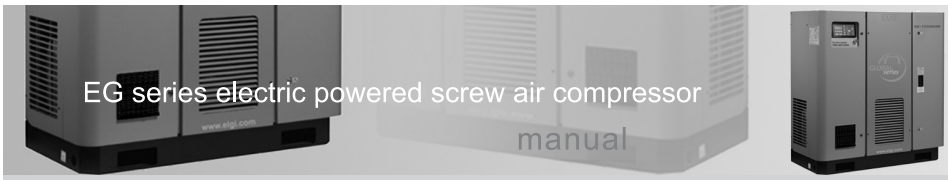

Operation and Maintenance Manual

Neuron II

User Manual

Version 1.6 • June 2014

EG series electric powered screw air compressor

manual

ELGi

Operation and Maintenance Manual

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EG series electric powered screw air compressor manual

Operation and Maintenance Manual

Product Specification

Identification	:	ELGI Neuron II
Definition	:	Pre-programmed logic controller
Function	:	Compressor control system & I/O Monitoring
Part number	:	00897701N
Software	:	Version 1.1PK3 - Programmable thru ISP Port
Supported Protocol	:	MODBUS RTU (RS485 Serial Communication)
Rated Voltage	:	24VAC ± 15%
Power Consumption	:	13W (Max)
Ride through	:	20ms
Flash memory	:	256Kbytes, (Usage: Program storage)
NVRAM	:	56bytes (usage: Day Hour Counter, Cumulative Counters, and Remaining Hours and Dryer off time)
Graphic Display	:	128X64 White Backlight Graphical LCD
Backlight	:	Adjustable, factory default: 560 ohms, tolerance +/- 10 ohm
Keypad	:	9 Keys (usage: menu keys, start, stop & reset) 11 LED (status, warnings and fault indication)
Language	:	English, French, Portuguese (selectable)
Dimensions	:	260 X 145 X 75 mm
Mounting	:	Panel mount using 6 screws
Regulatory	:	ETL, CE
Operating temp	:	0 ~ 45° C
Storage temp	:	-10 ~+70° C
RH	:	<95% @ 40°C without condensation

Product Specification

I/O Configuration

Analog inputs : 4 ports

2 x 4-20mA inputs

Range	-	0~16 bar
Resolution	-	0.1bar
Accuracy	-	±0.2bar

1 x KTY10

Range	-	-10~150°C
Resolution	-	1°C
Accuracy	-	±5°C

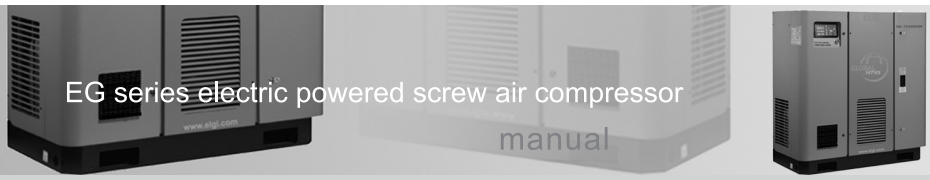
1 x PT1000

Range	-	-10~ 150° C
Resolution	-	1° C
Accuracy	-	±2° C

Analog output : 2 ports

2 x 1 to 5VDC One for Discharge Pressure and One for Discharge Temperature

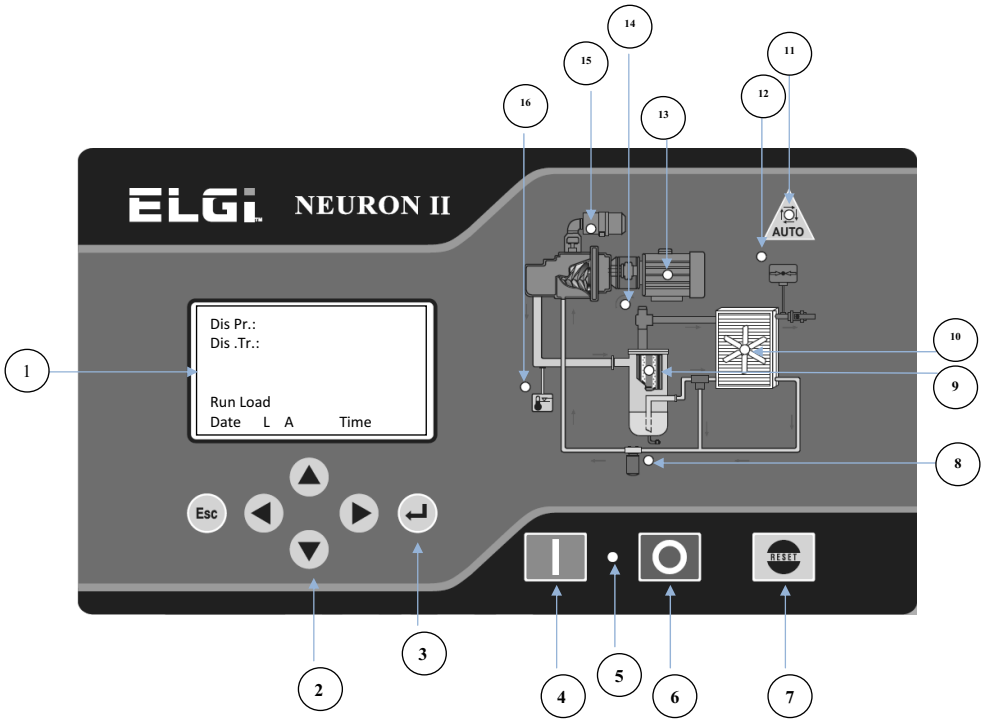
Relay outputs	:	8 Ports
Rated Voltage	:	24VDC / 230VAC
Rated Load	:	1.8A @ 230VAC / 1.8A @ 24VDC
Usage	:	6 Pre-programmed (Main, Star, Delta, Load, ADV, Fan Motor) 2 by default Programmed for Trip and Warn but Programmable for Warn, Load, Service, Standby, Trip, Remote & Ready. Relay 2 is fixed for dryer, if enabled.



Product Specification

Digital Inputs:		
Rated Voltage	:	24VDC (Potential Free, optically isolated 4KV)
Usage	:	Emergency Stop, Motor overload, Cooler over Load, DPAF or Remote Load/Unload, DPOF, Motor Reverse Rotation, Remote on/off & Dryer Input (if enabled).
Communication Ports		
Port1 Protocol	:	MODBUS RTU
Port2 Protocol	:	FC protocol (used to interface Danfoss VFD)
Port3 & Port4	:	Not used, Reserved for future use

Product Specification



1	128x64 Graphical Display	9	Air Oil Separator change indication LED
2	Navigation Keys	10	Cooler Fault LED
3	Enter Key	11	Auto Mode Enabled indication LED
4	Start key	12	High Discharge Pressure fault LED
5	LED (Green - Start , Red - Stop/Fault)	13	Main Motor fault LED
6	Stop Key	14	Reverse Rotation fault LED
7	Reset Key	15	Air Filter Change indication LED
8	Oil Filter change indication LED	16	High Discharge temperature fault LED

Product Specification

Terminal Connection

X01 - Power Supply 24VAC,Earth, Neurtal

X02 - Relay Outputs (5 Ports)

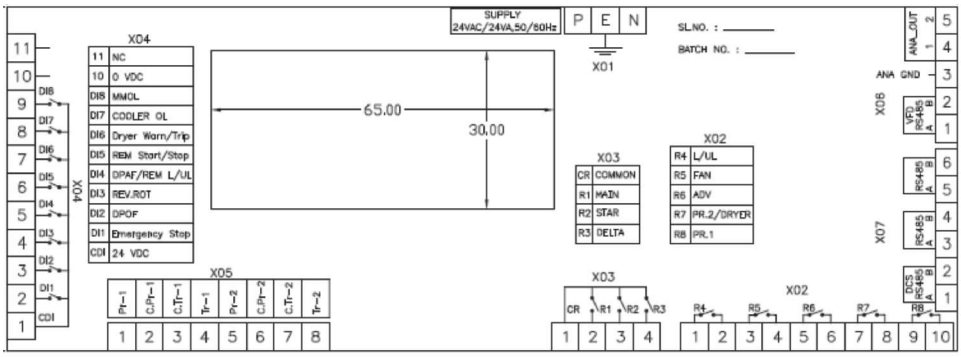
X03 - Relay Outputs (3 Ports)

X04 - Digital Inputs (8 Ports)

X05 - Analog Inputs (4 Ports)

X06 - Analog Outputs(2 Ports)

X07 - Communication Ports (4 Ports)



Neuron-2 Salient Features

Home Screen Display - Easy User Interface 8 line Graphical Display and intuitive menu navigation keys

Records (View -> Day report and Fault report)

- 30 day reports (Load hours, Unload hours, Run hours, Stop hours, Fault hours, Standby hours, Start Count, Load Count)
- 99 fault Reports
- Faults with Date and time stamp, Status of the machine at the time of fault etc.

Remote Function (both from MODBUS as well as Digital Input)

- Remote Loading and Unloading
- Remote Start and Stop

Lead and Lag - Pressure schedule (Operator -> Schedule)

- 32 Pressure Program (one schedule should be in Sunday (first day of the week) 00:00 Hrs)
- Important parameters to customise - On Time, OFF Time, Load Pr, Unload Pr
- Refer Page# 32 for detailed example

Other Interfaces and Communication

- VFD interface through MODBUS
- PC interface through MODBUS - To download Reports and Setting parameters
- 70 + Modbus Parameters for DCS controls
- Dryer Integration
- Power OFF 120 Sec Delay
- High, Low Dew Point warnings

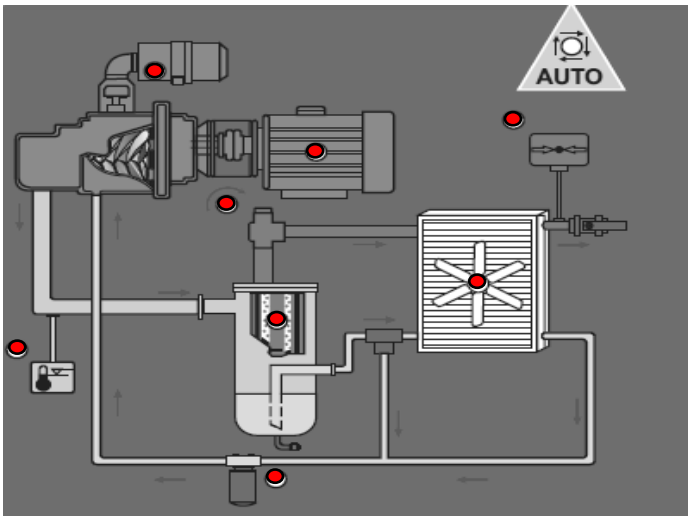
Neuron-2 Salient Features

Safeguard

- The 'Smart Logic' of NEURON II automatically decides the start delay required to ensure minimum wait time between successive starts of the compressor and dryer thereby increasing their lifetime.
- Start Inhibit till sump pressure is within safe limits to enhance the life of the compressor
- Low Voltage & Short time Power Interrupts detection to enhance the life of the contactors
- Low temperature start inhibit to avoid start-up overloads

Neuron-2 Salient Features

Mimic LED for fault indications



LED	Description
Auto	To indicate the machine is in automatic on/off mode. This LED glows in Amber Colour on the below conditions 1. When Pressure Schedule is enabled (or) 2. When Auto Restart is enabled
Air Oil Separator	Glows in Amber colour when 1. Air Oil Separator Service is due based on service hours
Main Motor Overload	Glows in Red when the main motor overload Digital Input is Open.
Reverse Rotation	Glows in Red when the Reverse Rotation Digital Input is Closed.
Cooler O/L	Glows in Red when the cooler Digital Input is Open
Pressure	Glows in Red when 1. Analog Pressure Input is Open (Probe Failure) 2. Dis. Pressure is higher than set HSP 3. Sump. Pressure is higher than set HSP
Temperature	Glows in Red when the 1. Analog Temperature Input is Open (Probe Failure) 2. Dis. Temperature is higher than set Trip temp.
Differential Pressure Oil Filter (DPOF)	Glows in Amber when the 1. DPOF Digital Input is Open & DPOF is enabled 2. Oil Filter Service is due
Differential Pressure Air Filter	Glows in Amber when the 1. DPAF Digital Input is Open & DPAF is enabled 2. Air Filter Service is due
Start & Stop	1. Glows in Red when machine is stopped / idle 2. Glows in Green when machine is running

Input Output Description

X01: Power supply

Pin	Function	Id	Active state
1	24V AC Phase	24 VAC P	-
2	Earth	Earth	-
3	24V AC Neutral	24 VAC N	-

X02: Relays

Pin	Function	Id	Active state
1	Common - Load Relay	Common	
2	Load Relay	Load / Unload	Load when Energized
3	Common - Fan Relay	Common	
4	Fan Relay	Fan	FAN ON when Energized
5	Common - Auto Drain Valve Relay	Common	
6	Auto Drain Valve Relay	ADV	ADV ON when Energized
7	Common - Dryer Relay	Common	
8	Dryer Relay	Dryer / Pr2	Energized
9	Common - Programmable Relay	Common	
10	Programmable Relay	Pr1	Energized

X03: Main Motor Relays

Pin	Function	Id	Active state
1	Common for Main, Star and Delta contactors	Common	-
2	Main Contactor	Main	Energized
3	Star Contactor	Star	Energized
4	Delta Contactor	Delta	Energized

Input Output Description

X04 : Main Motor Relays

Pin	Function	Id	Active state
1	Digital Inputs Common - 24VDC	24VDC	-
2	Emergency Stop	Emergency	Fault if open
3	Differential Pressure Oil Filter	DPOF	Warn if open
4	Reverse Rotation	Rev. Rot	Fault if closed
5	DPAF/REM Load and Unload	DPAF/REM L/UL	Warn or unload if open
6	Remote Start Stop Control	Remote Start /Stop	Stop if open
7	Dryer Warn/Trip	Dryer Warn/Trip	Warn/Fault if open
8	Cooler Motor Overload	Cooler OL	Fault if open
9	Main Motor Overload	MMOL	Fault if open
10	0V DC	0V DC	-
11	No Connection	NC	-

X05: Analog Inputs

Pin	Function	Id	Type	Range
1	Discharge pressure	Pr-1	4-20 mA	0 to 16 bar
2	15 to 24VDC	C.Pr-1		
3	Common Dis.Temp	C.Tr-1	KTY10	-10 to 150°C
4	Discharge temperature	Tr-1		
5	Sump Pressure	Pr-2	4-20 mA	0 to 16 bar
6	15 to 24VDC	C.Pr-2		
7	Common Dryer/ Ambient Temp.	C.Tr-2	PT 1000	-10 to 150°C
8	Dryer	Tr-2		

Input Output Description

X06: Analog outputs and VFD

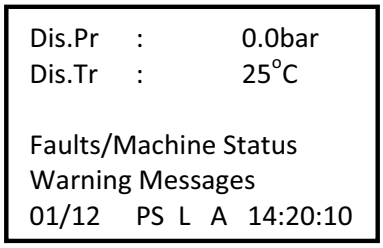
Pin	Function	Id	Type	Protocol/Range
1	VFD Interface	VFD A	RS485 A	Modbus RTU Protocol
2	VFD Interface	VFD B	RS485 B	
3	Supply Ground For 5V	0VDC	-	-
4	Dis. Pressure Output (0 to 16 bar)	AO1	Voltage	1 to 5v
5	Dis.Temperature (-10 to 150 deg C)	AO2	Voltage	1 to 5v

X07: Communication

Pin	Function	Id	Type	Protocol
1	DCS Interface	DCS A	RS485 A	Modbus RTU Protocol
2	DCS Interface	DCS B	RS485 B	
3	Reserved	A	RS485 A	
4	Reserved	B	RS485 B	
5	Reserved	A	RS485 A	
6	Reserved	B	RS485 B	

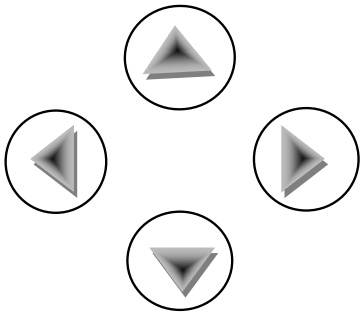
Main Screen

- o Discharge Pressure at 0.1bar Resolution
- o Oil Temperature at 1°C Resolution
- o Trip or Machine Status like Run, Load, Unload, Standby etc.,
- o Warning Messages
- o Date and Time with Mode Information



(**Mode Info:** PS - Pressure Schedule Enabled, UL - Unload Mode Enabled, L - Local, R - Remote, D - DCS, A - Auto Restart ON, M - Manual (Auto Restart OFF). For more details refer Machine settings in Operator Menu)

- o With Right, Left , Up and Down scroll



You can view …

- o Pressure setting parameters
- o Sump Pressure at 0.1 Resolution
- o Dew Point temperature
- o Current Day report

▶ **"RIGHT" - Live Analog Values**

1. Live Differential Pressure (Displays only if Sump Pressure enabled)
2. Live Sump Pressure (Displays only if Sump Pressure enabled)
3. Live Pt1000 Temperature (Displays only if DRYER on enabled)

▲ **"UP" - Set Analog Values**

1. Set Load Pressure
2. Set Unload Pressure
3. Set Start Sump Pressure (Displays only if Sump Pressure enabled)
4. Max Differential Pressure (Displays only if Sump Pressure enabled)

▼ **"DOWN" - Today Report**

1. Load and Stop Hours
2. Unload and Fault Hours
3. Run and Standby Hours
4. Start Count and Load Count

Main Screen

Message 1 - Compressor Status message

Status	Description
Ready	Ready for Start
Star	Motor Running in Star
Run	Motor Running in Delta
Run Load	Compressor in Load
Run Unload	Compressor in Unload
Stop Busy	Stop Sequence in Progress
Emergency Stop	Emergency Stop Push Switch is ON
Start Inhibit xx.x	During the Start, if the Sump Pressure is higher than the set start sump pressure value, you will see this message. XX.X denotes the live sump pressure value. The Compressor Starts only if the Sump Pressure value goes below the set value.
Temperature Inhibit ±XX	During the Start, if the Discharge temperature is higher than the set inhibit temperature value, you will see this message. ±XX denotes the live Discharge Temperature Value. The Compressor Starts only if the Discharge Temperature Value goes above the set value.
Start Inhibit “seconds”	If Sump Pressure is Not used (Disabled) then the controller will ensure minimum 60 seconds delay between the stop and the start. Count stops if “STOP” key is pressed
Auto Restart “seconds”	If Compressor is in Auto Mode, The controller will ensure minimum delay (user set, e.g. 90 sec) between stop and start. Count stops if “STOP” key is pressed
Start ack wait…	This message is displayed after a fault is cleared and waiting for user acknowledgement. By pressing “RESET” key user can acknowledge.
Standby	Compressor in Standby

Main Screen

Message 2 - Compressor Fault message

Fault	Description
Pr. Probe Failure	Discharge Pressure Sensor Probe Failure
Tr. Probe Failure	Temperature Sensor Probe Failure
Sump Pr. Probe Failure	Sump Pressure Sensor Probe Failure
HSP (AS)	**Case 1:** Sump Pressure is enabled If Sump Pressure exceeds the set high sump pressure value.
HSP (AD)	If Discharge Pressure exceeds the set high sump pressure value.
Cooler	If the Cooler Digital Input Opens due to Cooler fault
Main Motor Overload/ VFD Error	IF the MMOL Digital Input Opens due to Main Motor Over Load. VFD Error if VFD control is enabled.
Rev Rot / Ph Fail	If the Rev Rot Input Closes when Motor Running due to motor reverse rotation or Phase failure.
Trip Temperature	If the Discharge Temperature exceeds the set trip temperature value.
Sump Pressure Not Developing	After the Start, The Sump Pressure should be at least 0.3 bar after star delay expires. If this is NOT achieved this Fault occurs
Power failure	If the Mains Supply is Interrupted for more than 20 msec
Low Voltage	If the Mains Supply Voltage is less than the 67% of rated Voltage. Compressor is tripped & All Controller Operation is Halted until the Mains Supply Comes back to normal (at least 75% of the rated)
Dis. Pressure Not Developing	After the Load, The Discharge Pressure should be at least 0.5 bar in 5mins. If this is NOT achieved this Fault occurs
Dryer Trip	If dryer is enabled with Trip, this fault will occurs

Main Screen

Message 3 - Compressor warning messages

Warning	Description
DPAF	If DPAF Digital Input is Open and DPAF ON in factory setting
DPOF	If DPOF Digital Input is Open and DPOF ON in factory
Dryer Probe Failure	When Ch-4 analog sensor input fails
Low Dew Point	When Ch-4 Dew point temp. is less than Set value
High Dew Point	When Ch-4 Dew point temp. is greater than Set Value
High Differential Pressure	When the difference between Sump. Pressure and Discharge Pressure exceeds the Set Pressure. (Only in Sump Pr. Enabled condition)
Warn Temperature	When Discharge temp. exceeds the set warn temperature (Default is 105Deg C)
Change Oil Filter	When Service reaming Hr. reaches 0000 Hrs
Change Air Filter	When Service reaming Hr. reaches 0000 Hrs
Change Oil	When Service reaming Hr. reaches 0000 Hrs
Change Grease	When Service reaming Hr. reaches 0000 Hrs
Change Separator	When Service reaming Hr. reaches 0000 Hrs
Dryer Warn	If Dryer Digital Input is Open

Main Screen

Important Machine Settings for Users:

1. Control Mode:

Local - User can Start and Stop the Compressor by using local Start/Stop key

Remote - User can Start and Stop the Compressor by using Potential Free Digital Input. (Refer Digital Input Connector - X04).

DCS - User can Start and Stop the Compressor by using RS485 Modbus communication port (Refer Connector - X07).

Note: If in case of Emergency users are advised to stop the compressor using "Emergency Stop Push Button" available in the front Panel. This is applicable for all the control Mode explained above.

2. Unload Mode:

If this Enabled, Compressor will run only in unload mode and it will never allow compressor to run in Load mode. (This mode is used for service and maintenance purpose).

3. Auto Restart :

If this Enabled, Compressor will run automatically after power failure and it resumes based on previous condition. Default 90 sec delay given in the factory.

4. Load / Unload Pressure:

Compressor will run between Load and Unload pressure based on Compressed Air Utilization.

5. Warn RST Delay

It is used to delay the compressor start after power resumes if Auto Restart Mode is ON.

6. Star Delay

Star to Delta change over delay time. Default 6 sec delay given in the factory.

7. DTR Delay

From Delta change over to Load delay time. Default 10 sec delay given in the factory.

Main Screen

8. RTS Delay

Normal Stop of compressor will Unload and wait for this delay time to Stop the Compressor. Default 10 sec delay given in the factory.

9. Standby Time

Compressor will go to Standby if Unloading exceeds the specified time. Default 5 mins set in the factory.

Standby resume - If the actual pressure is less than Load Pressure then compressor will restart automatically. This feature will save the Energy if utilization of compressed air is less.

10. Start/Stop Per Hour

System will warn if the compressor is started more than the specified no of cycles per hour. Default 5 per Hour is set in the factory.

Note: *In case compressor is started more than the specified no of cycles per hour through Standby sequence then system will not enter into standby stop sequence until the existing hour completion. Mean time Standby override will display on screen.*

11. Auto Drain Valve

Auto Drain Valve is a special feature which is used to prevent the water molecule entry into the compressed air delivery. This function enables the drain valve to ON and OFF based on specified time in the Menu. Default 5 Sec ON in 4 mins interval.

12. Low Dew Point

System will warn if the dew point temperature is less than the set value (If Dryer is enabled).

13. High Dew Point

System will warn if the dew point temperature is higher than the set value (If Dryer is enabled).

Main Screen

14. Load/Unload Source:

a. Local: Load/Unload pressure is based on local settings and Digital Input will response for DPAF, if DPAF is enabled.

b. Remote selection from Digital input- Load/Unload can be operated from Remote

c. DCS: Load/Unload can be operate from DCS(Load/Unload Command Should be Given Continuously in the interval <= 3 Sec)

Note: Compressor start working in local load and unload if communication lost in DCS mode.

15. VFD Function:

VFD speed % will display in the HOME screen once VFD mode is enabled in factory setting.

When VFD is enabled, Unload pressure would be calculated as set load pressure + 0.5

Also user can view the below VFD parameter by accessing view->VFD menu 5.1.6

1. Voltage in V
2. Current in A
3. Frequency in Hz
4. Power in KW
5. RPM
6. Status of the VFD

VFD Operation as follows

1. Machine will be run at Minimum speed (default 750RPM) up to RUN LOAD condition when start up.
2. Machine will be run at Unload speed when machine in Unload, it may be Remote Unload or DCS unload or when Dis.pr is >= (Current Load_pressure+0.5bar)
3. Machine will be run at Optimum speed when Optimum is ON. (Only Load condition)
4. Machine will be run at Calculated Speed between Min.speed to Max.speed Based on the customer Utilization when machine in Load with Optimum is OFF.

Menu Structure

Press any one of the following keys ▲,▼, ◀ and ▶ to enter main menu

Main Menu

Dis. Pr	: 0.0 bar
Dis. Tr	: 25 ° C
Status	
► View	
Operator	
Service	
Factory	
Customer Care	

Dis. Pr	: 0.0 bar
Dis. Tr	: 25 ° C
Status	
► Admin	

View

View	Operator
	Fault Report
	Day Report
	Service time
	Cumulative time
	VFD

Menu Structure

Operator

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	
View	Operator	Mode	Control mode	Local / Remote / DCS
			Auto Restart	ON/ OFF
			Pressure Unit	PSI / Bar
			Temperature Unit	Fahren / Centi
		Pressure	Unload pressure	X X . X b or p (bar or psi)
			Load pressure	X X . X b or p
			Pr. Schedule	ON/ OFF
			Start Sump Press	X X . X b or p
			Max .Diff Pressure	X X . X b or p
		Delay	Warn RST delay	X X X s (second)
			Star delay	X X s
			DTR delay	X X s
			RTS delay	X X s
			Stanby Time	X X m (minute)
			St/Sp PH	X X
		DCS port	Type	Modbus
			ID	X X
			Baud	9600/19200
			Parity	None / Even / Add
			Length	8 / 7
			Stop Bit	2 / 1
		Temperature	Trip Temperature	X X X C or F
			Warn Temp	X X X C or F
			Fan Temp	X X X C or F
		Rating	XXXXXXXXXX	
		Fab NO	XXXXXXXXXX	

Menu Structure

Fault Report

Use ▲, ▼ to select the Fault Record number (1 to 99).

LEVEL 1	LEVEL 2	LEVEL 3
View	Fault report	Fault Message
		Date : DD/MM/YY
		Time : HH:MM:SS
		Dis.Pr : X X .X
		Dis.Tr : X X X
		Status : RDY/ACK/STAR etc.,

Fault Message:

HSP (AD) - Discharge Pressure High, Pressure Probe Fail, Temperature High, Temperature Probe Failure, HSP (AS) - Sump Pressure High, Sump Pressure Probe Fail, Low Voltage, Main Motor Overload, Cooler Motor Overload, Reverse Rotation, Discharge Pressure Not Developing, Sump Pressure Not Developing , Power Interruption, Phase Loss / Reverse, Dryer Trip.

Day Report

Use ▲, ▼ to select the Record number (1 to 30).

LEVEL 1	LEVEL 2	LEVEL 3
View	Day report	Date: DD/MM/YY
		L: X X Hours St: X X Hours
		UL: X X Hours F: X X Hours
		R: X X Hours Sby: X X Hours
		STC: X X X LDC: X X X X X

L- Load, St - Stop, UL - Unload, F- Fault, R- Run, Sby- Standby, STC - Start Count, LDC - Load Count

Menu Structure

Service Time

LEVEL 1	LEVEL 2	LEVEL 3
View	Service time	Remaining AFCT: X X X X hours
		Remaining OFCT: X X X X hours
		Remaining OSCT: X X X X hours
		Remaining OCT: X X X X hours
		Remaining RGT: X X X X hours

Cumulative Time

LEVEL 1	LEVEL 2	LEVEL 3
View	Cumulative time	Load X X X X X X hrs: X X Min
		Unload X X X X X X hrs: X X Min
		Run X X X X X X hrs: X X Min
		Stop X X X X X X hrs: X X Min
		Fault X X X X X X hrs: X X Min
		Standby X X X X X X hrs: X X Min
		Start Count X X X X X X
		Load Count X X X X X X X X X
		Utilisation X X %

Menu Structure

VFD

If VFD is connected to the compressor and VFD port is connected, user can view the following parameters of VFD in Neuron II.

1. Voltage in V
2. Current in A
3. Frequency in Hz
4. Power in KW
5. RPM
6. Status of the VFD

Operator

Password required.

Operator	Machine
	Scheduler
	Maintenance
	Language
	Change Password
	VFD Control

Menu Structure

Machine

#	Item	Min	Max	Option	Default	Unit
			Mode			
1	Control mode	-	-	loc/rem/dcs	loc	-
2	Auto Restart	-	-	on / off	off	-
3	Pr Unit	-	-	bar / psi	bar	-
4	Tr Unit	-	-	cen / fah	cen	-
			Pressure			
5	Unload Pressure	> load pressure+0.5 (bar)	< max unload pressure (bar)	-	7.5 bar	bar/psi
6	Load Pressure	4.0 (bar)	< unload pressure-0.5 (bar)	-	5.5 bar	bar/psi
			Set Delay			
7	Warn RST	90	250	-	90	second
8	Star	6	20	-	6	second
9	DTR	10	60	-	10	second
11	RTS	5	30	-	10	second
12	Standby	1	99	-	5	minute
13	St/Sp per hr	3	20	-	5	-
			DCS Port			
14	Type	-	-	Modbus		-
15	ID	01	99	-	01	-
16	Baud	-	-	9600/19200	9600	bps
17	Parity	-	-	None /Even / Odd	None	-
18	Length	-	-	8 / 7	8	-
19	Stop Bit	-	-	2 / 1	1	-
			Auto Drain Valve			
20	Off time	1	180	-	4	minute
21	On time	1	15	-	5	Second
			Set Dew Point			
22	Low Dew point	-6 C	+2 C	-	-2 C	C/F
23	High Dew point	6 C	12 C	-	8 C	C/F
			Load / Unload Source			
24	LD / UL Source	-	-	Loc / Rem / DCS	Loc	-

Menu Structure

Schedule

Enable Pressure Schedule, and then use ▲,▼ to select the schedule number (1 to 32). (one schedule should be in Sunday (first day of the week) 00:00 Hrs) Then Press "Enter" to set the following

#	Item	Min	Max	Option	Default	Unit
1	Day	-	-	Sun to Sat / (--- means no schedule)	---	-
2	Action	-	-	on / off	off	-
3	Time HH	00	23	-	00	Hour
4	Time MM	00	59	-	00	Minute
5	Unload Pressure	>= Load Pressure + 0.5 (bar)	<= Max Unload Pressure (bar)	-	7.5 bar	bar/psi
6	Load Pressure	4.0 bar	<= Unload Pressure – 0.5 (bar)	-	5.5 bar	bar/psi

Maintenance

#	Item	Min	Max	Option	Default	Unit
1	AF changed	-	-	no/yes	no	-
2	OF changed	-	-	no/yes	no	-
3	OS changed	-	-	no/yes	no	-
4	Oil changed	-	-	no/yes	no	-
5	Re Grease	-	-	no/yes	no	-

If users changed the Filter and entered Yes then Set Filter time from Service / Maintenance will be replaced for the remaining time automatically.

Menu Structure

Language

#	Item
1	English
2	Portuguese
3	Francais
4	Italiano

Default is English.

VFD Control

Item	Min	Max	Default	Unit
Optimum Speed	on/off	on/off	off	
P-Gain	0	50000	250	
I-Gain	0	5000	500	
I-Time	0	200	20	
Max.Speed	Factory settings can be viewed here			RPM
Min.Speed				RPM
Optimum Speed				RPM
UL Speed				RPM
High (5v)				RPM
Low (1v)				RPM

Menu Structure

VFD Speed Control

Min Speed: Compressor remains in Min Speed upto until the start "Run Load" condition during start.

PI Speed Control: In "Run Load", Compressor operates at calculated Speed between Min speed to Max speed depends on air utilization/Usage.

Unload Speed: Compressor runs at set Unload speed during Unload. This is irrespective of all unload modes lime Remote, DCS and Local Unload

Optimum Speed: Compressor runs at Optimum speed when in Load with Optimum is ON. (Factory Menu)

Pre-Check before start the compressor in VFD control

- VFD should be enabled in Factory -> VFD Settings to read and write between VFD and Neuron II.
- Ensure Modbus Communication exist between VFD and Neuron II by viewing the VFD RPM Range in Factory AO Scaling menu. Current VFD RPM will be displayed here, if communication lost it will display as ------
- Ensure Min reference of AO scaling ≥ VFD Parameters 3-02 and 4-11 & Max reference of AO scaling ≤ VFD Parameters 3-03 and 4-13.

Note : Though there is no communication exist between Neuron II and VFD, it is still possible to operate the compressor with VFD control. But it has to be manually entered and ensured that the Min reference and Max reference has been written into VFD parameters 6-14 and 6-15 respectively. Else the speed control will still happen but to the existing values already available in these parameters.

Menu Structure

Setting the P Value

P-Gain - Range: 0 -50000. This gain is given full range. The recommended setting is 20 - 1000.

The lower the setting will make the PI loop correction to start early i.e.

Example :

- If P value is set to 20 , makes the PI loop to start when the pressure difference between Set and Actual is 5.0 bar
- If P value is set to 1000, makes the PI loop to start when the pressure difference between Set and Actual is 0.1 bar

Hence, if the compressor has higher receiver capacity then the change in pressure will be less (slow response system) there we have to set the higher value. Similarly if compressor has low receiver capacity and the pressure shoots up quickly there the P gain value should be less.

Setting the I Value

I- Gain - Range: 0-5000. This gain is given full range. The recommended setting is 50-1000.

The recommended value is 125to 250 in our case. Anything less than 125 will be more stable.

The lower setting make the system tolerant to the error. A value 50 for I-gain will make the system to correct the error only if the pressure difference between set and actual exceeds 0.020 bar.

The higher setting make the system to sensitive to very small changes. E.g. A value of 1000 to I-Gain value make the system sensitive to 0.001bar difference. A very high value and sensitive system(low receiver capacity) , will drive the system into completely unstable state. Always try to keep lower values of I-Gain.

Setting I term

I-time - Range: 0-200. This indirectly counts the scan time.

The recommended value is 15 - 20.

A higher value delay the application of correction calculated based on the I-Gain and vice versa.

Menu Structure

Change Password

Procedure for changing the password

1. Enter the old Password
2. If old password is correct, next screen is displayed. If wrong means Incorrect password message will be displayed.
3. Enter the New password
4. Enter the New password again
5. If the new password matches both the times then new password is updated. If mismatch the control goes back to step 4.

Pressing Esc will bring the control to the previous screen

Service

Password required.

Service	Calibration (Offset)
	Relay
	Temperature
	Maintenance
	Clock
	Self-Test
	Password
	Digital Input
	Dryer Input
	Unload Mode

Menu Structure

Calibration (Offset)

Select the parameter need to calibrated using the ▲,▼, keys. Then Press "Enter" to calibrate.

Dis Pressure/Dis Temperature/Dew Point Temperature/ Sump Pressure Offset Calibration.

Dis.Pressure / Sump Pressure:

Feed some known current value (4 - 20mA) in pressure channel using a standard & recently calibrated meter and enter the offset difference in Neuron II. Allowable Range is +/- 0.5 bar.

Dis Temperature/Dew Point Temperature :

Feed some known Resistance value between 1456 to 4433 ohm for KTY10 / 960 to 1573 ohm for PT1000 in Temperature channel using a standard & recently calibrated meter and enter the offset difference in Neuron II. Allowable Range is +/- 5 deg C.

Note: Calibration must be carried out only when the compressor is in off condition and the digital outputs (relay terminals) are disconnected from the controller.

Note: Calibration for Pressure will be only in bar and for temperature only in Centigrade.

Relay

Select the Programmable Relay 1 or 2 using the ▲,▼, keys. Then Press "Enter" to assign the any one of the following functionality for the relay.

#	Item
1	Warn
2	Load
3	Service
4	Standby
5	Trip
6	Remote
7	Ready

Default:

Relay 1 = Warn

Relay 2 = Trip

Note: If Dryer is enabled then Programmable Relay 2 is not user programmable. It is used for automatic dryer control.

Menu Structure

Temperature

#	Item	Min	Max	Option	Default	Unit
1	Fan Temp	60 C	85 C	-	85 C	C/F
2	Inhibit Temp	-5 C	5 C	-	0 C	C/F

1. **Fan Temperature** - Fan relay will energize if discharge temperature reaches the set value and it will de-energize when the temperature decreases to -10ºC from the set value.
2. **Inhibit Temperature** - Compressor will allow to start when the discharge temperature is higher than the set value (if Temperature Inhibit is Enabled in Factory settings).

Maintenance

#	Item	Min	Max	Option	Default	Unit
1	Set AFCT	0000	30000	-	2000H	Hour
2	Set OFCT	0000	30000	-	2000H	Hour
3	Set OSCT	0000	30000	-	4000H	Hour
4	Set OCT	0000	30000	-	2000H	Hour
5	Set RGT	0000	30000	-	2000H	Hour

System will warn when it reaches 0000 hours and customer need to change the filter accordingly. Based on models it will vary, please refer for your authorized dealers.

Customers are advised to register in operator/Maintenance menu once the filter is replaced.

Menu Structure

Clock

#	Item	Min	Max
1	Date Format	DD/MM/YY	MM/DD/YY
2	Time Format	12 hr	24 hr
3	Day light savings	0	2

Date Format is applicable for all menus where as 12hr Time Format is applicable for home screen only.

Day light saving settings will add 1 or 2 hours from current GMT time.

#	Item	Min	Max
1	Hour	00	23
2	Minute	00	59
3	Second	00	59
4	Date	01	31
5	Month	01	12
6	Year	00	99
7	Day	Sun/Mon/Tue/Wed/Thu/Fri/Sat	

Menu Structure

Self Test

Self Test for testing the Controller Display, Mimic Led's, Keys, Analog and Digital Input/Outputs.

Follow the instructions displayed in the screen.

Warning!!!

Self Test should be conducted only when the compressor wiring is totally disconnected from the controller. Do NOT perform self test when the controller is connected to the compressor. Doing so will cause severe damage to the compressor. Self Test must done by the authorized service person only.

Change Password

Procedure for changing the password

1. Enter the old Password
2. If old password is correct, next screen is displayed. If wrong means incorrect password message will be displayed.
3. Enter the New password
4. Enter the New password again
5. If the new password matches both the times then new password is updated. If mismatch the control goes back to step 4.

   Pressing Esc will bring the control to the previous screen

Digital Input

Configuration of DI-4 (DPAF or Remote Load/Unload) can be viewed from this menu. (if Load/Unload Source is selected as Remote in Operator -> Machine settings).

Dryer Input

Dryer digital input DI-6 can be configured for Warn or Trip, This input will be effective if Dryer is ON in Factory -> Dryer.

Menu Structure

Factory menu

Password required.

Factory	Machine
	Dryer
	Password
	VFD Settings
	AO Scaling

Machine

#	Item	Min	Max	Option	Default	Unit
Compressor Info						
1	Rating	-	-	Manual Entry 10 digit alphanumeric	22	KW
2	Fab No	Editable alpha numeric			-	-
3	DPAF	-	-	on/off	off	-
4	DPOF	-	-	on/off	off	-
Max. Pressure Settings						
6	Max UL Pressure	>= 4.5 bar	<= 15.5 bar	-	7.5 bar	bar /psi
7	High Sump Pressure	>= Max Unload pressure +0.5 bar	<= Max Unload pressure +3	-	8.0 bar	bar /psi
8	Sump Pressure	-	-	enable/disable	disable	-
9	Start Sump Pressure	0.1 bar	16.0 bar	-	1.0 bar	bar /psi
10	Max. Differential Pressure	0.1 bar	2.0 bar	-	2.0 bar	bar /psi
Temperature Settings						
11	Trip temperature	80 C	120 C	-	110 C	C / F
12	Warn temperature	70 C	115 C (Trip.Tr – 5deg C)	-	105 C	C / F
13	Temperature Inhibit	-	-	Enable / Disable	Enable	-

Menu Structure

Rating - Compressor capacity and model information.

DPAF and DPOF for selective models only.

Max. UL Pressure - Maximum allowable Unload Pressure settings.

HSP - Compressor will Trip immediately if the Discharge Pressure or Sump Pressure exceeds the set limits.

Sump Pressure En/Dis - For Selective models only.

Start Sump Pr - If Sump is Enabled then compressor will allow to start when the sump pressure is less than the set value.

Max. diff Pr. - If Sump is Enable then Compressor will warn if the difference between Discharge Pressure and Sump Pressure is higher than the set value,

Trip Temperature - Compressor will Trip if the Discharge Temperature is higher than the set value.

Warn Temperature - Compressor will warn if the Discharge Temperature is higher than the set value.

Temperature Inhibit - Enable / Disable option for Temperature based Start Inhibit for more details refer Service/Inhibit Temperature option.

Dryer

#	Item	Min	Max	Option	Default	Unit
1	Dryer Mode	-	-	on/off	off	-
2	Dryer Delay	2	10	-	3	Minute

If Dryer Model is selected then Programmable relay2 is fixed for Dryer and dryer relay will energize after the set delay expires from last Stop. Compressor will warn or trip based on Dryer Input selection when digital Input is connected (refer Connector X04). This Dryer control works only after RUN state.

Menu Structure

Change Password

Procedure for changing the password

1. Enter the old Password
2. If old password is correct, next screen is displayed. If wrong means Incorrect password message will be displayed.
3. Enter the New password
4. Enter the New password again
5. If the new password matches both the times then new password is updated. If mismatch the control goes back to step 4.

Pressing Esc will bring the control to the previous screen

VFD Setting

VFD En/Dis	Enable/Disable
Max.Speed	Max.Speed values can be set between (Min.speed+100) to High reference RPM of AO Scaling
Min.Speed	Min.Speed values can be set between Low reference of AO Scaling to (Max.speed-100) RPM
Optimum Speed	Optimum speed values can be set between Min.speed to Max.speed RPM
UL Speed	Unload speed values can be set between Min.speed to (Max.speed-100) RPM

AO Scaling

Item	Min	Max	Default	Unit
High(5V) - High ref.	Low.Ref.+100	3000	1470	RPM
Low(1V) - Low ref.	750	High.Ref-100	750	RPM
VFD's Current set Low and High RPM will be displayed here				

Menu Structure

Menu (Factory -> AO SCALING) for Common settings for All VFD

Step 1 : Set Analog Output Low reference Scale of VFD (1V). This value between 750 to (High reference-100) RPM, it must be Greater than or Equal to 3-02 and 4-11 parameters of VFD and it will be written into 6-14 parameters of VFD.

Note that the minimum speed the compressor can run is limited by maximum of any one of these settings. Say the parameters contain 750, 900 and 1000 in parameter 3-02,4-11 and 6-14 respectively. The minimum speed is limited to 1000 rpm.

Step 2 : Set Analog Output High reference Scale of VFD (5V). This value between Low reference+100) to 3000 RPM, it must be Lesser than or Equal to 3-03 and 4-13 parameters of VFD and it will be written into 6-15 parameters of VFD.

Note that the maximum speed the compressor can run is limited by minimum of any one of these settings. Say the parameters contain 1500, 1600 and 1800 in parameter 3-03,4-13 and 6-14 respectively. The maximum speed is limited to 1500 rpm.

Customer Care

Dis. Pr	:	6.0 bar
Dis. Tr	:	32°C
Status		

S/W Version
URL www.elgi.com
e-mail: ccs@elgi.com

Admin

Password required.

Admin menu is used for Analog Input Calibration, Analog Output Offset Adjustment, Report Resets (Day Report/Fault Report/Cumulative/Service hours/Password).

Data Interface

Neuron II has two types of Data Interface

- Analog output
- DCS Port

Analog output

Two Channels are available as analog output. Channel -1 Discharge Pressure values 0.0 to16.0 bar, converted into 1 to 5V.

Channel-2 for Discharge Temperature values from -10 to 150 deg C, converted into 1 to 5V

Note: If in case of Analog output probe failure, analog output would be 0V by default.

DCS Port

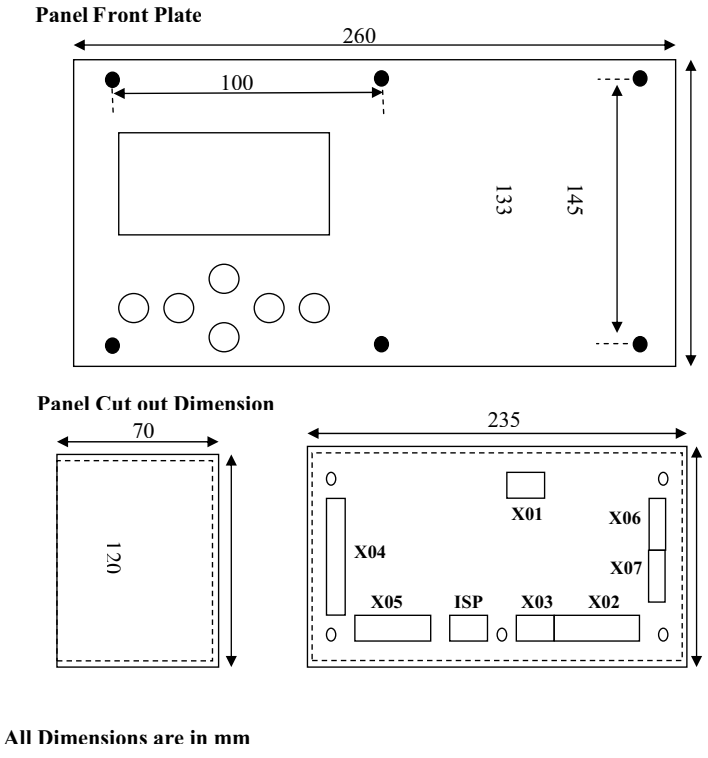
DCS port is Modbus RTU type to interface to Generic DCS system.

User can set the Device ID in menu **"Operator/ Machine/ DCS Port"**. Also Baud Rate, Parity, data Length, Stop Bit are user settable. The Modbus data table is provided in the Appendix.

Construction

- Corrosion & Dust protected Back Cover
- IP65 polyethylene front keypad
- Inputs and Outputs through terminal block
- Front Plate Dimensions 260 x 145mm
- Enclosure Dimensions 235 X 120 X 70 mm

Dimension Drawing



All Dimensions are in mm

Example - scheduler setting

Example – scheduler setting

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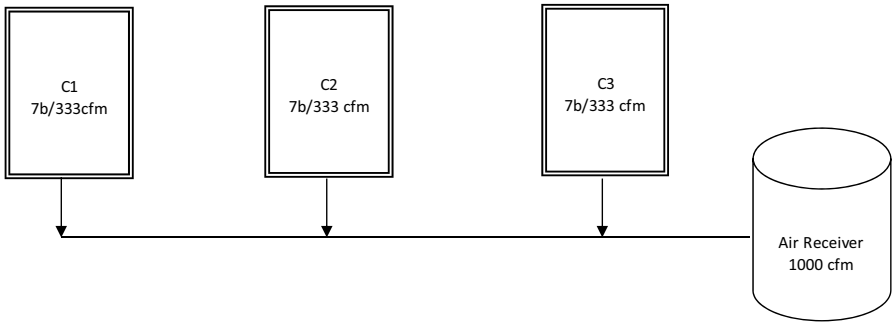
The settings are considered
When
1 End customer usage is 6 bar
2 Pressure variation in the air pipe is less than 0.1b
3 All the 3 compressor are connected in a sigle/Common Header
4 All the 3 compressor are connected in a Common receiver

	Pressure schedule settings in Neuron-2															
	Comp-1					Comp-2					Comp-3					
	ON	OFF	Load	U/L		ON	OFF	Load	U/L		ON	OFF	Load	U/L		
Day-1	Lead					Lag					Lag					
	8:00	18:00	7	7.5		8:00	18:00	6.6	7.2		8:00	18:00	6	6.8		
Day-2	Lag					Lead					Lag					
	8:00	18:00	6	6.8		8:00	18:00	7	7.5		8:00	18:00	6.6	7.2		
Day-3	Lag					Lag					Lead					
	8:00	18:00	6.6	7.2		8:00	18:00	6	6.8		8:00	18:00	7	7.5		
Day-4	Lead					Lag					Lag					
	8:00	18:00	7	7.5		8:00	18:00	6.6	7.2		8:00	18:00	6	6.8		
Day-5	Lag					Lead					Lag					
	8:00	18:00	6	6.8		8:00	18:00	7	7.5		8:00	18:00	6.6	7.2		
Day-6	Lag					Lag					Lead					
	8:00	18:00	6.6	7.2		8:00	18:00	6	6.8		8:00	18:00	7	7.5		
Day-7	OFF till Next week Day-1 8:00AM															



Example - scheduler setting

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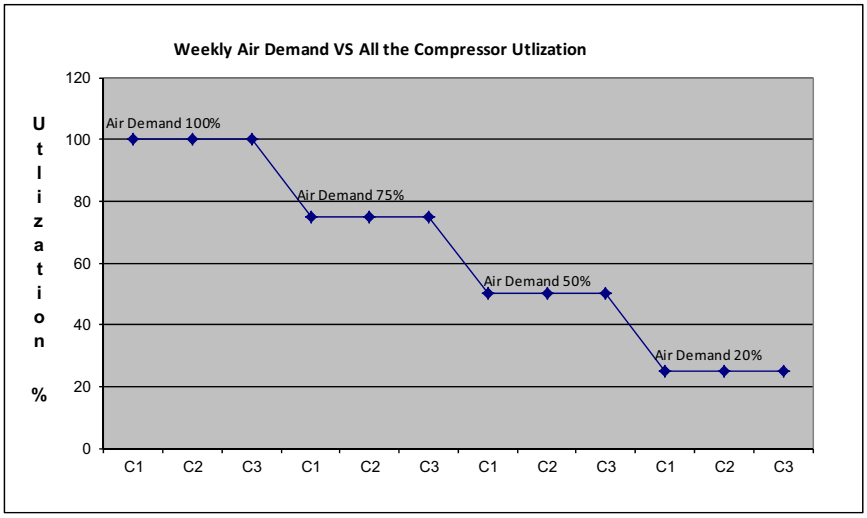
Weekly utilization

Comp->	Air Demand: 100% C1	C2	C3	Air Demand: 75% C1	C2	C3	Air Demand: 50% C1	C2	C3	Air Demand: 25% C1	C2	C3
Day-1	100	100	100	100	100	25	100	50	0	75	0	0
Day-2	100	100	100	25	100	100	0	100	50	0	75	0
Day-3	100	100	100	100	25	100	50	0	100	0	0	75
Day-4	100	100	100	100	100	25	100	50	0	75	0	0
Day-5	100	100	100	25	100	100	0	100	50	0	75	0
Day-6	100	100	100	100	25	100	50	0	100	0	0	75
Avg Utl%	**100**	**100**	**100**	**75**	**75**	**75**	**50**	**50**	**50**	**25**	**25**	**25**

Conclusion

Equal Utilization of all the 3 Compressor based on Pressure demand

It reduces the power consuption since the compressors are utilised based on the demand.



Neuron-2 Pressure Schedule Setup

Step-1 Goto Operator Menu
Step-2 Enter Password "4545"
Step-3 Operator -> schedule
Step-4 Enable
Step-5 Set ON TIME
Step-6 Set OFF TIME
Step-7 Set Load Pr
Step-8 Set Unload Pr.

Revision Details

Version	Date	Changes
1.0	2 April 2009	Initial Draft
1.1	8 July 2009	Pilot Batch S/W Version 1.1
1.3	5 Nov 2013	1.1PK3 release 1
1.4	27 Jan 2014	1.1PK3 release 2
1.5	7th May 2014	1.1PK3 VFD additions
1.6	4th June 2014	1.1.1PK3 R04A2 Menu corrections, 2.VFD PID setting described in detail