none"> Starts the compressor. When the unit is connected to MCC 1.0 network, pressing this button acknowledges the transfer of the start/stop control to MCC 1.0 Multiple Compressor Control unit. |
|  | <ul style="list-style-type: none"> Stops the compressor. When the unit is connected to MCC 1.0 network, pressing this button transfers the start/stop control to CCS3.0 from MCC1.0. |
|  | <ul style="list-style-type: none"> No function when the display is in main operating screen. When it is pressed while in menu mode, it goes to the lower-indexed heading to the parameter. In parameter settings menu, it increases the numeric value or changes the selectable values. |
|  | <ul style="list-style-type: none"> No function when the display is in main operating screen. <ul style="list-style-type: none"> When it is pressed while in menu mode, it goes to the higher-index heading or to the parameter. In parameter settings menu, it decreases the numeric value or changes the parameter. |
| | <ul style="list-style-type: none"> In main operating screen, press to get into menu mode. |

| | |
|--|--|
|  | <ul style="list-style-type: none"> • In menu mode, press to get into one level down in the same heading. • When pressed while it is on a selected parameter, it goes to parameter adjustment menu. • In parameter adjustment mode, press to enter it into non-volatile memory. • In password entry screen, press to shift the cursor to the right. |
|  | <ul style="list-style-type: none"> • In main operating screen, press for 2 seconds to reset the alarm. • In menu mode, press to get into one level up in the same heading. • In parameter adjustment mode, press to shift the cursor to the left. • In parameter adjustment mode, press for 2 seconds to exit without recording the parameter value. |

CCS 3.0 panel consists of 2x16 LCD backlight, keypad and LED status indicators

By navigating through the menu screens in the display, one can see the alarm log, compressor working and maintenance hours and adjust the compressor parameters.

Green LED indicates the operating status of the compressor. When this green LED is off, it indicates that the compressor is stopping. When it is continuously lit, it indicates that the main motor is running. When it blinks slowly, it indicates that the compressor is in Autowaiting mode.

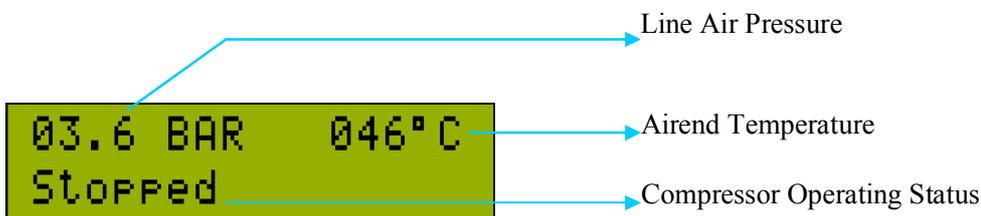
Red LED indicates that there is an alarm (warning or trip) in the system. When it blinks every one second, the alarm is warning (it does not stop the compressor). When it blinks faster, there is trip alarm in the system. Trip alarm shuts down the compressor.

2-a Start-Up Screen



When you power up CCS3.0, the above start-up screen is displayed. (the text on this display is entered in parameter “P5.8 Start-up Screen”. If no text has been entered in this parameter, then there is no text on start-up screen. After 5 seconds, the screen changes to main operating screen. During that 5 seconds, both LED indicators are continuously on.

2-b Main Operating Screen



CCS 3.0 main operating screen is as above. Line air pressure is displayed on the left of the upper row and airend temperature on the right of the upper row. The pressure and temperature units may be indicated in Bar/PSI and Celsius/Fahrenheit respectively.

The units may be changed in parameters “P3.6 Pressure Unit” and “P3.7 Temperature Unit”

Control source: Pressure Switch



---- 012°C
Stopped

CCS 3.0 can also control the compressor by a pressure switch. When the parameter “*P5.3 Control Source*” is selected as “pressure switch”, the pressure indication on the left of the upper row is changed as above.

The current operational status of the compressor is displayed on the lower row. The statuses are:

- STOPPED
- STOPPING
- STARTING
- MOTOR DRIVING
- WORKING ON UNLOAD
- WORKING ON LOAD
- ON AUTOWAITING
- WAITING ACKNOWLEDGEMENT

2.b.1 STOPPED :



03.6 BAR 046°C
Stopped

The compressor main motor stopped. Green LED is off.

2.b.2 STOPPING :



04.4 BAR 056°C
Stopping 003

The compressor is going to stop after the delay timer in parameter *P3.5 To Stop Delay*” expires. Remaining time is displayed on the right of the lower row.

2.b.3 STARTING :



00.2 BAR 022°C
Starting 003

The compressor is going to start after the delay timer in parameter *P3.8 To Start Delay*” expires. The remaining time is displayed on the right of the lower row. When the delay timer expires, main contactor and start contactor are energized.

Note: Star contactor is energized at 100 ms after the main contactor is energized.

2.b.4 MOTOR DRIVING :



00.2 BAR 022°C
Mot. Driving 004

When the delay timer in parameter “*P4.3.1 Y-Delta Rising*” expires, the star contactor will be deenergized and delta contactor will be energized. Remaining time is displayed on the right of the lower row.

2.b.5 WORKING ON UNLOAD :



07.2 BAR 062°C
Work. on Unload

This indicates that the compressor is running on unload. The load solenoid is deenergized. After the delay timer in parameter “P4.3.2 Getting Load”, the compressor starts running on load.

While the compressor is running on unload, when the delay timer in parameter “Pf Wait on Unload”, the mode of the compressor is changed to AUTOWAITING. The remaining time of “Waiting on Unload” is displayed on the right of the lower row. This is valid for AUTOMATIC mode only.



00.4 BAR +012°C
Work. on Unload

The compressor runs on no load when the airtend temperature is less than the temperature set in parameter “P4.2.4 To Load Temperature”. In this case,  icon on the left of the temperature blinks every 1 second.

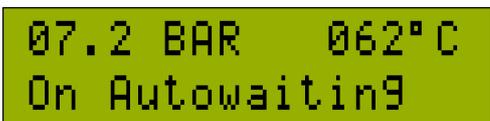
2.b.6 RUNNING ON LOAD :



04.4 BAR 056°C
Working on Load

This indicates that the load solenoid is energized and running on load.

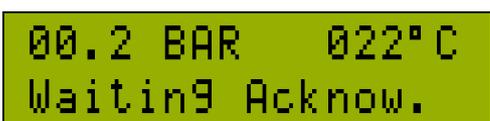
2.b.7 ON AUTOWAITING :



07.2 BAR 062°C
On Autowaiting

In this mode, the main contactor and delta contactor of the compressor have been reenergized and the main motor has stopped. Green LED blinks with long intervals. If there is a pressure transducer and the air pressure is below the pressure in parameter “P3.4 Pressure Load”, the compressor gets out of “Autowaiting” mode and gets into “Starting” mode. If there is a pressure switch, and when the switch is “closed”, then the compressor gets out of “Autowaiting” mode and gets into “Starting” mode.

2.b.8 WAITING ACKNOWLEDGEMENT :



00.2 BAR 022°C
Waiting Acknow.

This is active when CCS 3.0 is connected to MCC 1.0 network. In “Waiting Acknowledgement” mode, the compressor main motor already stopped. The operator presses the  button to acknowledge that the compressor control is transferred to MCC 1.0 system. When there is a trip alarm or the operator stops the compressor by pressing  button, the mode changes to “Waiting for Acknowledgement” mode.

Note : For “Waiting for Acknowledgement” mode, 3 parameters should be set as given below.

| | | |
|--------|---------------------------|-----------------|
| P4.5.1 | Load Valve Control Source | MODBUS |
| P4.5.2 | Start/Stop Control Source | MODBUS |
| P4.5.3 | Com. Work Mode | Acknowledgement |

2.c Alarm and Warning Display / Indication

2.c.1 Trip Alarm Display

04.4 BAR 056°C
EMERGENCY STOP

04.4 BAR 056°C
!ALARM!

In case of trip alarm, the main motor is stopped. On the below row of the LCD, “!ALARM!” and the alarm code of the last alarm blink every 1 second alternately. Even the fault condition is not active any more, the trip alarm is kept being displayed. When the alarm is reset, the alarm on the screen is cleared. Previous alarms may be seen in the alarm record.

| Trip Alarms | Trip Alarm Sources |
|----------------------------------|--|
| Emergency Stop | Digital Input IN-0 |
| Main Motor Thermic | Digital Input IN-1 |
| Separator Fail | Digital Input IN-2 |
| Phase Sequence | Digital Input IN-3 |
| Oil Filter | Digital Input IN-5 |
| Pressure Sensor | Pressure Sensor not connected or faulty (AN-1) |
| Temperature Sensor | Temperature Sensor not connected or faulty (AN-0) |
| High Temperature | Airend Temperature \geq “P4.2.1 Temperature High Limit“ |
| High Pressure | Air Pressure \geq “P4.1.1 Pressure High Limit“ |
| Low Temperature | Airend Temperature \leq ”P4.2. Temperature Low Limit“ |
| Short Circuit Failure | There is a short-circuit between +12V and GND line on the sockets. |
| Max. Start/Stop count in an Hour | Number of Start/Stop in an Hour \geq ”P4.4.7 Maximum Start/Stop“ |
| Fan Motor Thermic | When digital input IN-4 is selected as pressure control source ,this input is failure input for Fan motor thermic. If digital input IN-4 is selected as pressure switch, this input can not be selected as failure input for fan motor thermic. |
| Auxiliary Input 1 | If "P4.5.2-Start/Stop Control Source" is selected as Remote control , digital input IN-7 is used for remote start. If it is not selected as remote start , IN-7 is used as auxiliary failure input. |
| Auxiliary Alarm 2 | If “P4.5.1-Load Valve Control” is selected as remote, this input is used for remote load/unload control. If this parameter is not selected as remote, IN-6 is used as auxiliary failure input. |

2.c.2 Warning Display

| Warning Codes | Warning Sources |
|-----------------------|--|
| High Temperature | Airend Temperature \geq “P4.2.3 Temperature Alarm “ |
| High Pressure | Air Pressure \geq “P4.1.2 Pressure Alarm Value“ |
| Power Was Interrupted | The power supply to the device interrupted while the compressor was running. |

When there is “High Temperature” warning, the temperature value on the right of the upper row in the LCD blinks to warn the operator.

When there is “High Pressure” warning, the pressure value on the left of the upper row in the LCD blinks to warn the operator.

“Power Was Interrupted” warning is automatically reset when the compressor is restarted.

2.c.3 Changings & Maintenance Warning Display



When any of Changing & Maintenance remaining time is up, it is time for the related maintenance. In that case, at every hour when the compressor is running, the related maintenance is displayed on the below row of the LCD. The failure/warning indicator LED blinks at long

intervals. To clear the warning, press any menu control button on CCS 3.0 once. When a changing/maintenance warning is given, the compressor manufacturer should be contacted. Changing/maintenance remaining time can be seen on “P2-CHANGINGS & MAINT. TIME” screen.

There are 6 different warnings on Time to Changing & Maintenance in CCS 3.0.

| Warning Codes | Description |
|-------------------------|---------------------------------------|
| General Maintenance | General maintenance time is over. |
| Change Air Filter | Air filter change time is over. |
| Bearing Maintenance | Bearing maintenance time is over. |
| Change Oil Filter | Oil filter change time is over. |
| Change Oil | Oil change time is over |
| Change Separator Filter | Separator filter change time is over. |

3-CCS 3.0 MENU STRUCTURE

There are 5 headings in CCS 3.0 menu. These are:

- P1 - ALARM MENU
- P2 –CHANGING & MAINTENANCE REMANING TIMES
- P3 – USER SETTINGS
- P4 – SERVICE SETTINGS
- P5 – FACTORY SETTINGS

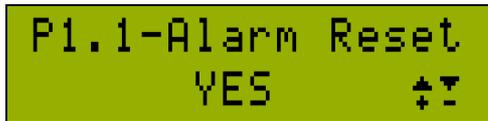
There are 3 parameters levels in CCS 3.0. These are: User, Service and Factory levels. Each parameter level is protected by a password. By user password, one may get access to user level only. By service password, one my get access to user and service levels. By factory password, one may get access to all user, service and factory levels. There is no password protection in Alarm menu and Changing & Maintenance menu. For these menus, when no button is pressed within 3 minutes, the screen is automatically changed to status screen.

3.a Alarm Menu



While in Status screen, press to enter menu. First heading of the menu is “P1 Alarm Menu”. icon indicates that there are sub-headings under the header. Press button to return to status screen.

3.a.1 Resetting Alarm



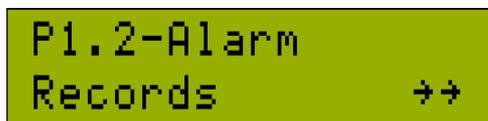
While in Alarm menu, when button is pressed, “P1.1-Alarm Reset” heading is displayed first. While in this heading, press button, a blinking cursor appears on the screen; to reset the alarm, select “YES” by using and buttons. Alarm reset clears all warning and trip

alarms and the alarm warning is removed in the system. An alternative way to reset the alarm is to press button for 2 seconds while in status display.

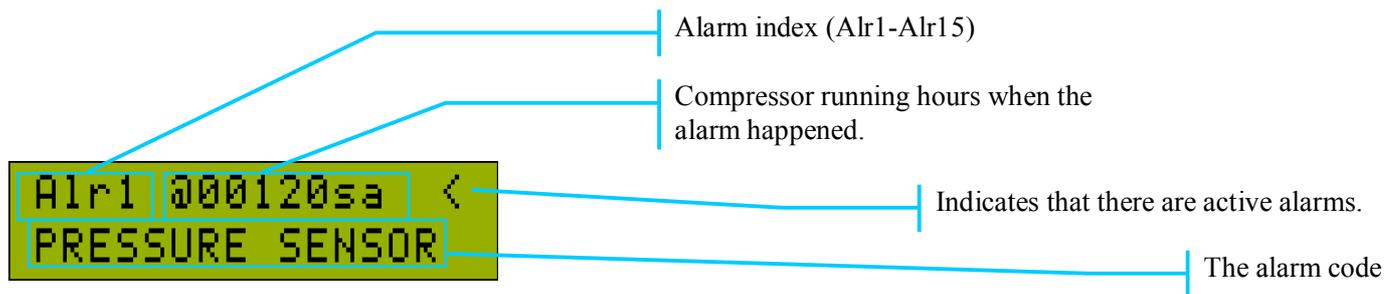
3.a.2 Active Alarms Menu

While in alarm menu, press and buttons consecutively to go to alarm records menu. The active alarms are displayed in this menu.

3.a.3 Alarm Records Menu



While in Alarm menu, press , , consecutively to go to alarm records. CCS 3.0 keeps record of the last 15 warning and trip alarms.



While in this screen, press button to view the record of the last alarms. Alr1 is the last alarm. The number of alarm index increases as previous alarms are displayed. By pressing button, previous alarms are viewed. The alarm with the active alarm indicator icon indicates that the alarm is still active. If this icon turns to “+” symbol, it indicates that the alarm has been reset by the operator but the condition is still present. If this icon turns to “-“, it indicates that the alarm has not been reset by the operator and the condition has disappeared.

3.b Changing & Maintenance Time Menu

```
P2-CHANGINGS &
MAINT. TIME  →→
```

It is the second heading in CCS 3.0 menu. It is about general maintenance of the compressor, and how much time remains to change bearing, oil, air filter, oil filter. Total working hours and total loaded hours may also be viewed here by pressing  button first and then selecting with  and  buttons.

3.b.1 Changing & Maintenance Remaining times screen

```
General Maint.
P2.1→ 1600 hr
```

Example. It counts down from the value set in parameter: “P4.4.1 General Maintenance Hours”. Maintenance should be made when this value is “0” or negative. (Refer to section 2.c.2 Changing & Maintenance Time warning display)

```
Total Work. Hour
P2.7→ 3400 hr
```

Total running hours and total loaded hours count forward, starting from “0”.

3.b.2 Changing & Maintenance Remaining Time Reset

```
Bearing Maint.
RESET→ YES  ↕⚠
```

The Changing & Maintenance Remaining times can be reset only in Service and Factory modes. Total working hours and total loaded hours can not be reset.

```
Bearing Maint.
P2.2→ -6 hr
```

On this example screen, it is indicated that bearing maintenance is over due by 6 hours. While in service or factory mode and in this screen, when  button is pressed in this screen, a warning text on the lower row is displayed. When “YES” is selected with , , bearing maintenance time can be set to the value in parameter “P4.4.2 Bearing Maintenance Hours”.

```
Bearing Maint.
P2.2→ 5000 hr
```

 button has no effect when the service mode or factory mode is not reached from password entry screen

3.c Password Entry Screen

```
PASSWORD = 0---
+Esc  ⚠  ↕  ↓Ent
```

```
PASSWORD = ***0
+Esc  ⚠  ↕  ↓Ent
```

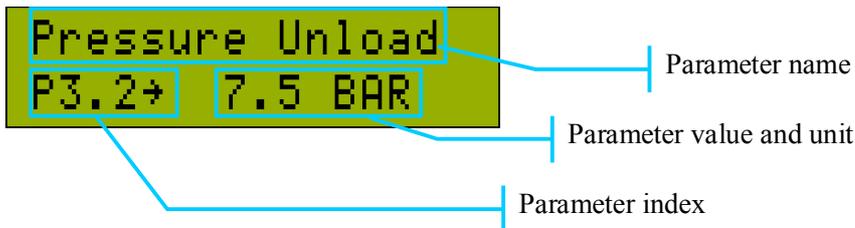
```
!INCORRECT!
ENTERANCE
```

Access to CCS 3.0 operator, service and factory parameters is protected by passwords. Password length is 4 characters. While in status screen, press  and  buttons together for 3 seconds to enter password entry screen. On entry, the cursor becomes active. One can enter the value in each digit by pressing  and  buttons.  button shifts the cursor to the right digit. and the previous digit value turns to “*”. Pressing  button exits out of password entry screen. To enter the password, press  button. The password will be checked. If it is wrong, “!INCORRECT ENTERANCE” warning is displayed, and the Screen exits to status screen after 3 seconds. If the password matches any of the 3 passwords, the screen jumps to the related heading.

3.d Parameter Settings Screen

Inside CCS 3.0 menu, user parameters are under “P3 User Settings”, service parameters under “P4 Service Settings”, and factory settings under “P5 Factory Settings”. These parameters are in 2 types : numerical values like temperature, pressure, second, hour or selectable values like language selection, pressure screen, temperature screen.

As an example, parameter “P3.2 Pressure Unload” is a numerical value. Its value is displayed after user password is entered and then , , ,  buttons are pressed consecutively.



The screen changes to as on the left when  button is pressed once more. The functions of the menu control buttons are indicated on the below row. Blinking cursor is on the lowest digit of the numerical value.  and  buttons increase/decrease the value of the digit where the cursor is. Pressing  button shifts the cursor to the left digit. The value is entered when  button is pressed. To exit without entering the value, press  button for 2 seconds.



Parameter “P3.6 Pressure Unit” is a selectable value. This parameter can be accessed after the user parameter is entered and , , , 5 x  buttons are pressed.



When  button is pressed, the screen changes to the screen on the left. The functions of the menu control buttons are indicated on the below row. Cursor is at the beginning of the selected value. The parameter value is selected by  and  buttons. The selection is entered when  button is pressed. To exit without entering the selection, press  button for 2 seconds. This example is valid for all the parameters.

3.e User Parameters (P3)

These parameters are under “ P3 USER SETTINGS” heading.

3.e.1 Operating Mode (P3.1):

When the compressor pressure reaches “P3.2 Pressure Unload“, the load valve is deenergized. If the operating mode is automatic and as long as the air pressure is not below “P3.2 Pressure Load“, the compressor idles for the time in “P3.3 Wait on Unload“. After that timer expires, the main motor is stopped and the compressor changes its status to autowaiting. If the working mode is continuous, the compressor idles continuously.

3.e.2 Pressure Unload (P3.2) (Bar/PSI):

When the air pressure reaches this parameter value, the control unit deenergized the load valve and the compressor idles. The maximum of this parameter’s value is 0.2 bar below the parameter “P4.1.2 Alarm Pressure” and also 0.2 bar above the parameter “P3.4 Pressure Load“. For example: If “P3.2 Pressure Unload” is 5.2bar, parameter “P3.4 Pressure Load” can not be lower than 5.2 bar.

3.e.3 Wait On Unload (P3.3) (seconds):

The compressor idles if the air pressure is more the unload pressure. After the Wait on Unload timer expires, the compressor changes its status to autowaiting mode.

3.e.4 Pressure Load (P3.4) (Bar/PSI):

If the compressor is idling and the air pressure falls below this parameter value, the compressor load solenoid is energized. The maximum value of this parameter is 0,2 bar below the parameter “P4.1.2 Alarm Pressure” and also 0,2 bar below the parameter “P3.2 Pressure Unload”. For example, if “P3.2 Pressure Unload” is 5.0 bar, “P3.4 Pressure Load” can not be set above 4.8 bar.

3.e.5 To Stop Delay (P3.5) (seconds):

This specifies the delay between the time (stop) button is pressed and the compressor is stopped. While the timer is running after (stop) button is pressed, if (start) button is pressed again, the compressor keeps running and the timer is reset.

3.e.6 Pressure Unit (P3.6):

All the pressure values can be converted into and displayed in Bar or PSI. The unit of the pressure values entered from the panel should be same as the selected pressure unit.

3.e.7 Temperature Unit (P3.7)

All the temperature readings are displayed in and the values may be converted into Centigrade or Fahrenheit

3.e.8 To Start Delay (P3.8) (seconds):

This parameter sets the delay between the time the start button is pressed and the compressor is started. If Stop button is pressed while the timer runs, the compressor is stopped and the timer is reset. This parameter is not accessible at operator level and service level.

3.e.9 User Password (P3.9):

```
PREV. PASW: 0---  
+Esc  ?  +Ent
```

This password is for access to the user settings. There are 3 steps to change the password. The old password is entered first.

```
PREV. PASW: 1234  
+Esc  ?  +Ent
```

After that, the new password is entered 2 times.

```
!INCORRECT!  
ENTERANCE
```

When there is wrong entry, “!Incorrect Enterance!” message is displayed for 3 seconds and settings screen is exited.

```
!PASSWORD  
CHANGED
```

When the entry is correct, “Password Changed” is displayed for 3 seconds.

3.f Service Parameters (P4)

Service parameters can be accessed only by entering service password or factory password at service password entry screen. Service parameters are grouped under 10 headings . They are under “P4 Service Settings”

3.f.1 Pressure Parameters (P4.1):

3.f.1.1 Stop Pressure (P4.1.1) (Bar/Psi):

If line pressure increases above this parameter 's value, trip alarm is given and the compressor is immediately stopped. Alarm LED blinks.

! Note: This value can not be lower than 0,2 bar above “*P4.1.2 Alarm Pressure*”.

3.f.1.2 Alarm Pressure (P4.1.2) (Bar/Psi):

If the line pressure gets above this parameter 's value, warning alarm is given and the compressor is immediately stopped. Alarm LED blinks.

! Note: This value can be minimum 0,2 bar above “*P3.2 Pressure Unload*” and maximum 0,2 bar below “*P4.1.1 Stop Pressure*”

3.f.2 Temperature Parameters (P4.2) (Cel/Fah):

3.f.2.1 Upper Temperature Limit (P4.2.1) (Cel/Fah):

If airtend temperature value increases above this parameter 's value, trip alarm is given and the compressor is immediately stopped. Alarm LED blinks.

! Note: This value can be minimum 3⁰C above “*P4.2.3 Temperature Alarm*”.

3.f.2.2 Lower Temperature Limit (P4.2.2) (Cel/Fah):

If airtend temperature value decreases below this parameter 's value, trip alarm is given and the compressor does not run. Alarm LED blinks.

3.f.2.3 Temperature Alarm (P4.2.3) (Cel/Fah):

If airtend temperature value increases above this parameter 's value, warning alarm is given. Warning LED and temperature value on the screen blinks.

! Note: This value can be maximum 3⁰C below “*P4.2.1 Upper Temperature Limit*”.

3.f.2.4 To Load Temperature (P4.2.4) (Cel/Fah):

If airtend temperature decreases below this parameter 's value at start-up, the compressor won't be loaded. When the temperature increases above this value, the compressor works in normal operation.

3.f.3 Timing Parameters (P4.3):

3.f.3.1 Y-Delta Rising (P4.3.1) (seconds):

The connection of the main motor will change from star to delta when this delay timer expires.

3.f.3.2 Getting Load (P4.3.2) (seconds):

This delay is the time between that the compressor is started and that it is loaded.

3.f.3.3 Regetting Load (P4.3.3) (seconds):

This delay is the time between that the compressor is unloaded and it is reloaded.

3.f.3.4 Auto Run Time (P4.3.4) (seconds):

The mains fails while the compressor is running. When the mains is restored, the compressor is automatically restarted after this delay timer expires. If the parameter value is set as “0”, this function is disabled.

3.f.3.5 Air Draining Time (P4.3.5) (seconds):

After the compressor stops, the air inside the airend is drained until this timer expires. The remaining time is displayed on the screen. When the timer expires, the compressor enters into Stopped mode.

3.f.3.6 Max. Rising/Hour (P4.3.6) :

When the number of start/stop 's in 1 hour is equal to or more than this parameter, *P4.3.6 Max. Rising/Hour*", trip alarm is given. When this parameter is set as "0", this function is disabled.

3.f.4 Service Hours (P4.4):

Service is due at the end of "Service Hours" (for changings & maintenances). Service remaining hours are calculated over these service hours. (please refer to : Changings & Maintenance Remaining Hours)

! Note: To disable any of these parameters, please enter "000000".

- | | |
|------------------------------------|------------------|
| 1. General Maintenance Hours | (P4.4.1) (hour) |
| 2. Bearing Maintenance Hours | (P4.4.2) (hour) |
| 3. Oil Changing Hours | (P4.4.3) (hour) |
| 4. Air Filter Changing Hours | (P4.4.4) (hours) |
| 5. Oil Filter Changing Hours | (P4.4.5) (hours) |
| 6. Separator Filter Changing Hours | (P4.4.6) (hours) |

3.f.5 Communication Parameters (P4.5):

3.f.5.1 Load Valve Control Source (P4.5.1):

This parameter determines which source controls the load valve of CCS3.0. If this parameter is selected as other than "Remote", the related input may be used as digital alarm input. There are 3 sources in CCS 3.0:

- **Sensor:** In this mode, CCS3.0 controls the load valve with the pressure sensor.
- **Remote:** In this mode, CCS3.0 controls the load valve with Remote Valve Control (digital input: DIN6). This input may be selected as falling-edge trigger or rising-edge trigger.

When the input contact type is NC (normally closed), the load valve is energized during the closed-circuit to open-circuit transition (falling-edge). The load valve is deenergized when it is closed circuit.

When the input contact type is NO (normally open), the load valve is energized during open-circuit to closed Circuit (rising edge). The load valve is deenergized when it is open-circuit.

In this mode, "P3.2 Pressure Unload" and "P3.4 Pressure to Load" parameters have no effect on air pressure control.

!Note: Please make sure that DI6 type is correct in "*P5.1 Input Contact Type*" heading while working in this mode.

- **MODBUS:** In this mode, CCS3,0 controls the load valve over communication. In this mode, "P3.2 Pressure Unload" and "P3.4 Pressure to Load" parameters have no effect on air pressure control.

!Note: If CCS3,0 is connected to EN-KO MCC 1.0 Multiple Compressor Control System, this parameter should be changed to MODBUS.

3.f.5.2 Start/Stop Control Source (P4.5.2):

This parameter determines which source controls start/stop. If this parameter is selected as other than "Remote", the related input may be used as digital alarm input. There are 3 sources in CCS 3.0:

- **Panel:** In this mode, “1” and “0” buttons on CCS3,0 panel are used for starting and stopping.
- **Remote:** In this mode, CCS3,0 start/stop is handled by Remote Start/Stop digital input (DIN7). This input may be selected as falling-edge trigger or rising-edge trigger.

When the input contact type is NC (normally closed), the compressor is started during closed-circuit to open-circuit transition (falling edge). The compressor is stopped when it is closed-circuit.

When the input contact type is NO, the compressor is started during open-circuit to closed-circuit transition (rising edge). The compressor is stopped when it is open-circuit.

In this mode,  button on the panel has no effect. When  button is pressed, the compressor is stopped when “P3.5 To Stop Delay” timer expires.

!note: Please make sure that DI7 type is selected correctly in “P5.1 Input Contact Type” heading.

- **MODBUS :** In this mode, CCS3,0 makes start/stop over communication.

!note: If CCS3,0 is connected to EN-KO MCC 1.0 Multiple Compressor Control System, this parameter is automatically changed to MODBUS.

3.f.5.3 Communication Work Mode (P4.5.3):

This parameter defines the functions of  and  buttons on the panel. 2 modes, “Acknowledged” and “Not acknowledged” may be selected. These modes are explained below :

| | <i>P4.5.3 Mode = Acknowledged</i> | <i>P4.5.3 Mode = Not Acknowledged</i> |
|---|--|--|
|  | Acknowledges to transfer the control of CCS 3.0 start/stop and load valve to MCC 1.0 | No effect. When CCS3.0 is connected to MCC 1.0, the start/stop and load valve controls are automatically transferred to MCC 1.0. |
|  | Stops the compressor. Waits for re-acknowledgement from the operator. | No effect. When CCS3,0 is connected to MCC 1.0, the start/stop and load valve controls are automatically transferred to MCC 1.0. |

3.f.5.4 Modbus Address (P4.5.4):

It sets the address of RS-485 port on CCS 3.0.

3.f.5.5 Baud Rate (P4.5.5)

It sets the baud rate of RS-485 port on CCS 3,0. The selectable rates are 2400 bps, 4800 bps, 9600 bps, 19200 bps,

!note: If CCS 3.0 communicates with EN-KO MCC 1.0 Multiple Compressor Control System, this parameter should be set at 19200 bps

3.f.5.6 Stop Bit (P4.5.6)

It sets the number of stop bits on RS-485 port of CCS 3,0. The number may be 1 or 2.

!note: If CCS 3,0 communicates with EN-KO MCC 1.0 Multiple Compressor Control System, this parameter must be set as 1.

3.f.5.7 Parity Bit (P4.5.7)

It determines parity bit control of RS-485 port on CCS 3,0. It may be Even or Odd. Parity Bit control is disabled when this parameter is set to “Disable”.

!note: If CCS 3.0 communicates with EN-KO MCC 1.0 Multiple Compressor Control System, this parameter must be set as “Even”.

3.f.5.8 Timeout Duration (P4.5.8)

If the communication breaks down or is not established during the duration set in this parameter, CCS 3,0 transfers the start/stop control to the panel and control of load valve to the sensor.

3.f.6 Calibration Parameters (P4.6)

3.f.6.1 Pressure Offset (P4.6.1) (Bar/PSI):

Pressure offset is the pressure value which is measured by the pressure sensor when the line pressure is at its lowest value (0 bar). Offset error is corrected by entering this parameter.

3.f.6.2 Temperature Offset (P4.6.2) (Cel/Fah):

Temperature offset is the difference between the measured value and the value measured by a calibrated temperature reading device at a certain temperature.

3.f.7 Preheating Parameters (P4.7)

- **Loaded Duration (P4.7.1) (Seconds)**
- **Unloaded Duration (P4.7.2) (Seconds)**

If the airend temperature is less than the parameter “*P4.2.4 To Load Temperature*”, the compressor goes into preheating. In that case, the load valve is energized for the duration in the parameter “*P4.7.1 Loaded Duration*”. The load valve is deenergized for the duration in the parameter “*P4.7.2 Unloaded Duration*”. When any of the parameters is set to “0”, the compressor continuously works unloaded until it reaches the parameter “*P4.2.4 To Load Temperature*”.

3.f.8 Fan Settings (P4.8)

3.f.8.1 Run Temperature (P4.8.1) (Cel/Fah):

If the airend temperature increases above the temperature in this parameter, CCS 3.0 runs the fan motor.

!Note: For the fan to be enabled, the parameter in “*P5.2 Functional Relay*” must be set as “Fan”

3.f.8.2 Stop Temperature (P4.8.2) (Cel/Fah):

If the airend temperature decreases below this parameter, CCS 3,0 stops the fan motor after the delay in parameter “*P4.8.3-Minimum Work Time*”

3.f.8.3 Minimum Work Time (P4.8.3) (Cel/Fah):

Fan motor runs minimum for that duration after the fan is started.

3.f.9 Service Password (P4.9)

This password is for getting access to service parameters. Changing procedure is same as in “*P3.9 User Password*”.

3.f.10 Language Selection (P4.10)

The language in the screen may be set as Turkish or English.

3.g Factory Parameters

These parameters are under “P5 Factory Settings” heading.

3.g.1 Input Contact Type (P5.1)

- DI2 – Motor Thermic Input Type
- DI3 – Separator Switch Input Type
- DI4 – Phase Sequence Protection Input Type
- DI5 – Pressure Switch Input Type
- DI6 – Oil Filter Switch Input Type
- DI7 – Remote Load Valve Control Input Type
- DI8 – Remote start/Stop Control Input Type



Inp. Contact Typ
P5.1 →

Input Contact Type controls when the digital inputs of CCS 3.0 will be active. In this menu, the statuses of all digital inputs except “Emergency Stop” are displayed. NC: Normally Closed; NO: Normally Open. Emergency Stop is always in NC (Normally Closed) and this can not be changed.



DI2-MOTOR THERM.
CONT. TYPE → NC

When  button is pressed, the contact input type of the DI2 input is displayed first. The input status of DI2 - DI8 may be displayed by  and  buttons.



DI2-MOTOR THERM.
↑:NC NC ↓:NO

To change the input type, go to the related digital input screen and press  button. In the below row, the button functions are displayed. The selection is confirmed by  button. You may exit the settings screen without confirming the input type by using  button.

! Attention: Wrong settings of these parameters may give damage to the compressor.

3.g.2 Functional Relay (P5.2)

The function of the output relay is assigned with this parameter. 8 functions can be assigned :

- **Not Selected:** When this function is selected, the Functional Relay is always deenergized..
- **Fan:** When this function is selected, the Functional Relay is used for fan motor control. The fan motor parameters may be set in “P4 Service Parameters” >>> “P4.8 Fan Settings”
- **Alarm:** When this function is selected, the Functional Relay is energized when there is trip alarm or warning alarm. The auxiliary output contact relay is deenergized when the alarms no longer exist.
- **Trip Alarm:** When this function is selected, the Functional Relay is energized when there is trip alarm.
- **Warning Alarm :** When this function is selected, the Functional Relay is energized when there is warning alarm.
- **Horn:** When this function is selected, and there is a trip and/or warning alarm, the auxiliary relay output is energized and drives the horn. The relay is energized and deenergized in periods of 3 seconds.
- **Normal Pressure :** When this function is selected, the auxiliary relay output is energized if the air pressure is between “P3.4 Pressure to Load” and “P3.2 Pressure Unload”
- **Heater:** When this function is selected, the auxiliary relay output is energized if the airend temperature is below the parameter in “P4.2.2 Lower Temperature Limit“. When the airend temperature increases above this parameter, the auxiliary relay output is deenergized.

3.g.3 Control Source (P5.3)

CCS 3.0 makes pressure regulation by pressure sensor or pressure switch. One of these 2 parameters is selected. When pressure switch is selected, the parameters related with pressure have no effect on the control.

3.g.4 Pressure Sensor (P5.4)

This is the rated pressure on the label of the pressure sensor connected to CCS 3,0AN1 input.

3.g.5 Clear Alarm List (P5.5)

It clears last 15 alarms recorded in Alarm Records.

3.g.6 Return Factory Settings (P5.6)

The below parameters marked with ● are returned to the “default (factory)” values.

| MENU INDEX | PARAMETERS | Default Setting | Minimum Value | Maximum Value | ● Return to Factory Settings |
|------------|-----------------------------------|-----------------|------------------|---------------|------------------------------|
| | User Parameters | | | | |
| P3.1 | Operating Mode | Automatic | Continuous | Automatic | ● |
| P3.2 | Pressure Unload | 7.5 Bar | 0.0 Bar | 15.6 Bar | ● |
| P3.3 | Wait on Unload | 300 sec. | 10 sec. | 1200 sec. | ● |
| P3.4 | Pressure Load | 6.0 Bar | 0.0 Bar | 15.4 Bar | ● |
| P3.5 | To Stop Delay | 5 seconds | 0 seconds | 30 seconds | ● |
| P3.6 | Pressure Unit | Bar | Bar | PSI | ● |
| P3.7 | Temperature Unit | Celcius | Celcius | Fahrenheit | ● |
| P3.8 | To Start Delay | 5 seconds | 0 seconds | 60 seconds | ● |
| P3.9 | User Password | 0001 | 0000 | 9999 | |
| | SERVICE PARAMETERS | | | | |
| | Pressure Parameters | | | | |
| P4.1.1 | Stop Pressure | 9 Bar | 0 Bar | 16 Bar | ● |
| P4.1.2 | Alarm Pressure | 8 Bar | 0 Bar | 16 Bar | ● |
| | Temperature Parameters | | | | |
| P4.2.1 | Upper Temperature Limit | 110 Cel | 90 Cel | 120 Cel | ● |
| P4.2.2 | Lower Temperature Limit | 0 Cel | 0 Cel | 10 Cel | ● |
| P4.2.3 | Temperature Alarm | 100 Cel | 80 Cel | 110 Cel | ● |
| P4.2.4 | To Load Temperature | 50 Cel | 20 Cel | 70 Cel | ● |
| | Timing Parameters | | | | |
| P4.3.1 | Y-DELTA Rising | 5 seconds | 2 seconds | 30 seconds | ● |
| P4.3.2 | Getting Load | 5 seconds | 0 seconds | 60 seconds | ● |
| P4.3.3 | Regetting Load | 5 seconds | 0 seconds | 60 seconds | ● |
| P4.3.4 | Auto Run Time | 5 seconds | 0 seconds | 60 seconds | ● |
| P4.3.5 | Air Draining Time | 0 seconds | 0 seconds | 60 seconds | ● |
| P4.3.6 | Max. Rising Hour | 6 | 0 | 10 | ● |
| | Service Periods Parameters | | | | |
| P4.4.1 | General Maintenance Hours | 5000 hours | 0 hours | 99999 hours | |
| P4.4.2 | Bearing Maintenance Hours | 5000 hours | 0 hours | 99999 hours | |
| P4.4.3 | Oil Changing Hours | 5000 hours | 0 hours | 99999 hours | |
| P4.4.4 | Air Filter Changing Hours | 5000 hours | 0 hours | 99999 hours | |
| P4.4.5 | Oil Filter Changing Hours | 5000 hours | 0 hours | 99999 hours | |
| P4.4.6 | Seperator Filter Changing Hours | 5000 hours | 0 hours | 99999 hours | |
| | Communication Parameters | | | | |
| P4.5.1 | Load Valve Control Source | Sensor | Sensor | MODBUS | |
| P4.5.2 | Start/Stop Control Source | Panel | Panel | MODBUS | |
| P4.5.3 | Com. Work Mode | Acknowledged | Not Acknowledged | Acknowledged | |
| P4.5.4 | Modbus Address | 1 | 1 | 100 | |
| P4.5.5 | Baud Rate | 19200 bps | 2400 bps | 19200 bps | |
| P4.5.6 | Stop Bit | 2 | 1 | 2 | |
| P4.5.7 | Parity Bit | Even | Odd | Even | |

| | | | | | |
|--------|-------------------------------|--------------|-----------------|--------------|---|
| P4.5.8 | Timeout Duration | 1.0 seconds | 0.1 seconds | 10.0 seconds | |
| | Calibration Parameters | | | | |
| P4.6.1 | Pressure Offset | 0.0 Bar | -1.0 Bar | + 1.0 Bar | |
| P4.6.2 | Temperature Offset | 0 Cel | -10 Cel | + 10 Cel | |
| | Preheating Parameters | | | | |
| P4.7.1 | Loaded Duration | 0 seconds | 0 seconds | 60 seconds | ● |
| P4.7.2 | Unloaded Duration | 0 seconds | 0 seconds | 120 seconds | ● |
| | Fan Settings | | | | |
| P4.8.1 | Run Temperature | 75 Cel | 50 Cel | 100 Cel | ● |
| P4.8.2 | Stp. Temperature | 60 Cel | 50 Cel | 90 Cel | ● |
| P4.8.3 | Minimum Work Time | 180 seconds | 0 seconds | 1200 seconds | ● |
| | | | | | |
| P4.9 | Service Password | 1245 | 0000 | 9999 | |
| P4.10 | Language Selection | Turkish | Turkish | English | |
| | Factory Settings | | | | |
| P5.1 | Input Contact Type | DI2-DI8 : NC | DI2-DI8 : NC | DI2-DI8 : NO | |
| P5.2 | Functional Relay | Not Selected | Not Selected | Heater | |
| P5.3 | Control Source | Sensor | Pressure Switch | Sensor | |
| P5.4 | Press. Sensor | 16 Bar | 0 Bar | 16 Bar | |
| P5.8 | Factory Password | 5489 | 0000 | 9999 | |

3.g.7 Boot Screen (P5.7)



In this menu, any information (like company, and so on) which is displayed at power on screen is set. Information length can be 16 characters on each of 2 rows. Previous information may be changed. The information is displayed for 5 seconds at power on. When this menu is entered into, the cursor on the left of the upper row blinks. If no characters has been entered before, the screen is blank as on the left. The alphanumeric characters can be selected by and buttons. Pressing button shifts the cursor to the right. Pressing button shifts the cursor to the right. Pressing button brings the cursor to the rightmost of the lower row. When button is pressed once more, the screen is recorded. To exit this screen without recording, press button for 2 seconds.

3.g.8 Factory Password (P5.8)

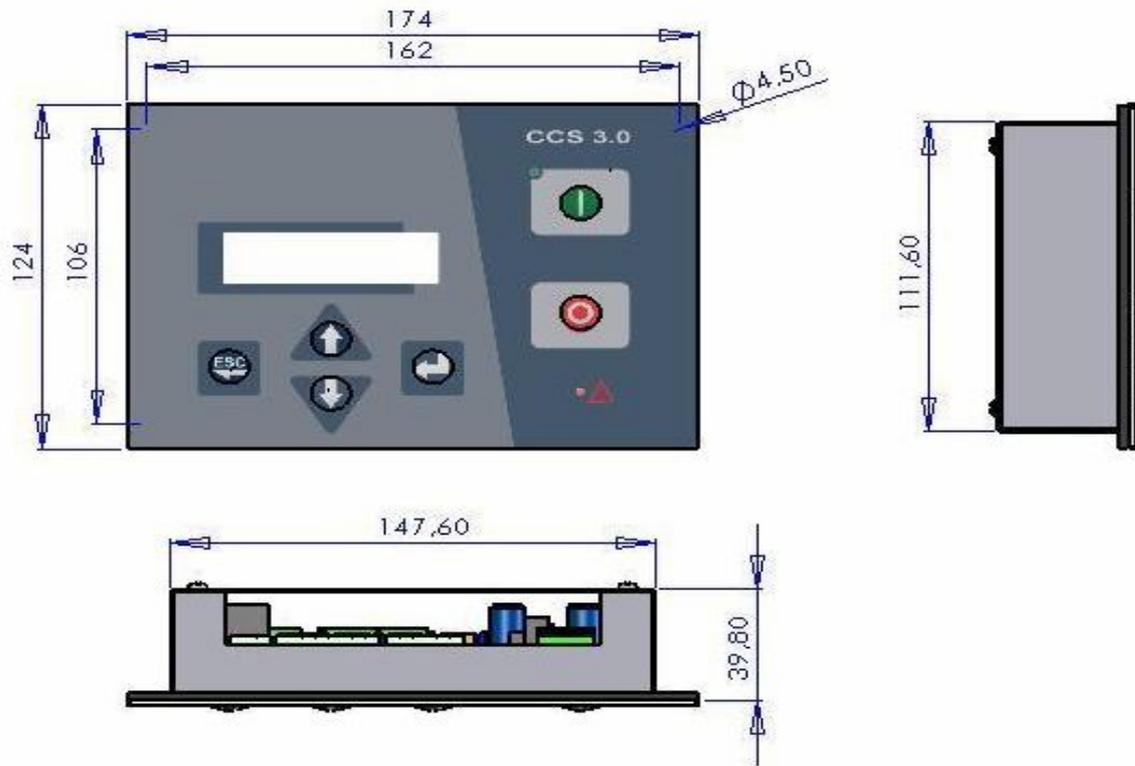
This password is for getting access to factory passwords. Changing procedure is same as “P3.9 User Password”.

3.g.9 CCS 3.0 Version (P5.9)

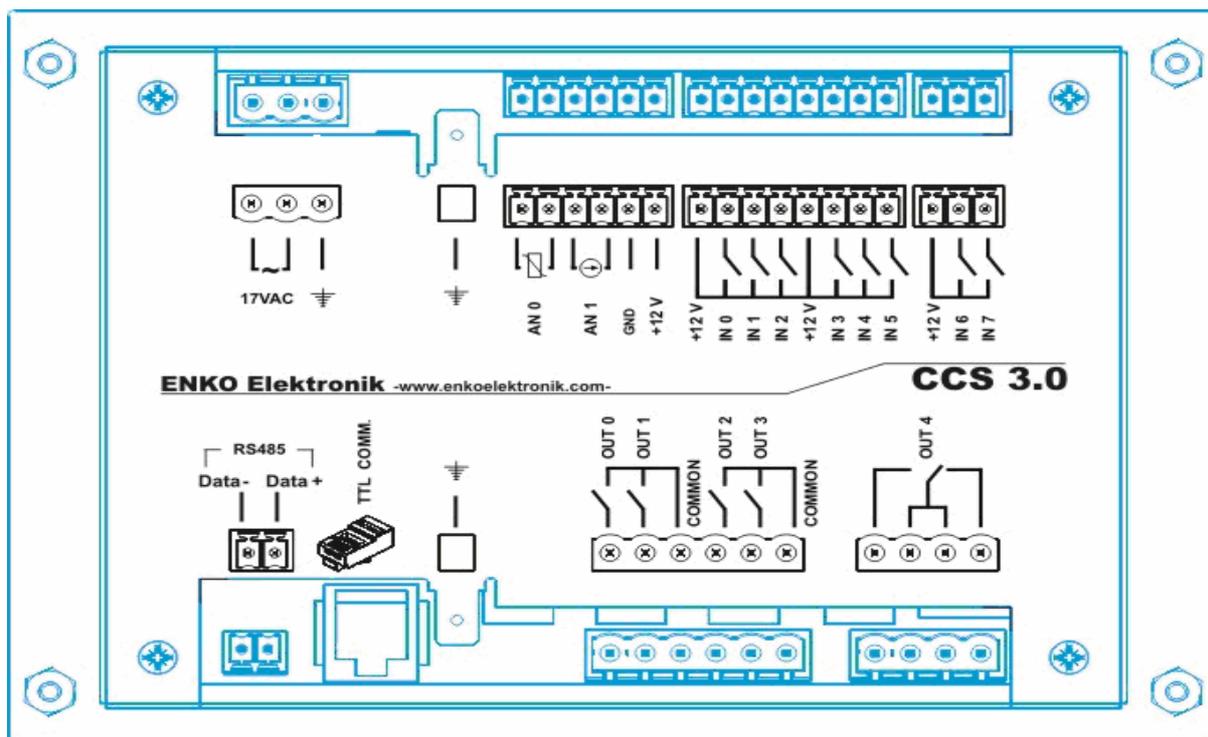
It shows the software version of CCS 3.0

3.g.10 Bootloader Version (P5.10)

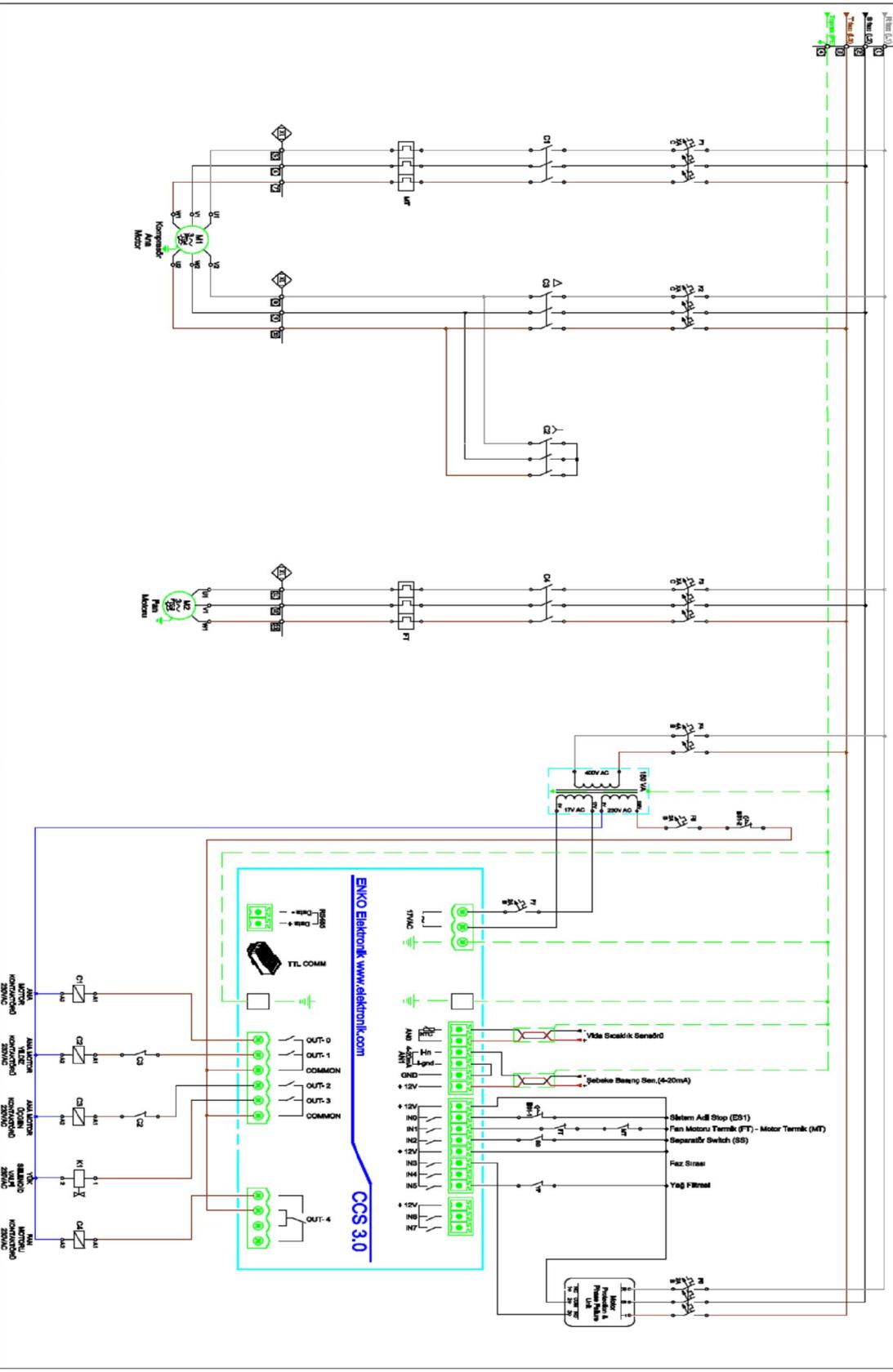
It shows the bootloader software version of CCS 3.0



| | |
|------------------------------|---|
| Power Supply | 10 -21 Vac 13- 30 Vdc |
| Operating Temperature | -10°C / +60°C |
| Relay Outputs | OUT0-OUT3 Relay Output (6A 250Vac cosφ =1.0) OUT4 Changeover Relay Output (10A 250Vac cosφ =1.0) |
| Connection | Screwless Socket |
| Housing | Metal Back Cover 0.8mm Metal Front Panel 2 mm |
| Weight | 550 gr. (average) |
| Dimensions (WxHxD) | 174 x 124 x 39.8 mm |
| Panel Cutout | 151.6 x 115.6mm |
| Installation | Panel mounting , fixing with metal screw |



| | |
|--------------|-----------------------------|
| IN 0 | EMERGENCY STOP |
| IN 1 | MOTOR THERMIC |
| IN 2 | SEPERATOR FILTER SWITCH |
| IN 3 | PHASE SEQUANCE RELAY |
| IN 4 | PRESSURE SWITCH |
| IN 5 | OIL FILTER SWITCH |
| IN 6 | REMOTE LOAD VALVE CONTROL |
| IN 7 | REMOTE START/STOP CONTROL |
| OUT 0 | MOTOR MAIN CONTACTOR |
| OUT 1 | MOTOR STAR CONTACTOR |
| OUT 2 | MOTOR DELTA CONTACTOR |
| OUT 3 | LOAD VALVE SELENOID |
| OUT 4 | AUXILIARY FUNCTIONAL OUTPUT |
| AN 0 | NTC TEMPERATURE SENSOR |
| AN 1 | 4-20mA PRESSURE SENSOR |



| | | | | | | | | | | |
|-----|-------|------|------------|---------------|---|-----------|---|-----------|-------------------------|----------------|
| Rev | Tarih | İmza | İsim | İmza | <p align="center">EN-KO</p> <p>Elektronik Kontrol Sistemleri San. Tic.Ltd. Şirketi 10006 sokak No:64 A O.S.B Çiğli-İzmir Tel:0232 3767806 Fax:0232 3767792</p> | Proje Adı | <p align="center">CCS 3.0</p> <p>Beğlantı Şeması</p> | Resim Adı | CCS 3.0 Beğlantı Şeması | |
| | | | Proje Sor. | Onur ÖZBELGİN | | Açıklama | | | Proje No | |
| | | | Çizen | Ertan SARI | | | | | Sayfa No | 1 |
| | | | Kontrol | Mustafa AKAR | | | | | Tarih | 14 / 07 / 2009 |

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