



**CCS 4.2**  
**COMPRESSOR CONTROL PANEL**  
*User Manual*



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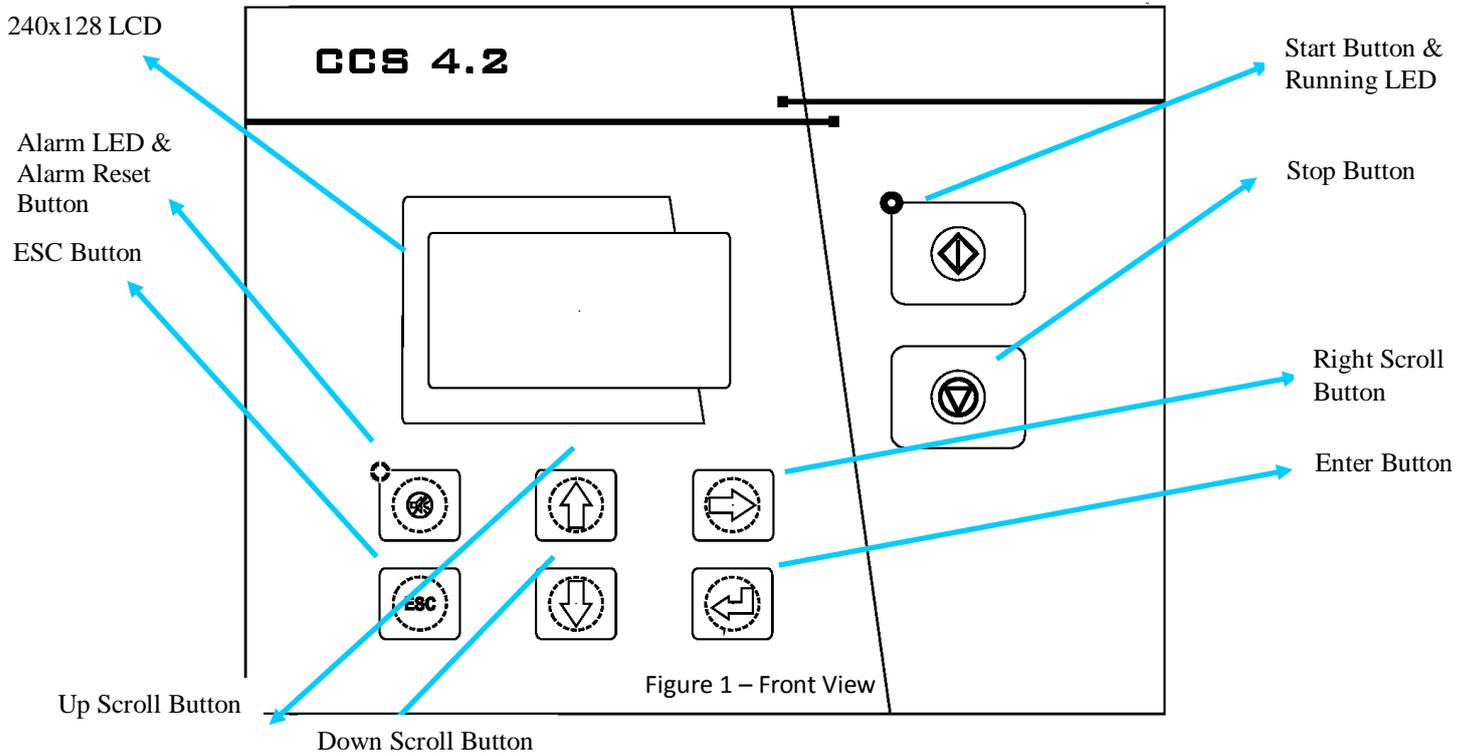
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## 1- CCS 4.2 INTRODUCTION

CCS 4.2 is designed for screw type air compressors. The unit is a microcontroller based air compressor controller which starts/stops the compressor regulates the air pressure, checks the temperature levels, protects the compressor against failures in the system and provides energy saving through variable speed control. All the inputs/outputs and the user interface is combined in a single unit.

## 2- SYSTEM DEFINITION



### Button Functions



#### Start Button:

Starts the compressor. When the unit is connected to an MCC 1.0 controller by ENKO, pressing the Start Button shifts the Start/Stop function to the MCC 1.0 controller.



#### Stop Button:

Stops the compressor. When the unit is connected to an MCC 1.0 controller by ENKO, pressing the Stop Button shifts the Start/Stop function to the MCC 1.0 controller.



#### Up Scroll Button:

If pressed while viewing the home screen, other instrumentation pages such as maintenance timers, other analog input values, inverter information, real time clock and IP & Network information (for Ethernet enabled models) pages are scrolled through.

If pressed while viewing the Menu page, scrolls to the previous menu item or parameter. If pressed while viewing the Parameter Edit page, the parameter number or numeric value is changed.



**Down Scroll Button:**

If pressed while viewing the home screen, other instrumentation pages such as maintenance timers, analog inputs, inverter information, real time clock and IP & Network information (for Ethernet enabled models) pages are scrolled through.

If pressed while viewing the Menu page, scrolls to the next menu item or parameter. If pressed while viewing the Parameter Edit page, the parameter number or numeric value is changed.



**Right Scroll Button:**

The button is used to shift the cursor to the right when viewing the Password Entry page or if trying to change the value of a parameter.



**Alarm Reset Button:**

If pressed once while there is an alarm in the system, the horn is silenced. If pressed for 3 seconds while there is an alarm in the system, the alarm will be removed. If the alarm condition continues to exist in the system the alarm cannot be removed.



**ESC Button:**

The button is used to go back to the previous page or exit the Parameter Edit page without saving the parameter.



**Enter Button:**

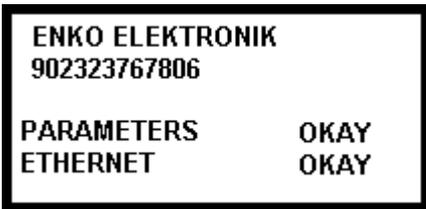
This button is used to go to the sub-menu page or exit the Parameter Edit page with saving the parameter.

**Note:** If the Up Scroll and Down Scroll buttons are pressed simultaneously for 3 seconds, the CCS 4.2 enters the Service Mode. While in Service Mode, the compressor will never go on-load.

The green LED located besides the Start Button indicates the compressors status. If the LED is off, it indicates the compressor is idle, on the other hand a solid green lit LED indicates the main motor is running. If the green LED is blinking, this indicates the compressor is starting.

The red LED located besides the Alarm Reset button indicates whether or not there is an alarm in the system. If the red LED is blinking, this indicates there is an alarm in the system, if the LED is off, it indicates there are no alarms in the system.

**2 – 1 Start-up Screen**

Screen	Description
 <p>Figure 2 – Start-up Screen</p>	<p>This screen appears when the unit is first energized. The first row indicates the company name followed by the phone number which both can be edited as desired. The next two lines indicate the results of the internal tests done by the CCS4.1. These tests are Parameters and the Ethernet connection. This screen is followed by the Home Screen.</p>

2 –2 Home Screen

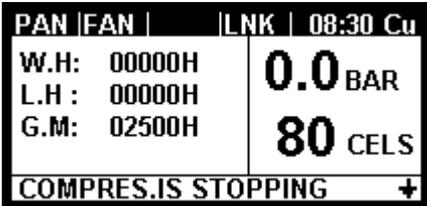
Screen	Description				
	<p><b>Home Screen</b></p> <p>Following the Start-up Screen, the Home Screen appears. An information banner can be seen on the top of the screen. The leftmost cell of the info banner indicates the control source of the unit. “PAN” indicates the control is at the panel itself, “RMT” indicates the control is at the remote start input, “COM” indicates the control is at the communication port and “CON” indicates the control should be at the communication port but because there hasn’t been any communication for a while the control is at the panel itself.</p> <p>The second cell from the left of the info banner indicates the status of the fan. “FAN” indicates that the fan is active, if there is no indication this means the fan is inactive.</p> <p>The third cell indicates the pressure calendar and e-mail status. “CLN” indicates the pressure calendar is active. If the pressure calendar is not active and there is an email being sent for any reason “EML” appears on the cell. If none of the conditions above are true, the cell will be empty.</p> <p>The fourth cell indicates the alarm or Ethernet status. If there are any yellow or red alarm active in the system “ALM” will appear in the cell. If there are no alarms in the system, the cell indicates the status of the Ethernet connection. “LNK” indicates an Ethernet connection is established, “ULK” indicates there is no Ethernet connection.</p> <p>The last cell on the info band indicates the real-time clock and day of week.</p> <p>The middle left cell indicates the Total Running Hours, Total On-load Running Hours and Hours Left Until Next Maintenance Due.</p> <p>The middle right cell indicates the main line pressure information and below the air/oil mixture temperature of the screw block.</p> <p>The bottom of the Home Screen indicates the status of the compressor.</p> <p>The user can navigate to the other instrumentation screens using the up and down scroll buttons.</p> <table border="1" data-bbox="620 1733 1407 2092"> <tr> <td>STARTING</td> <td>After the start delay time has passed the motor will be started. While this delay timer is counted the start process can be cancelled.</td> </tr> <tr> <td>MOTOR DRIVING</td> <td>In a Star-Delta compressor system, the compressor will be in this status during the time after the star contactor is opened and before passing to delta. In an Inverter compressor system, the compressor will be in this status during the time until the motor reaches the optimum</td> </tr> </table>	STARTING	After the start delay time has passed the motor will be started. While this delay timer is counted the start process can be cancelled.	MOTOR DRIVING	In a Star-Delta compressor system, the compressor will be in this status during the time after the star contactor is opened and before passing to delta. In an Inverter compressor system, the compressor will be in this status during the time until the motor reaches the optimum
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Figure 3 – Home Screen

	speed.
WORKING UNLOAD	If the system pressure is within defined limits or no air is being demanded, the compressor will de-energize the load solenoid and open the air discharge valve.
WORKING LOAD	If the system pressure is lower than the low-pressure parameter the compressor will energize the load solenoid.
AT AUTOMATIC MODE	If there's no or little air demand and the off-load delay time has passed, the control unit will stop the motor and enter this status. If the system pressure falls below the low-pressure parameter the compressor will go into starting mode.
WILL STOP	If there's a stop request from the control source, the compressor will enter WILL STOP status, go off-load and start counting down the will stop delay timer. If desired the stop process can be cancelled by sending a start request during the period of the delay timer.
COMPRES. IS STOPPING	The compressor will enter this status after the WILL STOP status and will be stopped. In order to start the compressor again, it will have to be started again.
IN SERVICE MODE	Bu durumda iken kompresör hiçbir zaman yüke geçmez. Sürekli olarak boşta çalışması sağlanır.
WAITING ACKNOWLEDGE	If the control source is "HAB", the user must confirm the first start from the CCS4.1 control panel. A confirmation is also required to start following an alarm situation.
CALENDAR STOP MODE	If the pressure calendar is active and there is a stop scheduled and the user tries to start the compressor from the panel, this warning appears on the screen. This warning will stay on the screen for a certain time, then go back to the most recent status indication.
THERE IS RED FAIL	If there is a red alarm in the system and the user tries to start the compressor from the panel this warning appears on the screen. This warning will stay on the screen for a certain time, then go back to the most recent status indication.
REMOTE START ACTIVE	If the control source is remote-start and the user tries to start the compressor from the panel this warning message appears on the screen. This warning will stay on the screen for a certain time, then go back to the most recent status indication.

Table 1 – Compressor Status Indications

#### Maintenance Timers Screen

This screen is accessed by pressing the down scroll button once while in the home screen. The user can see how much time is left until the next maintenance for various parts. The air pressure is indicated on the info banner instead of the real-time clock.

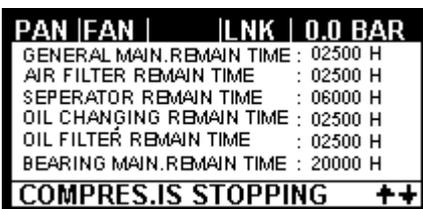


Figure 4 – Maintenance Timers Screen

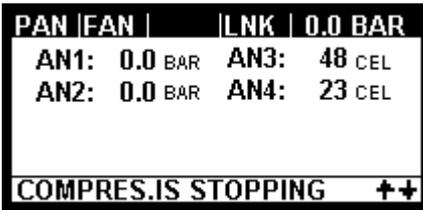


Figure 5 – Analog Inputs Screen

### Analog Inputs Screen

This screen is accessed by pressing the down scroll button once while on the maintenance timers screen or twice while on the home screen. The analog inputs screen indicates the readings from the analog inputs on the panel. The pressure unit and temperature unit can be set using the related parameters. If there are any I/O expansion modules on the system, those values will also be displayed on this screen.

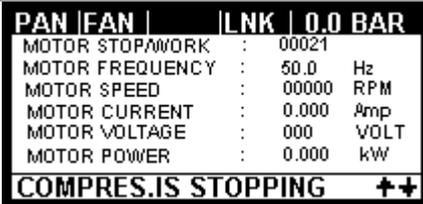


Figure 6 – Inverter Info Screen

### Inverter Info Screen

This screen can be accessed by pressing the down scroll button once while on the analog inputs screen. The user can view motor & Inverter related information and start/stop counts on the inverter info screen.



Figure 7 – Date & Time Info Screen

### Date & Time Info Screen

This screen can be accessed by pressing the down scroll button once while on the Inverter info screen. The user can view the real-time clock, system date and day of week information from the date & time info screen.

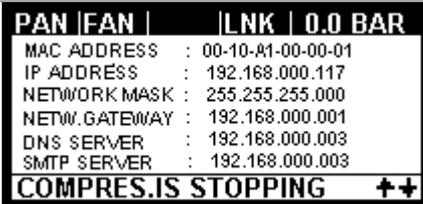


Figure 8 – Ethernet Info Screen

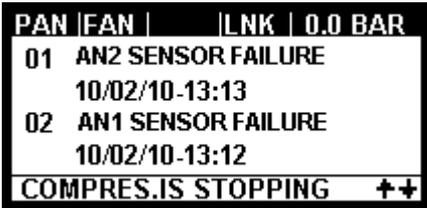
### Ethernet Info Screen

If the controller has the Ethernet option, this screen can be accessed by pressing the down scroll button once while on the date & time info screen. Various network related information can be viewed from this screen. Please ensure the Ethernet module parameter is set correctly from Factory Parameters -> Ethernet Module Yes/No.

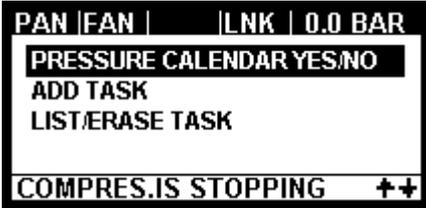
## 2 – 3 Settings Menu Screen

Screen	Description
 <p>Figure 9 – Settings Menu Screen</p>	<p>This screen is accessed by pressing the enter button while on the home screen. The user can scroll through the menu by using the up and down scroll buttons.</p> <p>The sub-menus located on this screen are as follows;</p> <ul style="list-style-type: none"> <li> Alarm List</li> <li> Parameter Settings</li> <li> Input / Output Settings</li> <li> Pressure Calendar</li> <li> Maintenance Timer Settings</li> <li> Controller Settings</li> <li> Date / Time Settings</li> <li> Mail Settings</li> </ul>

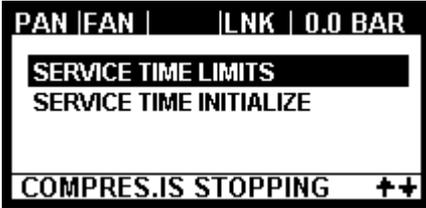
## 2 – 4 Alarm List Screen

Screen	Description
 <p>Figure 10 – Alarm List Screen</p>	<p>This screen is accessed by pressing the enter button while the cursor is on the 1 – Alarm List in the Settings Menu Screen. The alarm list indicates the most recent 25 alarms that occurred in the system with their time-stamp. Following the time-stamp, information regarding the current status of the alarm is displayed. The “&lt;” symbol indicates that the alarm is active and has not been reset by the user, the “+” symbol indicates the alarm is active but has been reset by the user, the “-” symbol indicates that the alarm is currently inactive but has not been reset by the user.</p> <p>The user can go back to the settings menu screen by pressing the ESC button, or can scroll through the alarm list by using the up and down scroll buttons.</p> <p>If the enter button is pressed while the cursor is over an alarm, the user will be prompted to reset the alarm, the reset process can be completed by pressing the enter button again or can terminate the alarm reset process by pressing the ESC button.</p>

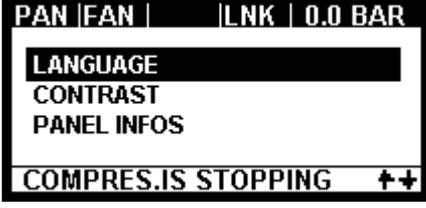
## 2 – 5 Pressure Calendar Screen

Screen	Description
 <p>Figure 11 – Pressure Calendar Screen</p>	<p>This screen is accessed by pressing the enter button while the cursor is on the 4 – Pressure Calendar in the Settings Menu Screen. The pressure calendar can be created by defining upto 28 weekly jobs for the compressor.</p> <p>The user can scroll through the list by using the up and down scroll buttons. Jobs can be added by moving the cursor over the “Add Job” item and pressing the enter button. In this screen, the user can see the day, hour and minute of week, compressor status, on-load or off-load pressure settings can be defined for the job. If the compressor status is set as stopping, the on-load and off-load pressure values cannot be set. The on-load and off-load pressure values can only be set if the status is selected as starting and when that job schedule is due, the compressor will start and run at these set pressure values. Once the desired job is defined press the ESC button and a prompt screen will appear. The user can press the enter button to save and exit or press the ESC button again to exit without saving.</p> <p>In order to see a list of currently defined jobs or delete a defined job the user can enter the Job List / Delete menu item. The user can scroll over the desired job and press the enter button twice to delete the job.</p>

## 2 – 6 Maintenance Timers Screen

Screen	Description
 <p>Figure 12 – Maintenance Timers Screen</p>	<p>This screen is accessed by pressing the enter button while the cursor is on the 5 – Maintenance Timer Settings in the Settings Menu Screen. The maintenance timers can be set / reset from this screen. For example if the general maintenance time is desired to be 2500 hours, it can be set through this page. When a maintenance time has come, the system indicates a yellow alarm. When a maintenance is performed, the related timer can be reset using the maintenance timer reset item on this menu.</p>

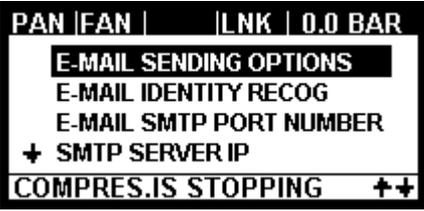
## 2 – 7 Controller Settings Screen

Screen	Description
 <p>Figure 13 – Controller Settings Screen</p>	<p>This screen is accessed by pressing the enter button while the cursor is on the 6 – Controller Settings in the Settings Menu Screen.</p> <p>The user can set the device language, contrast ratio and device information, which contains info about software, firmware and bootloader version. In order to set the language or contrast ratio the user will need to enter a password.</p>

## 2 – 8 Date/Time Settings Screen

Screen	Description
 <p>Figure 14 – Date/Time Settings Screen</p>	<p>This screen is accessed by pressing the enter button while the cursor is on the 7 – Date/Time Settings in the Settings Menu Screen.</p> <p>The user can set the real-time clock, date and day of week from this menu.</p>

## 2 – 9 Mail Settings Screen

Screen	Description
 <p>Figure 15 – Mail Settings Screen</p>	<p>This screen is accessed by pressing the enter button while the cursor is on the 8 – Mail Settings in the Settings Menu Screen.</p> <p>The user can set under which conditions (such as alarm or maintenance) e-mails will be sent from the E-mail Send Settings menu item.</p> <p>If the e-mail ID confirmation option is set as “yes” the username and password settings for the e-mail server must be set by the user, is set as “no” the user does not have to enter the login info.</p> <p>E-mail SMTP port number is the port number to be used to access the e-mail server.</p> <p>SMTP server IP is the IP access of the email server. In order to find out the IP address of a email server please visit <a href="http://tracert.com/resolver.html">http://tracert.com/resolver.html</a>.</p> <p>The sender address of the email must be entered in the “From” menu item.</p> <p>The recipient address of the email must be entered in the “To” menu item.</p> <p>The CC field is optional so it can be left blank or email addresses that are desired to be CC’ed can be entered here.</p> <p>The username and password is to be entered in their respective fields if the e-mail ID confirmation option is set to “yes”.</p>

### 3 – INPUTS & OUTPUTS

The maximum current consumption of the +12Vdc output is **350mA**.

#### 3 – 1 Digital Inputs

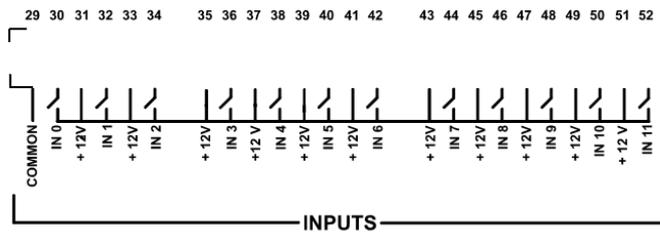
Specification	Description
Number of Digital Inputs	12*
Number of Configurable Digital Inputs	11**
Input Type	Optical Isolation
Minimum Input Voltage	2.1 Vdc Minimum
Maximum Input Voltage	+50Vdc (Compared to GND)
Contact Current	2 mA at +12 Vdc

\* : The number of digital inputs can be increased by upto 8 inputs using an optional ENKO extension module which communicates over the CanBUS port.

\*\* : The Emergency Stop function on the IN0 input is non-configurable and can not be changed.

The connection diagram for the CCS 4.2 inputs is shown below. The COMMON input is short-circuited with GND input inside the control unit.

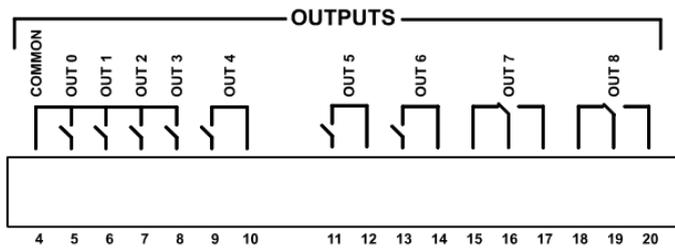
To activate this input connect the related 12V output to this input.



#### 3 – 2 Digital Outputs

Specification	Description
Number of Digital Outputs	9*
Output Type	Dry Contact Relay  OUT0, OUT1, OUT2, OUT3 with common 6A Resistive at 35Vdc or 250 Vac OUT4, OUT5, OUT6 with 2 contact outputs 6A Resistive at 35Vdc or 250 Vac OUT7, OUT8 with 3 contact outputs 10A Resistive at 35Vdc or 125 Vac

\* : OUT0 is internally connected to IN0 (Emergency Stop) input via hardware. The number of digital outputs can be increased by upto 8 outputs using an optional ENKO extension module, which communicates over the CanBUS port.



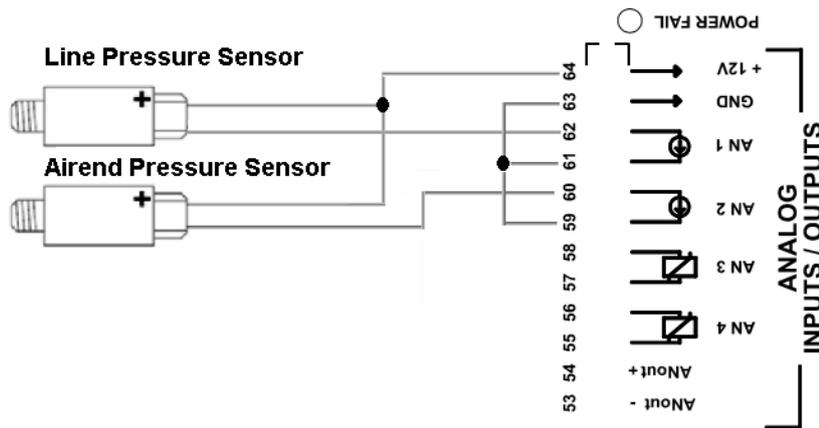
### 3 – 3 Analog Inputs

The Power Fail LED adjacent to the Analog Input will light up if the related +12Vdc output value drops below +6Vdc. This condition only occurs when more than 350 mA is drawn on the related +12Vdc output.

#### Pressure Sensor Inputs

Specification	Description
Number of Analog Inputs	2 (AN1 and AN2)*
Input Type	Differential Current Measurement Input 4 – 20 mA
Input Resistance	120 Ohm
Maximum Pressure Measurement	99 Bar
Accuracy	± 2% of Scale

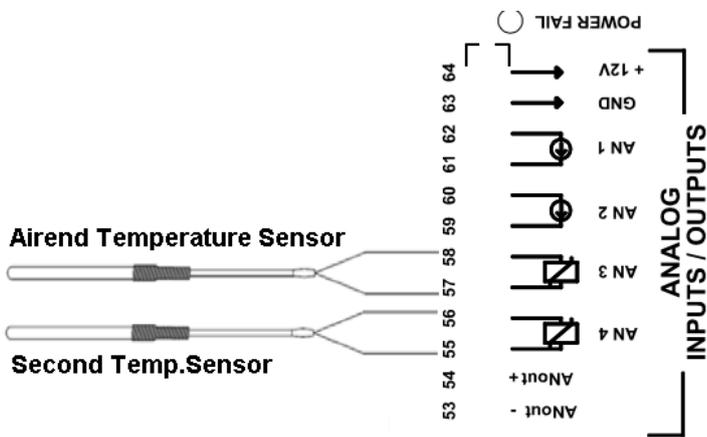
\* : The number of analog inputs can be increased by upto 2 inputs using an optional ENKO extension module, which communicates over the CanBUS port.



#### Temperature Sensor Inputs

Specification	Description
Number of Analog Inputs	2 (AN3 and AN4)*
Input Type	Resistive Measurement Input NTC R25=10K KTY R25=1K KTY R25=2K PT1000 PT100
Open-Circuit Voltage	3.2V

\* : The number of analog inputs can be increased by upto 2 inputs using an optional ENKO extension module, which communicates over the CanBUS port.

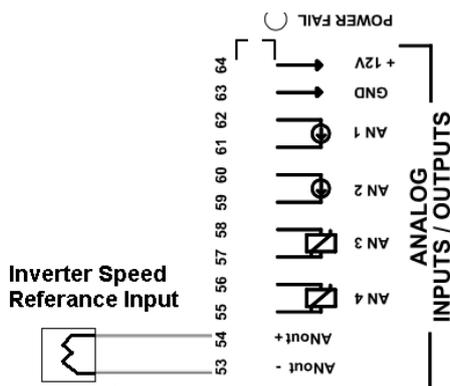


### 3 – 4 Analog Outputs

Specification	Description
Number of Analog Outputs	1 ANout*
Output Type	0-20 mA or 0-10V**
Maximum Load Resistance	550 Ohm Max

\* : The number of analog outputs can be increased by upto 1 input using an optional ENKO extension module, which communicates over the CanBUS port.

\*\* : The user can select whether this output will be current or voltage from the parameters. This output should be set according to the speed reference input of the Inverter.



### 3 – 5 CanBUS Communication Port

The CanBUS communication port is used to increase the inputs / outputs of the CCS 4.1. Upto 8 digital inputs, or 8 digital outputs, or 4 analog inputs or 1 analog output can be added as needed.

### 3 – 6 RS485 Communication Port

The RS485 communication port can be used for two functions. If there is an Inverter in the system, this port should be connected to the RS485 output on the Inverter. The CCS 4.2 will automatically connect to the Inverter with ModBUS Master protocol. If there are no inverters in the system, the RS485 communication port can be used to connect to an external system such as a PC or PLC using ModBUS Slave protocol.

The RS485 communication port is galvanically isolated.

### 3 – 7 RS232 Communication Port

The RS232 communication port can be used to connect to an external system such as a PC or PLC using ModBUS Slave protocol.

### 3 – 8 Ethernet Communication Port

The Ethernet communication port can be used to connect to another system such as a PC with ModBUS TCP Slave protocol. Also the CCS 4.2 has e-mail features where automatic e-mails can be sent to pre-defined recipients when an alarm or maintenance condition occurs in the system.

## 4 – PARAMETER LIST

User Parameters	Default	Minimum	Maximum	Unit
Working Mode	Automatic	Constant	Automatic	-
Unload Pressure	7.5	5.2	15.6	Bar
Getting Unload Wait Time	300	10	3600	Seconds
Getting On-load Pressure	6	5	15.4	Bar
Air Draining Time	0	0	600	Seconds
Water Draining Time	5	1	30	Seconds
Water Draining Waiting Time	60	30	3600	Seconds
Getting Start Delay	5	3	60	Seconds
Getting Stop Delay	10	1	600	Seconds
Pressure Unit Projection	Bar	Psi	Bar	-
Temperature Unit Projection	Celsius	Fahreneit	Celsius	-
Screen Saver Time	300	0	600	Seconds
Service Parameters	Default	Minimum	Maximum	Unit
Airend Temperature Low Value	0	-20	30	Degrees
Airend Pressure Initial Value	1	0	2	Bar
Minimum Getting Load Temperature	50	0	70	Degrees
Star-Delta Starting Time	7	1	30	Seconds
Getting Load Delay Time	1	1	30	Seconds
Regetting Load Delay Time	1	1	30	Seconds
Getting Load Information Source	Sensor	Sensor Digital Input RS232 Communication Ethernet Communication RS485 Communication		-
Stop / Work Information Source	Panel	Panel Digital Input RS232 Communication Ethernet Communication RS485 Communication		-
Pressure Difference Failure Delay	2	1	10	Seconds
Reworking Delay	0	0	120	Seconds
Water Draining Time Unload	0	0	30	Seconds
Maximum Start in One Hour	6	0	15	-
Fan Motor Up Limit	75	57	95	Degrees
Fan Motor Low Limit	65	55	93	Degrees
Fan Motor Minimum Working Time	180	10	300	Degrees
Suffisant Pressure Delay	5	4	10	Minutes
Suffisant Pressure Value	4.8	3.5	6	Bar
Heater Set Temperature	-5	75	0	Degrees
Heater Hysteresis Value	-5	5	0	Degrees
Factory Parameters	Default	Minimum	Maximum	Unit
Ethernet Module Yes / No	No	No	Yes	-
Speed Control Source	Constant	Constant Variable Analog Soft Start		-
Inverter Trademark	Mitsubishi FR-F	KEB Mitsubishi FR-F,FR-AF Mitsubishi FR-E Leroy Somer ABB ACS500,ACS800		-
AN1 Sensor Maximum Value	16	5	99.9	Bar
AN2 Sensor Maximum Value	16	5	99.9	Bar

AN5 Sensor Maximum Value	16	5	99.9	Bar
AN6 Sensor Maximum Value	16	5	99.9	Bar
Acknowledge For Start	Yes	No	Yes	-
Extention Unit Yes / No	No	No	Yes	-
Air Draining at Unload	No	No	Yes	-
Minimum Regulation Difference	0.2	0.2	0.5	Bar
AN3 Temperature Sensor Type	NTC R25=10K	NTC R25=10K KTY R25=1K KTY R25=2K PT1000 PT100		-
AN4 Temperature Sensor Type	NTC R25=10K	NTC R25=10K KTY R25=1K KTY R25=2K PT1000 PT100		-
Analog Output Type	Current	Current Voltage		-
<b>Warning Parameters</b>	<b>Default</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Unit</b>
Air / Oil Temperature Value	105	100	120	Degrees
Airend Pressure Alarm Value	8	7.7	15.8	Bar
Line Pressure Alarm Value	8	7.7	15.8	Bar
Pressure Difference Alarm Value	0.8	0.2	4.8	Bar
Second Temperature Alarm Value	105	50	150	Degrees
Pressure 1 Upper Value	8	0	15.8	Bar
Pressure 2 Upper Value	8	0	15.8	Bar
Temperature 1 Upper Value	105	50	150	Degrees
Temperature 2 Upper Value	105	50	150	Degrees
<b>Alarm Parameters</b>	<b>Default</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Unit</b>
Air / Oil Temperature Upper Value	110	100	120	Degrees
Airend Pressure Upper Value	8.5	7.7	15.8	Bar
Line Pressure Upper Value	8.5	7.7	15.8	Bar
Pressure Difference Upper Value	1	0.2	4.8	Bar
Second Temperature Upper Value	110	50	150	Degrees
Pressure 1 Upper Value	8.5	0	15.8	Bar
Pressure 2 Upper Value	8.5	0	15.8	Bar
Temperature 1 Upper Value	110	50	150	Degrees
Temperature 2 Upper Value	110	50	150	Degrees
<b>Motor Parameters</b>	<b>Default</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Unit</b>
Maximum Output Frequency	50	20	100	Hz
Motor Nominal Revolution	2900	700	6000	RPM
Motor Nominal Current	135	0.5	710	Amper
Motor Nominal Voltage	400	1	650	Volt
Motor Nominal Frequency	50	40	100	Hz
Motor Nominal Power	75	0.35	400	KW
Motor CosFi	1	0.5	1	-
Motor Service Factor	1	0.5	1.5	-
Motor Pole Number	2 Poles	2 Poles	8 Poles	-
<b>PI Parameters</b>	<b>Default</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Unit</b>
Maximum Speed	3000	100	10000	RPM
Minimum Speed	1500	0	2900	RPM
Optimum Speed	2700	800	3000	RPM
Speed at Unload	1800	800	3000	RPM
P Factor	40	0	100	-
I Factor	10	0	100	-
Maximum Ramp Value	10	5	100	Seconds

Inverter Parameters	Default	Minimum	Maximum	Unit
Boost	2	0	5	Percentage
Delta Boost	10	0	20	Percentage
Delta Boost Time	0	0	10	Seconds
Swithching Frequency	4		2KHz 4KHz 8KHz 12KHz 16KHz	KHz
Overcurrent Level	120	100	200	Percentage
Extreme Modulation	0	0	1	-
Power Regulation Factor	12	5	15	-
Stall Prevention Operation Level (P22)	110	0	200	Percentage
Soft-PWM Operation Selection (P240)	1	0	1	-
RS232 Parameters	Default	Minimum	Maximum	Unit
Baud Rate	19200		4800 9600 19200 38400 57600	-
Data Bits	8 Bits		7 Bits 8 Bits	-
Parity	Single		Odd Even None	-
Stop Bits	1 Bit	1 Bit	2 Bits	-
Network Number	1	1	255	-
RS485 Parameters	Default	Minimum	Maximum	Unit
Baud Rate	19200		4800 9600 19200 38400 57600	-
Data Bits	8 Bits		7 Bits 8 Bits	-
Parity	Double		Odd Even None	-
Stop Bits	1 Bit	1 Bit	2 Bits	-
Network Number	1	1	255	-
Incoming Data Timeout	600	200	3000	Miliseconds
Data Sending Delay	600	50	600	Miliseconds
Calibration Parameters	Default	Minimum	Maximum	Unit
AN1 Pressure Offset	0	-1	1	Bar
AN2 Pressure Offset	0	-1	1	Bar
AN5 Pressure Offset	0	-1	1	Bar
AN6 Pressure Offset	0	-1	1	Bar
AN3 Temperature Offset	0	-5	5	Degrees
AN4 Temperature Offset	0	-5	5	Degrees
AN7 Temperature Offset	0	-5	5	Degrees
AN8 Temperature Offset	0	-5	5	Degrees
ANOUT0 Offset	0	-0.5	0.5	Miliampers
ANOUT0 Value	20	18	25	Miliampers
Ethernet Parameters	Default	Minimum	Maximum	Unit
MAC Adress	-	-	-	-
IP Address	-	-	-	-

Network Gateway	-	-	-	-
Network Mask	-	-	-	-
DNS Server Address	-	-	-	-
Ethernet Connection Type	Automatic		Automatic 10Mbit Half 10Mbit Full 100Mbit Half 100Mbit Full	-
Automatic / Manual IP Getting	Manual	Manual	DHCP	-

#### 4 - 1 User Parameters

The User Parameters can be accessed by entering the Settings Menu Screen and then entering 2 – Parameter Settings.

**Working Mode:** If the controller is in Automatic Mode, the motor will be stopped at the end of Getting Unload Wait Time. If the controller is in Constant Mode, there is no Getting Unload Wait Time and the motor will not be stopped when the compressor reaches the desired pressure level.

The minimum value is Constant Mode, maximum value is Automatic Mode and default value is Automatic Mode.

**Unload Pressure (bar/psi):** In Inverter enabled systems, when the compressor pressure reaches this value, the load solenoid will be de-energized and the compressor will be unloaded. In contactor-based systems, both the load solenoid and the air-draining valve will be de-energized together, which will unload the compressor. Depending on the parameter setting, the Unload Pressure value can be displayed in Bar or PSI units.

The maximum value of this parameter is Air End Pressure Alarm Value minus the Minimum Regulation Difference.

The minimum value of this parameter is 0.2 bars higher than the Getting On-Load Pressure. The minimum value of the Getting On-Load Pressure is 5 bars so the minimum value of the Unload Pressure is 5 bars plus 0.2 bars which sums up to 5.2 bars. The minimum value of the Unload Pressure will vary depending on the Getting On-Load Pressure value set in your system.

The minimum value for this parameter is 5.2 bars, maximum value is 15.6 bars, default value for 7.5 bar compressors is 7.5 bars, default value for 10 bar compressors is 10 bars and the default value for 13 bar compressors is 13 bars.

**Getting Unload Wait Time (sec):** If the airend pressure exceeds the Unload Pressure, the compressor will be unloaded at the end of this wait time.

The minimum value for this parameter is 10 seconds, maximum value is 3600 seconds and the default value is 300 seconds.

**Getting On-load Pressure (bar/psi):** If the compressor is unloaded and the airend pressure drops below this value, the compressor gets loaded. In Inverter systems, the load solenoid will be energized. On the other hand in contactor based systems, both the load solenoid and the air-draining valve will be energized together which will load the compressor. Depending on the parameter setting, the Getting On-Load Pressure value can be displayed in Bar or PSI units.

The maximum value of this parameter is Air End Pressure Alarm Value minus the Minimum Regulation Difference.

The minimum value of this parameter is 0.2 bars lower than the Unload Pressure. The minimum value of the Unload

Pressure is 5.2 bars so the minimum value of the Getting On-Load Pressure is 5.2 bars minus 0.2 bars, which sums up to 5 bars. The minimum value of the Getting On-Load Pressure will vary depending on the Unload Pressure value set in your system.

The minimum value for this parameter is 5 bars, maximum value is 15.4 bars, default value for 7.5 bar compressors is 6 bars, default value for 10 bar compressors is 8 bars and the default value for 13 bar compressors is 11 bars.

**Air Draining Time (sec):** If the airend pressure sensor has not been assigned to any one of the inputs, this timer is activated after the compressor has stopped and the compressor cannot be started until the timer has ended.

The minimum value for this parameter is 0 seconds, maximum value is 600 seconds and the default value is 0 seconds.

**Water Draining Time (sec):** This parameter determines the water draining time and is active when the compressor is on-load.

The minimum value for this parameter is 1 second, maximum value is 30 seconds and the default value is 5 seconds.

**Water Draining Waiting Time (sec):** This timer determines the delay time between water drainages when the compressor is loaded or unloaded. If the compressor is unloaded the Water Draining Waiting Time will be 10 times the value.

The minimum value for this parameter is 30 seconds, maximum value is 3600 seconds and the default value is 60 seconds.

**Getting Start Delay (sec):** This timer determines how much delay there will be between pressing the Start Button on the CCS 4.2 panel and the start of the compressor. After the Start Button is pressed and this delay timer is counting, the user can press the Stop Button to cancel the start operation and this timer will be reset.

The minimum value for this parameter is 3 seconds, maximum value is 60 seconds and the default value is 5 seconds.

**Getting Stop Delay (sec):** This timer determines how much delay there will be between pressing the Stop Button on the CCS 4.2 panel and the stop of the compressor. After the Stop Button is pressed and this delay timer is still counting, the user can press the Start Button to cancel the stop operation and this timer will be reset.

The minimum value for this parameter is 1 second, maximum value is 600 seconds and the default value is 10 seconds.

**Pressure Unit Projection:** This parameter determines whether or not all the pressure values in the system will be shown as PSI or as BAR unit.

The minimum value for this parameter is PSI, maximum value is BAR and the default value is BAR.

**Temperature Unit Projection:** This parameter determines whether or not all the temperature values in the system will

be shown as Degrees or as Fahrenheit unit.

The minimum value for this parameter is Fahrenheit, maximum value is Degrees and the default value is Degrees.

**Screen Saver Time (sec):** This parameter determines within how many seconds the screen saver becomes active. In screen saver mode, the screen will show the line pressure value. If this parameter is set to 0 (zero) the screen saver never becomes active.

The minimum value for this parameter is 0 seconds, maximum value is 600 seconds and the default value is 300 seconds.

#### **4 – 2 Service Parameters**

**Airend Temperature Low Value (C/F):** If the airend temperature drops below this parameter, the compressor will not start in order to ensure safety.

The minimum value for this parameter is -20 °C, maximum value is 30 °C and the default value is 0 °C.

**Airend Pressure Initial Value (bar/psi):** If the airend pressure is above this parameter during the initial start of the compressor, the CCS 4.2 will output an “Air is Not Draining” alarm. When the airend temperature drops below this value, the “Air is Not Draining” alarm will automatically be reset.

The minimum value for this parameter is 0 bar, maximum value is 2 bars and the default value is 1 bar.

**Minimum Getting Load Temperature (C/F):** If the airend temperature drops below this parameter, the compressor will not be loaded during the initial start of the compressor. When the airend temperature exceeds this parameter, the compressor will continue its normal operation.

The minimum value for this parameter is 0 °C, maximum value is 70 °C and the default value is 50 °C.

**Star - Delta Starting Time (sec):** This parameter determines the delay time while shifting from star to delta in systems with contactor driven motors. In Inverter driven systems the parameter determines the reaction time of the PI cycle.

The minimum value for this parameter is 1 second, maximum value is 30 seconds and the default value is 7 seconds.

**Getting Load Delay Time (sec):** This parameter determines the delay time between the compressor initial start and the compressor loading.

The minimum value for this parameter is 1 second, maximum value is 30 seconds and the default value is 1 second.

**Regetting Load Delay Time (sec):** This parameter determines how much delay there will be before the compressor is re-loaded after being unloaded.

The minimum value for this parameter is 1 second, maximum value is 30 seconds and the default value is 1 second.

**Getting Load Information Source:** This parameter determines which source (Sensor, Digital Input, RS232 Communication, Ethernet Communication or RS485 Communication) will be used as reference for loading control.

The minimum value for this parameter is Sensor, maximum value is RS485 Communication and the default value is Sensor.

**Stop / Work Information Source:** This parameter determines which source (Panel, Digital Input, RS232 Communication, Ethernet Communication or RS485 Communication) will be used as reference for stop / work control.

The minimum value for this parameter is Panel, maximum value is RS485 Communication and the default value is Panel.

**Pressure Difference Failure Delay (sec):** If the pressure difference between the airend pressure and line pressure exceeds the warning or alarm limits, the CCS 4.2 will indicate a warning or alarm at the end of the time period determined by this parameter value.

The minimum value for this parameter is 1 second, maximum is 10 seconds and the default value is 2 seconds.

**Reworking Delay (sec):** In the case of a power failure, the compressor will rework at the end of the time period determined by this parameter when the power returns. If this parameter is set to 0 (zero) this function is disabled.

The minimum value for this parameter is 0 seconds, maximum value is 120 seconds and the default value is 0 seconds.

**Water Draining Time Unload (sec):** When the compressor is unloaded the water will be drained for the time period set by this parameter.

The minimum value for this parameter is 0 seconds, maximum value is 30 seconds and the default value is 0 seconds.

**Maximum Start in One Hour:** If the compressor starts and stops as many times as the value determined by this parameter, the compressor will signal an alarm.

The minimum value for this parameter is 0, maximum value is 15 and the default value is 6.

**Fan Motor Up Limit (C/F):** If the airend temperature exceeds this parameter, the CCS 4.2 control unit will start the fan motor.

The minimum value for this parameter is 57 °C, maximum value is 95 °C and the default value is 75 °C.

**Fana Motor Low Limit (C/F):** If the airend temperature drops below this parameter, the fan motor will be stopped

after the Fan Motor Minimum Working Time has passed.

The minimum value for this parameter is 55 °C, maximum value is 93 °C and the default value is 65 °C.

**Fan Motor Minimum Working Time (sec):** The fan motor will continue to run for at least the time period determined by this parameter once the fan is started.

The minimum value for this parameter is 10 seconds, maximum value is 300 seconds and the default value is 180 seconds.

**Suffisant Pressure Delay (min):** If the airend pressure drops below the Suffisant Pressure Value and stays below for the time period determined by this parameter the system will output a Minimum Pressure is Reached alarm.

The minimum value for this parameter is 4 minutes, maximum value is 10 minutes and the default value is 5 minutes.

**Suffisant Pressure Value (bar/psi):** If the airend pressure drops below this value and stays below for the time period determined by the Suffisant Pressure Delay, the system will output a Minimum Pressure is Reached alarm.

The minimum value for this parameter is 3.5 bars, maximum value is 6 bars and the default value is 4.8 bars.

**Heater Set Temperature (C/F):** If the value reading from the heater temperature sensor drops below this parameter, the heater output is activated.

The minimum value for this parameter is -5 °C, maximum value is 75 °C and the standard value is 0 °C.

**Heater Hysteresis Value (C/F):**

The heater output will be deactivated when the heater temperature value is larger than or equal to the sum of Heater Set Temperature and Heater Hysteresis Value.

The minimum value for this parameter is -5 °C, maximum value is 5 °C and the default value is 0 °C.

#### **4 – 3 Factory Parameters**

**Ethernet Module Yes / No:** If theres an Ethernet module connected to the CCS 4.2 and this parameter is set to Yes, then the Ethernet functions can be done. If this parameter is selected as No, then the Ethernet functions cannot be done.

The mininum value for this parameter is No, maximum value is Yes and the default value is No.

**Speed Control Source:** The source of the motor drive is selected using this parameter. If a star – delta system is being used Constant should be selected. If an Inverter system is being used, Variable should be selected. The CCS 4.2  
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currently supports Mitsubishi, KEB, ABB, Leroy Somer and Teco brand inverters for communication. If the Inverter model is not supported (brands listed above) this parameter can be selected as Analog which then any brand of Inverter can drive the motor from the analog output by using speed control. The Soft Start option in this parameter should be selected if a soft start device is being used to drive the motor.

**CAUTION! - When this parameter is changed, the functions assigned to Digital Inputs and Outputs are automatically changed.**

**If this parameter is set as CONSTANT,**

OUT0: Air Drain	OUT4: Star Contactor
OUT1: Load Solenoid	OUT5: Delta Contactor
OUT2: Fan Contactor	OUT6: Horn
OUT3: Main Contactor	OUT7: Water Drain
OUT8: Red Fail	

**If this parameter is set as VARIABLE,**

OUT0: Air Drain	OUT4: Cooling
OUT1: Load Solenoid	OUT5: No Function
OUT2: Fan Contactor	OUT6: Horn
OUT3: Output Breaker	OUT7: Water Drain
OUT8: Red Fail	

**If this parameter is set as ANALOG,**

OUT0: Air Drain	OUT4: Cooling
OUT1: Load Solenoid	OUT5: No Function
OUT2: Fan Contactor	OUT6: Horn
OUT3: Output Breaker	OUT7: Water Drain
OUT8: Red Fail	

**If this parameter is set as SOFT START,**

OUT0: Air Drain	OUT4: Soft Start
OUT1: Load Solenoid	OUT5: Soft Reset
OUT2: Fan Contactor	OUT6: Horn
OUT3: No Function	OUT7: Water Drain
OUT8: Red Fail	
IN9: Ramp End (Contact Type: Normally Open)	

The minimum value for this parameter is Constant, maximum value is Soft Start and the default value is Constant.

**Inverter Trademark:** This parameter is used to determine the make of the Inverter used in the system. KEB, Mitsubishi (FR-F and FR-E), Leroy Somer (PowerDrive and Digi Drive) and ABB (ACS500 and ACS800) models are currently supported by the CCS 4.2 and new models are being added so please check with the manufacturer for updates.

The minimum value for this parameter is KEB, maximum value is ABB ACS800 and the default value is Mitsubishi.

**AN1 Sensor Maximum Value (bar/psi):** This parameter determines the maximum value of the pressure sensor connected to the AN1 input. Please note if this value is not set properly, correct readings will not be able to be done from the sensor.

The minimum value for this parameter is 5 bars, maximum value is 99.9 bars and the default value is 16 bars.

**AN2 Sensor Maximum Value (bar/psi):** This parameter determines the maximum value of the pressure sensor connected to the AN2 input. Please note if this value is not set properly, correct readings will not be able to be done from the sensor.

The minimum value for this parameter is 5 bars, maximum value is 99.9 bars and the default value is 16 bars.

**AN5 Sensor Maximum Value (bar/psi):** This parameter determines the maximum value of the pressure sensor connected to the AN5 input. Please note if this value is not set properly, correct readings will not be able to be done from the sensor.

The minimum value for this parameter is 5 bars, maximum value is 99.9 bars and the default value is 16 bars.

**AN6 Sensor Maximum Value (bar/psi):** This parameter determines the maximum value of the pressure sensor connected to the AN6 input. Please note if this value is not set properly, correct readings will not be able to be done from the sensor.

The minimum value for this parameter is 5 bars, maximum value is 99.9 bars and the default value is 16 bars.

**Acknowledge for Start:** This parameter is activated if the Stop / Work Information Source under the Service Parameters is set to one of the Communication ports (RS232, Etherent or RS485). If this parameter is set to Yes, then during the initial start command the user is prompted to confirm by pressing the Start Button from the panel. If any alarms that stop the motor occur in the system, the user is prompted to confirm from the panel upon receiving a start command.

The minimum value for this parameter is No, maximum value is Yes and the default value is Yes.

**Extention Unit Yes / No:** If the digital inputs / outputs or the analog inputs / outputs on the CCS 4.2 controller are not enough, a CCS 4.2E extention unit can be connected to the controller in order to increase the I/O's. When an extention unit is connected, this parameter should be set as Yes, which enables the I/O's on the extention unit to be detected by the controller.

The minimum value for this parameter is No, maximum value is Yes and the default value is No.

**Air Draining at Unload:** If the Speed Control Source is selected as Variable or Analog, the compressor is unloaded, and if the aird pressure is increasing, the Air Drain output will be activated if the aird pressure reaches 0.2 bars less than the Aird Pressure Alarm Value. Then the aird pressure drops to 5 bars, the Air Drain Output is closed and the aird pressure drop is stopped.

**Minimum Regulation Difference (bar/psi):** If the Speed Control Source is selected as Variable or Analog, the initial speed setting will be lower than the Unload Pressure by the value set by this parameter. When the line pressure goes higher than that value, the motor speed is reduced and when the line pressure drops below that value, the motor speed is increased.

The minimum value for this parameter is 0.2 bars, the maximum value is 0.5 bars and the default value is 0.2 bars.

**AN3 Temperature Sensor Type:** This parameter determines the type of sensor connected to the AN3 analog temperature input. The sensor type options include NTC R25 = 10K, KTY R25 = 1K, KTY R25 = 2K, PT 1000 and PT 100.

The minimum value for this parameter is NTC R25 = 10K, maximum value is PT 100 and the default value is NTC R25 = 10K.

**AN4 Temperature Sensor Type:** This parameter determines the type of sensor connected to the AN4 analog temperature input. The sensor type options include NTC R25 = 10K, KTY R25 = 1K, KTY R25 = 2K, PT 1000 and PT 100.

The minimum value for this parameter is NTC R25 = 10K, maximum value is PT 100 and the default value is NTC R25 = 10K.

**Analog Output Type:** This parameter determines whether the Analog Output will be Current or Voltage. For Current, the operation range is 0 – 20 mA and for Voltage the operation range is 0 – 10 V. If the option is set as Current, the CCS 4.2 will output current as source.

The minimum value for this parameter is Current, the maximum value is Voltage and the default value is Current.

## **4 – 4 Communication Parameters**

### **4-4-1 RS232 Parameters**

**Baud Rate:** This parameter determines the baud rate of the RS232 communication port. The options include 4800, 9600, 19200, 38400 and 57600.

The minimum value for this parameter is 4800, the maximum value is 57600 and the default value is 19200.

**Data Bits:** This parameter determines the number of data bits of the RS232 communication port.

The minimum value for this parameter is 7 bits, the maximum value is 8 bits and the default value is 8 bits.

**Parity:** This parameter determines the parity of the RS232 communication port.

The minimum value for this parameter is Odd, maximum value is None and the default value is Even.

**Stop Bits:** This parameter determines the number of stop bits of the RS232 communication port.

The minimum value for this parameter is 1 bit, maximum value is 2 bits and the default value is 1 bit.

**Network Number:** This parameter determines the ModBUS communication protocol network number of the RS232 communication port.

The minimum value for this parameter is 1, maximum value is 255 and the default value is 1.

#### **4-4-2 RS485 Parameters**

**Baud Rate:** This parameter determines the baud rate of the RS485 communication port. The options include 4800, 9600, 19200, 38400 and 57600.

The minimum value for this parameter is 4800, the maximum value is 57600 and the default value is 19200.

**Data Bits:** This parameter determines the number of data bits of the RS485 communication port.

The minimum value for this parameter is 7 bits, the maximum value is 8 bits and the default value is 8 bits.

**Parity:** This parameter determines the parity of the RS485 communication port.

The minimum value for this parameter is Odd, maximum value is None and the default value is Even.

**Stop Bits:** This parameter determines the number of stop bits of the RS485 communication port.

The minimum value for this parameter is 1 bit, maximum value is 2 bits and the default value is 1 bit.

**Network Number:** This parameter determines the ModBUS communication protocol network number of the RS232 communication port.

The minimum value for this parameter is 1, maximum value is 255 and the default value is 1.

**Incoming Data Timeout (mSec):** This parameter determines how long the CCS 4.2 will wait to receive an incoming data before being timeout when the RS485 port is being used to communicate with the Inverter.

The minimum value for this parameter is 200 mSec, maximum vaue is 3000 mSec and the default value is 600 mSec.

**Data Sending Delay (mSec):** This parameter determines in what time periods the RS485 port will request to send data to the Inverter.

The minimum value for this parameter is 50 mSec, maximum value is 1000 mSec and the default value is 600 mSec.

### **4-4-3 Ethernet Parameters**

**MAC Address:** This parameter determines the MAC address for the CCS 4.2.

**IP Address:** This parameter determines the IP address for the CCS 4.2. If the Automatic / Manual IP Getting parameter is set as Manual, the address entered in this parameter is highly important.

**Network Gateway:** This parameter determines the network gateway for the CCS 4.2. The IP address of the network gateway which accesses the Internet is to be entered in this parameter.

**Network Mask:** This parameter determines the network mask for the CCS 4.2.

**DNS Server Address:** This parameter determines the DNS Server Address for the CCS 4.2.

#### **4-4-3-1 Ethernet Sub-Parameters**

**Ethernet Connection Type:** This parameter determines the network connection speed of the Ethernet module. The options include 10Mbit Half, 10Mbit Full, 100 Mbit Half and 100 Mbit full.

**Automatic Manual IP Getting:** This parameter determines whether the IP getting will be done manually or by automatically from the DHCP server.

### **4 – 5 Warning Parameters**

**Air / Oil Temperature Value (C/F):** If the Air / Oil temperature exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 100 °C, maximum value is 120 °C and the default value is 105 °C.

**Airend Pressure Alarm Value (Bar/Psi):** If the airend pressure exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is Unload Pressure + 0.2 bars, maximum value is Airend Pressure Upper Value – 0.2 bars and the default value is 8 bars.

**Line Pressure Alarm Value (Bar/Psi):** If the line pressure exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is Unload Pressure + 0.2 bars, maximum value is Line Pressure Upper Value – 0.2

bars and the default value is 8 bars.

**Pressure Difference Alarm Value (Bar/Psi):** If the pressure difference between the aircend and the line exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 0.2 bars, maximum value is Pressure Difference Upper Value – 0.2 bars and the default value is 0.8 bars.

**Second Temperature Alarm Value (C/F):** If the temperature measured from the second temperature sensor (AN4) exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 50 °C, maximum value is 150 °C and the default value is 105 °C.

**Pressure 1 Upper Value (Bar/Psi):** If the Pressure 1 value exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 0 bars, maximum value is 15.8 bars and the default value is 8 bars.

**Pressure 2 Upper Value (Bar/Psi):** If the Pressure 2 value exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 0 bars, maximum value is 15.8 bars and the default value is 8 bars.

**Temperature 1 Upper Value (C/F):** If the Temperature 1 value exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 50 °C, maximum value is 150 °C and the default value is 105 °C.

**Temperature 2 Upper Value (C/F):** If the Temperature 2 value exceeds the limit set by this parameter, the controller will display a warning but will not stop the motor.

The minimum value for this parameter is 50 °C, maximum value is 150 °C and the default value is 105 °C.

#### **4 – 6 Alarm Parameters**

The motor will be stopped if any alarms in this parameter group occur in system.

**Air / Oil Temperature Upper Value (C/F):** If the air / oil temperature exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is 100 °C, maximum value is 120 °C and the default value is 110 °C.

**Airend Pressure Upper Value (Bar/Psi):** If the airend pressure exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is Airend Pressure Alarm Value + 0.2 bars, maximum value is 16 bars and the default value is 8.5 bars.

**Line Pressure Upper Value (Bar/Psi):** If the line pressure exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is Line Pressure Alarm Value + 0.2 bars, maximum value is 16 bars and the default value is 8.5 bars.

**Pressure Difference Upper Value (Bar/Psi):** If the pressure difference between the airend and the line exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is Pressure Difference Alarm Value + 0.2 bars, maximum value is 16 bars and the default value is 1 bar.

**Second Temperature Upper Value (C/F):** If the temperature of the second temperature probe (AN4) exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is 50 °C, maximum value is 150 °C and the default value is 110 °C.

**Pressure 1 Upper Value (Bar/Psi):** If the Pressure 1 value exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is 0 bars, maximum value is 15.8 bars and the default value is 8.5 bars.

**Pressure 2 Upper Value (Bar/Psi):** If the Pressure 2 value exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is 0 bars, maximum value is 15.8 bars and the default value is 8.5 bars.

**Temperature 1 Upper Value (C/F):** If the Temperature 1 value exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is 50 °C, maximum value is 150 °C and the default value is 110 °C.

**Temperature 2 Upper Value (C/F):** If the Temperature 2 value exceeds the limit set by this parameter, the controller will stop the motor and display a warning.

The minimum value for this parameter is 50 °C, maximum value is 150 °C and the default value is 110 °C.

#### **4– 7 Calibration Parameters**

**AN1 Pressure Offset (Bar/Psi):** This parameter calibrates the variance of the AN1 pressure input.

The minimum value for this parameter is -1 bar, maximum value is 1 bar and the default value is 0.

**AN2 Pressure Offset (Bar/Psi):** This parameter calibrates the variance of the AN2 pressure input.

The minimum value for this parameter is -1 bar, maximum value is 1 bar and the default value is 0.

**AN5 Pressure Offset (Bar/Psi):** This parameter calibrates the variance of the AN5 pressure input.

The minimum value for this parameter is -1 bar, maximum value is 1 bar and the default value is 0.

**AN6 Pressure Offset (Bar/Psi):** This parameter calibrates the variance of the AN6 pressure input.

The minimum value for this parameter is -1 bar, maximum value is 1 bar and the default value is 0.

**AN3 Temperature Offset (C/F):** This parameter calibrates the variance of the AN3 temperature input.

The minimum value for this parameter is -5 °C, maximum value is 5 °C and the default value is 0 °C.

**AN4 Temperature Offset (C/F):** This parameter calibrates the variance of the AN4 temperature input.

The minimum value for this parameter is -5 °C, maximum value is 5 °C and the default value is 0 °C.

**AN7 Temperature Offset (C/F):** If there is an I/O extension unit connected to the CCS 4.2, this parameter calibrates the variance of the AN7 temperature input.

The minimum value for this parameter is -5 °C, maximum value is 5 °C and the default value is 0 °C.

**AN8 Temperature Offset (C/F):** If there is an I/O extension unit connected to the CCs 4.2, this parameter calibrates the variance of the AN8 temperature input.

The minimum value for this parameter is -5 °C, maximum value is 5 °C and the default value is 0 °C.

**ANOut0 Offset:** This parameter calibrates the variance of the ANOut0 Analog Output.

The minimum value for this parameter is -0.5 mA, maximum value is 0.5 mA and the default value is 0 mA.

**ANOut0 Value:** The gain value for the ANOut0 Output can be set using this parameter.

The minimum value for this parameter is 18 mA, maximum value is 25 mA and the default value is 20 mA.

#### **4 – 8 Logo Settings**

This parameter determines the logo, which will be shown on the start-up screen. OEM companies can place their own company information using this parameter.

#### **4 – 9 Phone Settings**

This parameter determines the phone number, which will be shown on the start-up screen. OEM companies can add their own company phone number using this parameter.

#### **4 – 10 Standart Values**

**7.5 Bar Standart Values:** If a compressor is desired to be configured according to the 7.5 bar default parameter values this option can be used.

**10.0 Bar Standart Values:** If a compressor is desired to be configured according to the 10 bar default parameter values this option can be used.

**13.0 Bar Standart Values** If a compressor is desired to be configured according to the 13 bar default parameter values this option can be used.

**Save Factory Settings:** Once all the parameter configurations are made in the factory, this option should be selected to save all the parameters in the CCS 4.2 memory.

**Return Factory Parameters:** If the factory has done the Save Factory Settings operation after the initial parameter configuration of the CCS 4.2 panel, all the parameters can be restored back by using this option. Please note that all the current parameter settings will be replaced by the factory set parameters.

#### **4– 11 Motor Parameters**

This set of parameters will only appear if the Speed Control Source parameter is set to Variable or Analog.

**Maximum Output Frequency (Hz):** This parameter determines the maximum frequency the Inverter will apply to the motor.

The minimum value for this parameter is 20 Hz, maximum value is 100 Hz and the default value is 50 Hz.

**Motor Nominal Revolution (RPM):** The RPM information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 700 rpm, maximum is 6000 rpm and the default value is 2900 rpm.

**Motor Nominal Current (A):** The current information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 0.5 A, maximum is 710 A and the default value is 135 A.

**Motor Nominal Voltage (V):** The voltage information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 1 V, maximum is 650 V and the default value is 400 V.

**Motor Nominal Frequency (Hz):** The frequency information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 40 Hz, maximum is 100 Hz and the default value is 50 Hz.

**Motor Nominal Power (kW):** The motor power information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 0.35 kW, maximum is 400 kW and the default value is 75 kW.

**Motor CosFi:** The CosFi information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 0.5, maximum is 1 and the default value is 0.75.

**Motor Service Factor:** The motor service factor information that can be found on the metal plate located on the motor is to be inputted as this parameter. The Motor Nominal Power and Motor Nominal Current values set on the Inverter are multiplied with this parameter and sent to the Inverter from the CCS 4.2.

The minimum value for this parameter is 0.5, maximum value is 1.5 and the default value is 1.

**Motor Pole Number:** The pole count information that can be found on the metal plate located on the motor is to be inputted as this parameter.

The minimum value for this parameter is 2, maximum is 8 and the default value is 2.

## **4 – 12 PI Parameters**

This set of parameters will only appear if the Speed Control Source parameter is set to Variable or Analog.

**Maximum Speed (RPM):** If the Speed Control Source parameter is set as Variable, this parameter determines the maximum speed that will be applied to the Inverter.

The minimum value for this parameter is 100 rpm, maximum value is 9999 rpm and the default value is 3000 rpm.

**Minimum Speed (RPM):** If the Speed Control Source parameter is set as Variable, this parameter determines the minimum speed that will be applied to the Inverter.

The minimum value for this parameter is 0 rpm, maximum is 2900 rpm and the default value is 1500 rpm.

**Optimum Speed (RPM):** If the Speed Control Source parameter is set as Variable, this parameter determines the optimum speed that will be applied to the Inverter when the compressor is first started.

The minimum value for this parameter is 800 rpm, maximum value is 3000 rpm and the default value is 2700 rpm.

**Speed at Unload (RPM):** If the Speed Control Source parameter is set as Variable, this parameter determines the speed that will be applied to the Inverter when unloading the compressor.

The minimum value for this parameter is 800 rpm, maximum value is 3000 rpm and the default value is 1800 rpm.

**P Factor:** This parameter determines the proportional coefficient of the PI cycle to apply for speed regulation.

The minimum value of this parameter is 0, maximum value is 100 and the default value is 40.

**I Factor:** This parameter determines the integral coefficient of the PI cycle to apply for speed regulation.

The minimum value for this parameter is 0, maximum is 100 and the default value is 10.

**Maximum Ramp Value:** This parameter determines the maximum speed-up and slow-down time for the Inverter.

The minimum value for this parameter is 5 seconds, maximum value is 100 seconds and the default value is 10 seconds.

## **4– 13 Inverter Parameters**

This set of parameters will only appear if the Speed Control Source parameter is set to Variable or Analog.

**Boost (%):** This parameter determines how much boost voltage will be applied to the Inverter output during initial motor ramp up so that the torque stays constant.

The minimum value for this parameter is 0, maximum value is 5 and the default value is 2.

**Delta Boost (%):** This parameter only applies to KEB branded Inverters. The Delta Boost determines the voltage to be applied during initial ramp up. After the Delta Boost voltage characteristic is applied for the time period set by the Delta Boost Time parameter, Boost voltage characteristic will continue to be applied.

The minimum value for this parameter is 0, maximum value is 20 and the default value is 0.

**Delta Boost Time (sn):** This parameter determines how long the Delta Boost will be applied and is only used for KEB branded Inverters.

The minimum value for this parameter is 0 seconds, maximum value is 100 seconds and the default value is 0 seconds.

**Switching Frequency (KHz):** This parameter determines the switching frequency of the Inverter's power module and varies from application to application. A low switching frequency value will result in lower Inverter heating, lower discharge current, lower switching losses and lower radio emittance. On the other hand a high switching frequency value will result in lower noise, an advanced sine wave and lower motor losses. Possible options for this parameter include 2 KHz, 4KHz, 8KHz, 12KHz and 16 KHz.

The minimum value for this parameter is 2 KHz, maximum value is 16 KHz and the default value is 4 KHz.

**Overcurrent Level (%):** This parameter only applies to KEB branded Inverters.

The minimum value for this parameter is 100%, maximum value is 200% and the default value is 120%.

**Extreme Modulation:** This parameter only applies to KEB branded Inverters. Extreme Modulation determines if the motor will work at 100% or 110%. The 100% level is assumed to be achieved when the measured values reach the values declared on the metal info plate located on the motor. If a higher torque rate is desired, this parameter should be set as ON.

The minimum value for this parameter is 0: OFF, maximum is 1: ON and the default value is 0: OFF.

**Power Regulation Factor (%):** This parameter only applies to KEB branded Inverters.

The minimum value for this parameter is 5, maximum value is 15 and the default value is 12.

**Stall Prevention Operation Level (P22) (%):** This parameter only applies to Mitsubishi branded Inverters. Stall Prevention Operation Level determines the ratio of the output current to the Inverter nominal current.

The minimum value of this parameter is 0, maximum value is 200 and the default value is 110.

**Soft-PWM Operation Selection (P240):** This parameter only applies to Mitsubishi branded Inverters. Soft-PWM Operation Selection determines the noise of the motor.

The minimum value of this parameter is 0: NO, maximum is 1: YES and the default value is 1: YES.

#### **4– 14 Preheat Parameters**

The Preheat Parameters group is only active on CCS 4.2's where the customer code is 1000.

**Preheat Yes / No:** This parameter determines whether the preheat function is active or not.

The minimum value for this parameter is No, maximum value is Yes and the default value is No.

**Getting Unload Wait Time (sec):** During initial start-up of the compressor, if the airtend temperature is lower than the Minimum Load Getting Temperature, then preheating must be done. During preheat, the compressor will go through unload/on-load cycles until the desired temperature is reached. This parameter determines the wait time during the unload cycle.

The minimum value for this parameter is 1 second, maximum value is 120 seconds and default value is 60 seconds.

**Getting On-Load Pressure (Bar / Psi):** When the compressor is in unload/on-load cycle during preheating as explained above, the compressor will be unloaded without being loaded if the airtend pressure exceeds the limit determined by this parameter.

The minimum value for this parameter is 0 bars, maximum value is 6 bars and the default value is 3.5 bars.

**Getting On-Load Wait Time (min):** When the compressor is in unload/on-load cycle during preheating as explained above, if the airtend pressure does not increase until the end of the time period set by this parameter then a Preheat Timeout failure occurs in the system.

The minimum value for this parameter is 1 minute, maximum value is 5 minutes and the default value is 3 minutes.

#### **4 - 15 Input / Output Settings**

The parameters in this group can be accessed by selecting 3 – Input / Output Settings from the Settings Menu Screen.

**4-15-1 Input Contact Setting:** In this parameter group, the contact type for inputs IN1 – IN20 can be set as Normally Open or Normally Closed.

**4-15-2 Input Function Apportioning:** In this parameter group, the functions for IN1 – IN20 can be assigned. The function options include; No Function, Emergency Stop, Oil Filter, Separator, Main Thermostat, Fan Thermostat, Phase Fail, Oil Level, Remote Load, Remote Work, Thermostat, Main Feedback, Fan Feedback, Aux 1, Aux 2, Aux 3, Ramp End, Inverter Fail and Optimum Speed.

The Ramp End function should be assigned if the motor is controlled using a soft-start device.

The Remote Load and Remote Work functions should be assigned if remote control is going to be done.

Main motor contactor feedback can be received by assigning Main Feedback function to one of the inputs. An auxiliary output from the main motor contactor should be connected to an input on the CCS 4.2, the related input function should be assigned as Main Feedback and the contactor type should be selected according to the type of the contactor to receive the main motor contactor feedback. If there is no feedback within 5 seconds of contactor status change, the controller will give an alarm.

Fan motor contactor feedback can be received by assigning Fan Feedback function to one of the inputs. An auxiliary output from the fan motor contactor should be connected to a digital input on the CCS 4.2, the related input function should be assigned as Fan Feedback and the contactor type should be selected according to the type of contactor to receive the fan motor contactor feedback. If there is no feedback within 5 seconds of contactor status change, the controller will give an alarm.

**4-15-3 Output Function Apointing:** In this parameter group, the functions fro OUT0 – OUT17 can be assigned. The function options include; No Function, Air Drain, Load Solenoid, Main Contactor, Fan Contactor, Star Contactor, Delta Contactor, Heater, Water Drain, Horn, Red Fail, Yellow Fail, Cooling, Output Breaker, Soft Start, Soft Reset, Fast Drain, Continuous Fan, Auto Ready, Motor Work, Compressor Loaded and Red+Yellow.

The Cooling option should be assigned to drive the external fan installed on the motor for Inverter systems. Similarly the Output Breaker function should be assigned if the Inverter has a output breaker function in Inverter systems.

The Soft Start and Soft Reset functions should be assigned if the motor is driven using a soft start device.

The Fast Drain function should be assigned to quickly drain the air when the motor stops in Inverter systems.

The Continuous Fan function will be activated 10 seconds after the motor has started and will continue to stay active until the motor stops.

## **5 – ALARM / WARNING DESCRIPTIONS**

### ***5-1 Control Unit Alarms / Warnings***

#### **5-1-1 Alarms that Stop the Motor**

**Emergency Stop:** If the signal at the IN0 input is not normal according to the set Contactor Type this alarm is signaled. Please check wether or not the emergency stop button is pressed.

**Phase Sequence or PTC Failure:** If the phase protection module detects an error in the phase sequence, the output status of the CCS 4.2 is changed and this alarm is signaled. Please check the phase sequence is correctly wired.

**Oil Filter Closed:** If the signal from the Oil Filter input fails this alarm is signaled. Please check the oil filter.

**Auxiliary Failure – 1:** If a signal is received at the Aux 1 input of the CCS 4.2, this alarm is signaled. Please check the hardware that is connected to the Aux 1 input.

**Auxiliary Failure – 2:** If a signal is received at the Aux 2 input of the CCS 4.2, this alarm is signaled. Please check the hardware that is connected to the Aux 2 input.

**Auxiliary Failure – 3:** If a signal is received at the Aux 3 input of the CCS 4.2, this alarm is signaled. Please check the hardware that is connected to the Aux 3 input.

**Thermostat Failure:** If a signal is received at the Thermostat input of the CCS 4.2, this alarm is signaled. Please check the temperature thermostat.

**Oil Level is Low:** If a signal is received at the Oil Level input from the oil level sensor, this alarm is signaled. Please check the oil level sensor.

**Main Motor Thermic Failure:** If the signal from the Main Motor Thermic input on the CCS 4.2 is lost this failure will occur. Please check the motor thermic outputs driving the motor.

**Fan Motor Thermic Failure:** If the signal from the Fan Motor Thermic input on the CCS 4.2 is lost this failure will occur. Please check the fan thermic outputs driving the fan motor.

**Seperator Filter Closed:** If a signal is received at the Seperator input of the CCS 4.2, this alarm is signaled. Please check the seperator filter.

**AN3 Sensor Failure:** If the sensor connected to the AN3 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the temperature sensor and its cable.

**Air / Oil Temperature is High Limit:** If the Temperature Sensor 1 (AN3) value is larger than or equal to the limit set by the Air / Oil Temperature Upper Value parameter, this alarm will be signaled.

**AN4 Sensor Failure:** If the sensor connected to the AN4 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the temperature sensor and its cable.

**Second Temperature is High Limit:** If the Temperature Sensor 2 (AN4) value is larger than or equal to the limit set by the Second Temperature Upper Value parameter, this alarm will be signaled.

**AN1 Sensor Failure:** If the sensor connected to the AN1 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the sensor connected to AN1 and its cable.

**Airend Sensor is High Limit:** If the pressure value read from the airend pressure sensor is larger than or equal to the limit set by the Airend Pressure Upper Value parameter, this alarm will be signaled.

**AN2 Sensor Failure:** If the sensor connected to the AN2 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the sensor connected to AN2 and its cable.

**Line Sensor is High Limit:** If the pressure value read from the line pressure sensor is larger than or equal to the limit set by the Line Pressure Upper Value parameter, this alarm will be signaled.

**Pressure Difference is High Limit:** If the line pressure is 6 bars or higher, and the pressure difference between the airend and line values are larger than or equal to the limit set by the Pressure Difference Upper Value parameter, this alarm will be signaled.

**Parameter Writing Failure:** If there an error occurs during a parameter write process in the CCS 4.2, this alarm will be signaled. Please contact your service company if this alarm occurs.

**Max Start in an Hour Achieved:** If within one hour, the compressor is started as many times as the limit set by the Maximum Start in One Hour parameter, this alarm is signaled.

**Air is Not Draining:** If the airend pressure is larger than or equal to the limit set by the Airend Pressure Initial Value parameter during initial start, this alarm is signaled. If the airend pressure drops below the Airend Pressure Initial Value parameter, this alarm is automatically reset and the compressor is started.

**Air / Oil Temperature is Low Value:** If the airend temperature drops below the limit set by the Airend Temperature Low Value parameter, this alarm is signaled.

**Compressor is Not Stopping:** If the line pressure does not drop below the limit set by the Airend Pressure Initial Value parameter after pressing the stop button and the related delay timer has passed, this alarm will be signaled and the

compressor will be stopped.

**Oil Level is Low:** If the oil level in the oil tank drops below the oil sensor level this alarm will be signaled. Please check the oil level in the tank.

**Minimum Pressure is Reached:** If the airtend pressure drops below the limit set by the Sufficient Pressure Value parameter for the time period set by Sufficient Pressure Delay parameter during normal compressor operation, this alarm is signaled.

**Preheat Timeout:** During initial start and air/oil temperature is lower than the limit set by the Minimum Load Getting Temperature parameter, the compressor will be loaded so that the compressor oil is heated up with ease. If the airtend temperature exceeds 3.5 bars, the compressor will be unloaded and run for 1 minute. If the airtend pressure does not reach 3.5 bars within the time limit set by this parameter after being loaded, this alarm will be signaled.

**Extension Unit Failure:** If communication cannot be established between the CCS 4.2 and CCS 4.2E extension unit, this alarm will be signaled. Please check the connection between the two units.

**AN5 Sensor Failure:** This alarm can only occur when there is an extension unit connected. If the sensor connected to the AN5 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the sensor connected to AN5 and its cable.

**AN6 Sensor Failure:** This alarm can only occur when there is an extension unit connected. If the sensor connected to the AN6 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the sensor connected to AN6 and its cable.

**AN7 Sensor Failure:** This alarm can only occur when there is an extension unit connected. If the sensor connected to the AN7 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the sensor connected to AN7 and its cable.

**AN8 Sensor Failure:** This alarm can only occur when there is an extension unit connected. If the sensor connected to the AN8 input on the CCS 4.2 fails or the cable is teared this alarm is signaled. Please check the sensor connected to AN8 and its cable.

**Pressure Sensor 1 High Limit:** If the Pressure 1 value is larger than or equal to the limit set by the Pressure 1 Upper Value parameter, this alarm will be signaled.

**Pressure Sensor 2 High Limit:** If the Pressure 2 value is larger than or equal to the limit set by the Pressure 2 Upper Value parameter, this alarm will be signaled.

**Temperature Sensor 1 High Limit:** If the Temperature 1 value is larger than or equal to the limit set by the Temperature 1 Upper Value parameter, this alarm will be signaled.

**Temperature Sensor 2 High Limit:** If the Temperature 2 value is larger than or equal to the limit set by the Temperature 2 Upper Value parameter, this alarm will be signaled.

**Short Circuit Error:** If the +12V supply outputted from the CCS 4.2 for sensor supply and digital inputs is short-circuited with GND, this alarm is signaled. Even if the output is short-circuited, the current cannot exceed 200mA.

**Main Motor Contactor Didn't Get:** If any one of the inputs on the CCS 4.2 is set as Main Feedback and main motor contactor feedback is received, the CCS will start checking the contactor for failures. Anytime the contactor is energized, if the CCS 4.2 does not receive a feedback that it is energized within 5 seconds, this alarm will be signaled.

**Main Motor Contactor Didn't Leave :** If any one of the inputs on the CCS 4.2 is set as Main Feedback and main motor contactor feedback is received, the CCS will start checking the contactor for failures. Anytime the contactor is de-energized, if the CCS 4.2 does not receive a feedback that it is de-energized within 5 seconds, this alarm will be signaled.

**Fan Motor Contactor Didn't Get:** If any one of the inputs on the CCS 4.2 is set as Fan Feedback and fan motor contactor feedback is received, the CCS will start checking the contactor for failures. Anytime the contactor is

energized, if the CCS 4.2 does not receive a feedback that it is energized within 5 seconds, this alarm will be signaled.

**Fan Motor Contactor Didn't Leave:** If any one of the inputs on the CCS 4.2 is set as Fan Feedback and fan motor contactor feedback is received, the CCS will start checking the contactor for failures. Anytime the contactor is de-energized, if the CCS 4.2 does not receive a feedback that it is de-energized within 5 seconds, this alarm will be signaled.

### 5-1-2 Warnings that do NOT Stop the Motor

**Air Filter is Plugged:** If the signal is lost from the CCS 4.2 Air Filter input, this warning will be signaled. Please check the air filter.

**Pressure Difference is High:** If the line pressure is higher than 6 bars, and the pressure difference between the line and the airend is larger than or equal to the limit set by the Pressure Difference Alarm Value parameter, this warning is signaled.

**Airend Pressure is High:** If the airend pressure is larger than or equal to the limit set by the Airend Pressure Alarm Value parameter, this warning will be signaled.

**Line Pressure is High:** If the line pressure is larger than or equal to the limit set by the Line Pressure Alarm Value parameter, this warning will be signaled.

**Airend Temperature is High:** If the airend temperature is larger or equal to the limit set by the Airend Temperature Alarm Value parameter, this warning will be signaled.

**Second Temperature is High:** If the second sensor temperature is larger than or equal to the limit set by the Second Temperature Alarm Value parameter, this warning will be signaled.

**General Service Maintenance:** If the general service timer reaches the general maintenance time, this warning will be signaled. In order to reset this warning, go to Settings Menu -> Maintenance Timer Settings -> Service Timers Reset.

**Time to Change Air Filter:** If the related service timer reaches the Air Filter replacement time, this warning will be signaled. In order to reset this warning, go to Settings Menu -> Maintenance Timer Settings -> Service Timers Reset.

**Time to Change Oil Filter:** If the related service timer reaches the Oil Filter replacement time, this warning will be signaled. In order to reset this warning, go to Settings Menu -> Maintenance Timer Settings -> Service Timers Reset.

**Time to Change Separator:** If the related service timer reaches the Separator Filter replacement time, this warning will be signaled. In order to reset this warning, go to Settings Menu -> Maintenance Timer Settings -> Service Timers Reset.

**Rulman Maintenance Time Warning:** If the related service timer reaches the Rulman replacement time, this warning will be signaled. In order to reset this warning, go to Settings Menu -> Maintenance Timer Settings -> Service Timers Reset.

**Time to Change Oil:** If the related service timer reaches the Oil replacement time, this warning will be signaled. In order to reset this warning, go to Settings Menu -> Maintenance Timer Settings -> Service Timers Reset.

**Electric Cut-off:** If the electricity is cut-off while the compressor is running, the compressor is automatically started when the electricity comes back and this warning will be displayed before the compressor is started.

**RTC Chip Failure:** If the Real Time Clock chip inside the CCS 4.2 has failed, this warning will be displayed. Please call the maintenance to fix the controller.

**E-mail Didn't Send:** If the E-mail Sending Option is set to YES, then at every warning, service or alarm condition and email will be sent. If the email settings are not correct or there is a connection issue and the email could not be sent, this warning will be signaled.

**Pressure Sensor 1 High Limit:** If the Pressure 1 value is larger than or equal to the limit set by the Pressure 1 Upper Value parameter, this warning is signaled.

**Pressure Sensor 2 High Limit:** If the Pressure 2 value is larger than or equal to the limit set by the Pressure 2 Upper Value parameter, this warning is signaled.

**Temperature Sensor 1 High Limit:** If the Temperature 1 value is larger than or equal to the limit set by the Temperature 1 Upper Value parameter, this warning is signaled.

**Temperature Sensor 2 High Limit:** If the Temperature 2 value is larger than or equal to the limit set by the Temperature 2 Upper Value parameter, this warning is signaled.

## ***5-2 Inverter Unit Alarms / Warnings***

### **5-2-1 Inverter Alarms that Stop the Motor**

**Inverter Communication Failure:** If the communication between the CCS 4.2 and Inverter has failed, this alarm will be signaled. Please check the communication cable between the CCS 4.2 and the Inverter.

**Security Lock Failure:** The terminals 16-20 on KEB branded Inverters are output cut-off ports. On Mitsubishi branded Inverters, the connection between MRS and PC is the output cut-off ports. If during normal operation this input is cut, the Inverter will cut off its output. The CCS 4.2 will check this input as a security measure during initial start-up. If this input has not changed its status, this alarm will be signaled. Please check the cable connection.

**Inverter General Failure:** If an alarm that stops the motor occurs on the Inverter, this alarm will be signaled.

**Motor Type is Wrong:** The motor specifications inputted in the Motor Parameters will be referenced with the KEB or Mitsubishi branded Inverter specs used in the system. If the Inverter used cannot drive the motor used, this alarm will be signaled.

**Mitsubishi Inverter Failures:** If a Mitsubishi branded Inverter is used in the system, the following alarms from the Inverter can be displayed on the CCS 4.2 also. Please refer to the Inverter's User Manual for the detailed explanations of these alarms.

- Inverter Overcurrent Failure
- Inverter Overvoltage Failure
- Inverter Overload Failure
- Motor Overload Failure
- Inverter Overheat Failure
- Inverter Instant Power Failure
- Inverter Undervoltage Failure
- Inverter Input Phase Failure
- Inverter Stall Prevention
- Inverter Brake Transistor Prevention
- Inverter Ground Fault
- Inverter Output Phase Failure
- Inverter External Thermal Relay
- Inverter PTC Thermistor Failure
- Inverter OPT Option Alarm
- Inverter Option Slot Alarm
- Inverter EEPROM Failure
- Inverter Retry Count Excess
- Inverter Power Supply Fault
- Inverter 24V Output Short-circuit

- Inverter Fault 14 Alarm E.CDO
- Inverter Fault 14 Alarm E.IOH
- Inverter Fault 14 Alarm E.SER
- Inverter Fault 14 Alarm E.AIE
- Inverter E1 Option Alarm
- Inverter Internal Circuit Error

## 5-2-2 Inverter Warnings that do NOT Stop the Motor

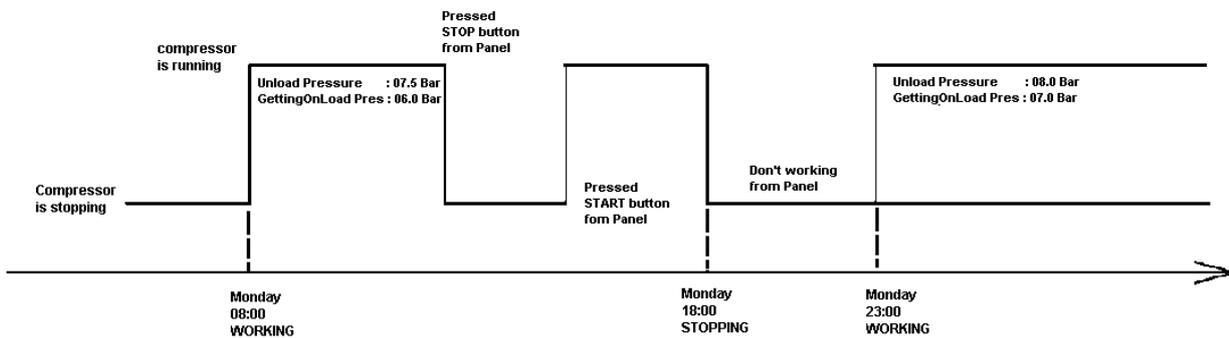
**Inverter General Warning:** If any warning occurs on the Inverter, the CCS 4.2 will signal this warning.

## 6 – PRESSURE CALENDAR

The CCS 4.2's pressure calendar function can handle 28 weekly tasks.

There are two functions that can be assigned to each task which are START and STOP. When a task is defined as START and the set time has come, the compressor will automatically start. The user can stop the compressor by pressing the Stop Button where the compressor will be stopped and will not attempt to start again. When a task is defined as STOP and the set time has come, the compressor will automatically be stopped and will not be allowed to start again.

It is possible to set the desired pressure range during every run cycle. For example in one task the user can define to run the compressor between 6 to 7.5 bars, while in another task the compressor can be run between 7 to 8 bars.



## 7 – OUTPUT FUNCTIONS

**Air Drain:** This function is de-energized in Service Mode.

If the Getting Load Information Source is set as Sensor;

If the Speed Control Source is set as Constant or Soft Start and the compressor is idle this output is de-energized. When the loading conditions occur, this output is energized.

If the Speed Control Source is set as Variable or Analog, this output is energized when the loading conditions occur. When the compressor is unloaded;

If the Air Draining at Unload parameter is set as YES, this output will be de-energized, and then when the aird pressure drops below 5.5 bars this output will be energized and air draining will be stopped. After the aird pressure reaches 0.1 bar less than the Aird Pressure Upper Value, this output will be de-energized and the air draining will be done.

If the Air Draining at Unload parameter is set as NO, this output will be de-energized when the compressor is unloaded.

If the Getting Load Information Source is set as Digital Input;

If a command to run the compressor off-load is received from the Digital Input, then this output will be energized.

Note: If the air/oil temperature value drops below the Minimum Getting Load Temperature parameter, this output will be de-energized.

**Load Solenoid:** This output is de-energized in Service Mode.

If the Getting Load Information Source is set as Sensor;

The output is de-energized when the compressor is idle. When the loading conditions occur, this output is energized.

If the Getting Load Information Source is set as Digital Input;

The output is de-energized when a work unload command is received from the Digital Input. If a work on-load command is received from the Digital Input, the output is energized.

Note: If the air/oil temperature value drops below the Minimum Getting Load Temperature parameter, this output will be de-energized.

**Main Contactor:** This output is always de-energized if the Speed Control Source parameter is set to anything other than Constant. If the Speed Control Source is set to Constant, this output is energized together with the Star Contactor when a start command is received. The output will be de-energized when a stop command is received and the motor is stopped.

**Star Contactor:** This output is always de-energized if the Speed Control Source parameter is set to anything other than Constant. If the Speed Control Source is set to Constant, this output is energized together with the Main Contactor when a start command is received. The output will be de-energized when the time period set by the Star-Delta Starting Time has passed.

**Delta Contactor:** This output is always de-energized if the Speed Control Source parameter is set to anything other than Constant. If the Speed Control Source is set to Constant, this output is energized when the Start Contactor is de-energized at the end of Star-Delta Starting Time.

**Fan Contactor:** This output will be energized if the Air/Oil Temperature exceeds the limit set by the Fan Motor Up Limit parameter. The Fan Contactor output will continue to stay energized during the time period set by the Fan Motor Minimum Working Time parameter regardless of the Air/Oil Temperature. After this time period has passed, this output will be de-energized if the Air/Oil Temperature drops below the limit set by the Fan Motor Low Limit.

**Heater:** This output will be energized if the heater temperature drops below the limit set by the Heater Set Temperature parameter. When the heater temperature exceeds the sum of Heater Set Temperature parameter and the Heater Hysteresis Value, this output will be de-energized.

**Water Drain:** If the compressor is loaded, this output will be energized until the time period set by the Water Draining Time parameter has passed, and then is de-energized for the time period set by Water Draining Wait Time parameter.

If the compressor is unloaded, this output will be energized until the time period set by the Water Draining Time Unload parameter has passed, and then is de-energized for 10 times the time period set by the Water Draining Wait Time parameter.

**Horn:** This output will be energized if there are any red or yellow alarms in the system. Once energized, three seconds later the output will be de-energized, another three seconds later the output will be energized again and this cycle will

continue until Alarm Reset button is pressed from the panel.

**Red Fail:** If any red failures (motor stopping alarms) occur in the system this output will be energized. When the failure is reset, this output will be de-energized.

**Yellow Fail:** If and yellow failures (non-motor stopping warnings) occur in the system this output will be energized. When the failure is reset, this output will be de-energized.

**Cooling:** This output is used to control the external fan (if any installed) to prevent the motor from overheating when running at low RPM. If the Speed Control Source is set as Variable or Analog, this output will be energized when the compressor is starting or running. Two minutes after the main motor has stopped, the output will be de-energized.

**Output Breaker:** If the Speed Control Source is set as Variable or Analog, this output will be energized when the compressor is starting or running and will be de-energized when the motor has stopped. The Output Breaker output should be connected to the output cut-off port on the Inverter as a safety precaution. If the Speed Control Source is set as Variable, the status of this output is read through communication, which creates a safety lock.

**Fast Drain:** If the Speed Control Source is set as Variable or Analog, this output will be energized when the compressor is starting or running and will be de-energized when the motor has stopped.

**Continuous Fan:** This output will be energized ten seconds after the main motor has started and will be de-energized when the motor stops.

**Auto Ready:** This output will be energized when the panel is energized and will stay energized as long as the panel is energized.

**Motor Work:** This output will be energized when the main motor has started and will be de-energized when the motor stops.

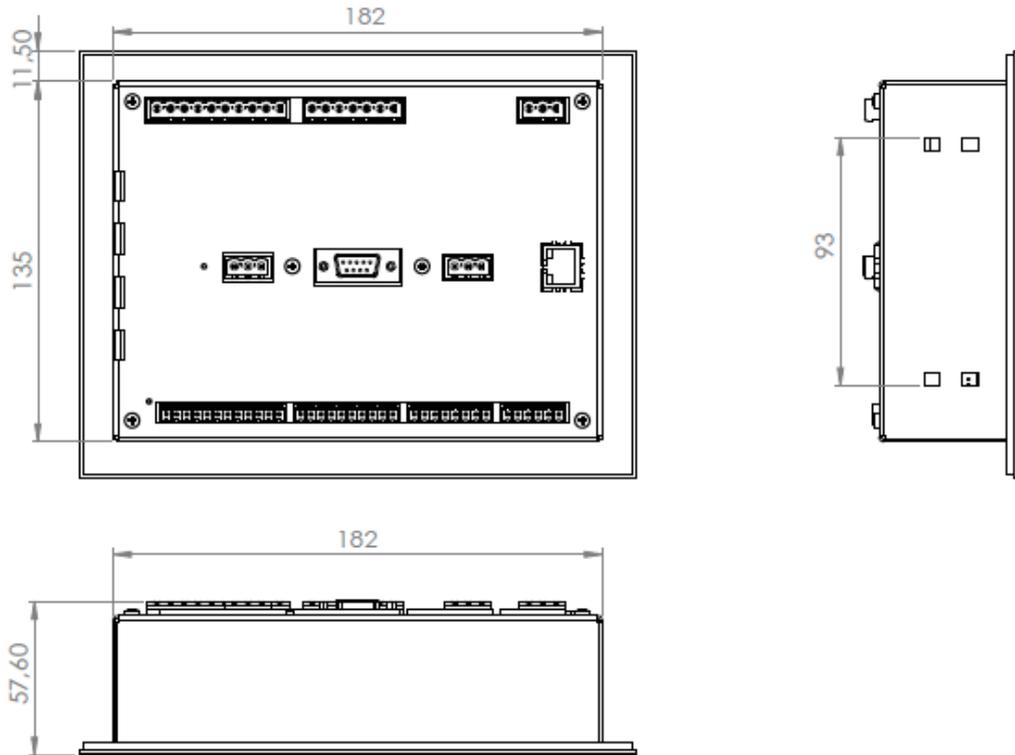
**Compressor Loaded:** This output will be energized when the compressor is loaded and will be de-energized when the compressor is unloaded.

**Red + Yellow:** This output will be energized when there's a red alarm (motor stopping) or a yellow warning (non-motor stopping), and will be de-energized when the alarm is reset.

**Soft Start:** This output is energized at the end of the time period set by the Getting Start Delay parameter if the Speed Control Source is set as Soft Start. The output will be de-energized when the motor has stopped.

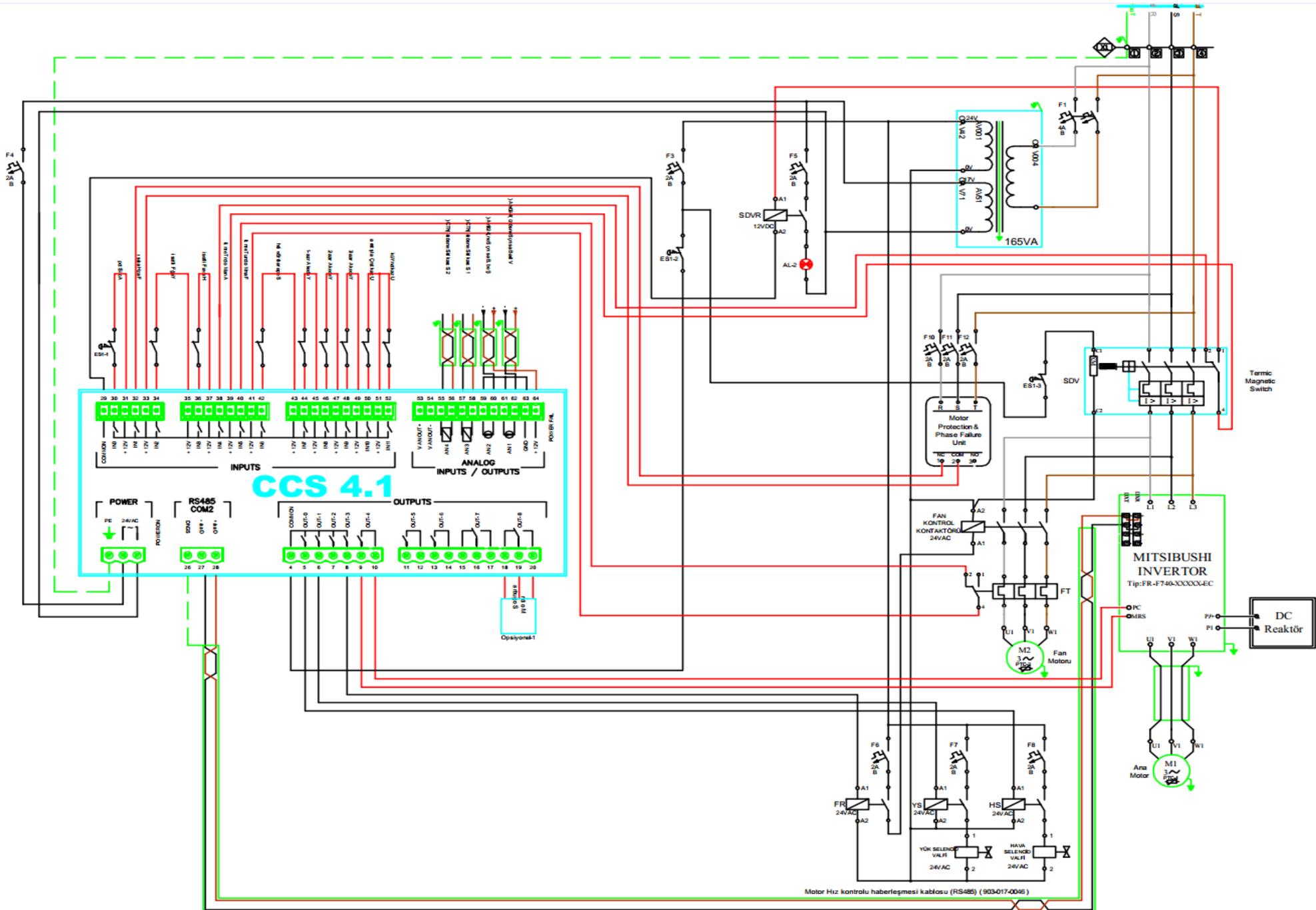
**Soft Reset:** This output is used to reset an alarm, which has occurred on the soft start device when the Speed Control Source is set as Soft Start. When the alarm is being reset, this output will be energized, then de-energized after 250 milliseconds.

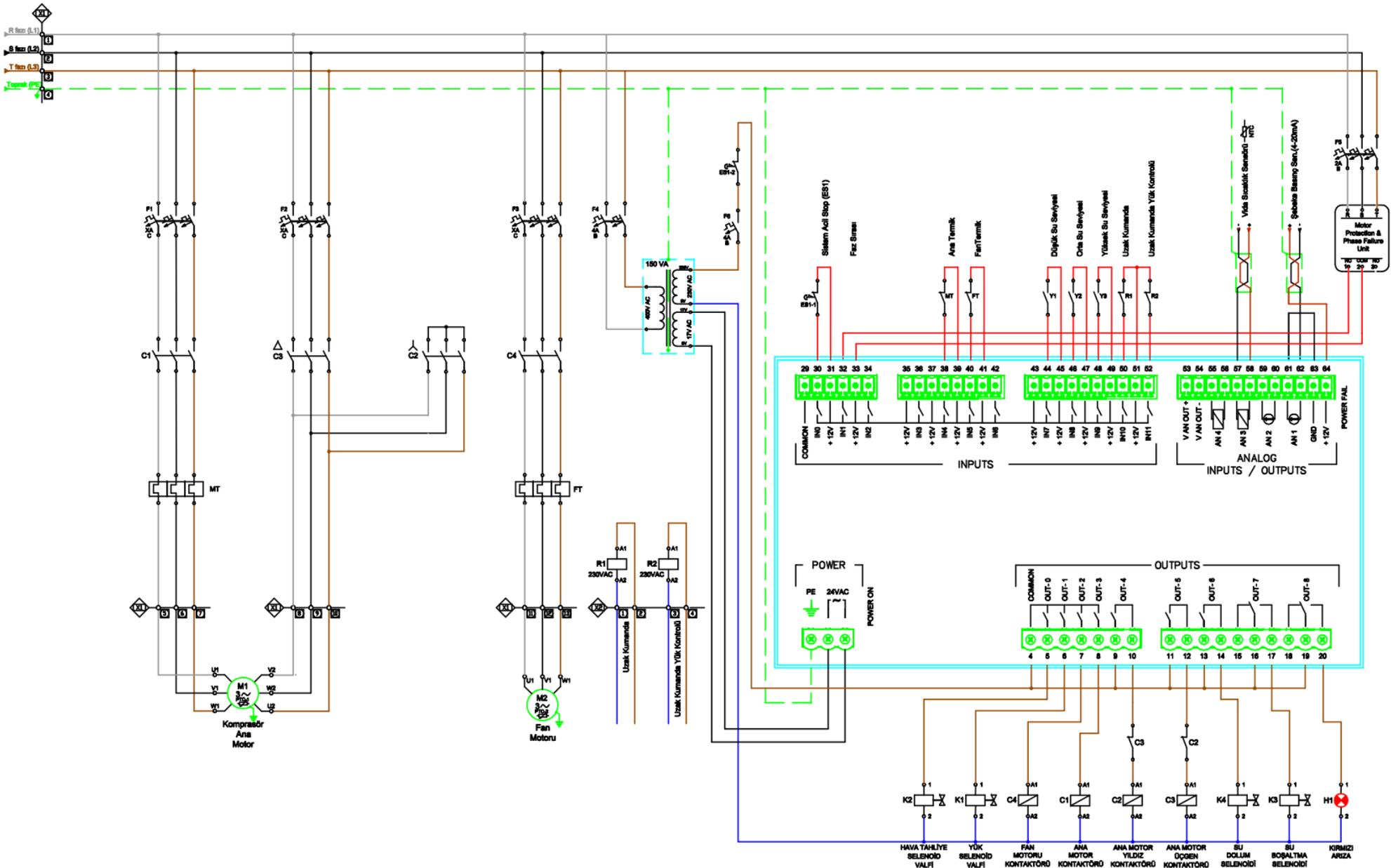
## 8 – MECHANICAL DIMENSIONS



<b>Enclosure</b>	Galvanized Metal
<b>Protection Class</b>	IP 52 (Front Panel)
<b>Weight</b>	600 gr. (Average)
<b>Dimensions (WxHxD)</b>	207 mm x 160 mm x 57.6 mm
<b>Panel Cut-out</b>	182 mm x 138 mm
<b>Mounting</b>	Panel mount with metal fixing clips Maximum panel thickness is 3mm

## 9 – CONNECTION DIAGRAM





## 10 – DOCUMENT VERSION

**Version No:** V1.3

**Modification Date:** 25.03.2013

**Author:** Hasip TUNA

**Modification:** Published as first edition.

## Appendix A - Communication Enabled Inverter Settings

If the compressor is desired to be driven using an Inverter through the CCS 4.2, first of all the Speed Control Source parameter found under the Factory Parameters group must be set as Variable. If the selected Inverter is pre-loaded in the CCS 4.2, the Inverter can be driven using communication. If the Inverter is not pre-loaded in the panel, then the Inverter can be driven using the Analog speed reference output.

After correctly setting the Inverter Trademark parameter found under the Factory Parameters group, the Motor Parameters must be carefully set by taking the information found on the metal plate located on the motor as reference. Then check the PI Parameters and Inverter Parameters are set correctly. Also the Star-Delta Starting Time parameter found under the Service Parameters must be set to 1.

The OUT4 output function should be set as Output Cut-off and the output should be connected to the related input on the Inverter.

### Note :

For the RS 485 communication cable please use the twisted shielded pairs. Please use these pairs to connect all the Data – terminals together and all the Data + terminals together.

In order to reduce the noise in the network, complete the network using 120-Ohm resistors on both line terminations. The CCS 4.2 has a built-in 120-Ohm line termination resistor as standard.

### Mitsubishi FR-AF;

Go to Communication Parameters -> RS485 Parameters from the CCS 4.2 Menu and do the following RS485 settings.

Baud Rate = "9600"

Data Bits = "8 Bits"

Parity = "Even"

Stop Bits = "1 Bit"

The following settings must be done using the PU unit found on the Mitsubishi FR-AF Inverter. These settings are the Inverter parameter settings.

Pr. 160 = "0"

Pr. 187 = "24"

Pr. 338 = "0"

Pr. 342 = "0"

Pr. 331 = "1"

Pr. 339 = "0"

Pr. 75 = "0"

Pr. 332 = "96"

Pr. 340 = "0"

Pr. 77 = "2"

Pr. 333 = "1"

Pr. 549 = "1"

Pr. 78 = "1"

Pr. 334 = "2"

Pr. 550 = "9999"

Pr. 79 = "2"

Pr. 335 = "10"

Pr. 551 = "2"

Pr. 17 = "2"

Pr. 336 = "1"

Pr. 882 = "1"

Pr. 14 = "0"

Pr. 337 = "1"

Pr. 342 = "1"

Below you can see a brief guide on how to program the Inverter using the PU unit.

Step 1: Press the  button after the Inverter is energized.

Step 2: Then press the  button.

Step 3: Use the  navigation button and scroll to ALLC.

Step 4: Press the  button, then use the  navigation button and scroll to "1".

Complete the step by pressing the  again to return all parameters to factory settings.

Step 5: Now set all the parameters shown on the table above. To do so, press the  to see the parameters screen.

The screen should look like , which means parameter 0. Use the  navigation button and scroll to the desired parameter number and press the  button to enter it. Then do the desired settings to the selected parameter using the  navigation button and press the  button again to save the changes. Repeat Step 5 until all the settings indicated above are done.

### Mitsubishi FR-E;

Go to Communication Parameters -> RS485 Parameters from the CCS 4.2 Menu and do the following RS485 settings.

Baud Rate = "9600"

Data Bits = "8 Bits"

Parity = "Even"

Stop Bits = "1 Bit"

The following settings must be done using the PU unit found on the Mitsubishi FR-E Inverter. These settings are the Inverter parameter settings.

Pr. 160 = "0"

Pr. 121 = "9999"

Pr. 342 = "0"

Pr. 183 = "24"

Pr. 14 = "0"

Pr. 340 = "1"

Pr. 17 = "2"

Pr. 549 = "1"

Pr. 77 = "2"

Pr. 882 = "1"

Pr. 78 = "1"

Pr. 342 = "1"

Pr. 117 = "1"

Below you can see a brief guide on how to program the Inverter using the PU unit.

Step 1: Press the  button after the Inverter is energized.

Step 2: Then press the  button.

Step 3: Use the  navigation button and scroll to ALLC.

Step 4: Press the  button, then use the  navigation button and scroll to "1".

Complete the step by pressing the  again to return all parameters to factory settings.

Step 5: Now set all the parameters shown on the table above. To do so, press the  to see the parameters screen.

The screen should look like , which means parameter 0. Use the  navigation button and scroll to the desired parameter number and press the  button to enter it. Then do the desired settings to the selected parameter using the  navigation button and press the  button again to save the changes. Repeat Step 5 until all the settings indicated above are done.