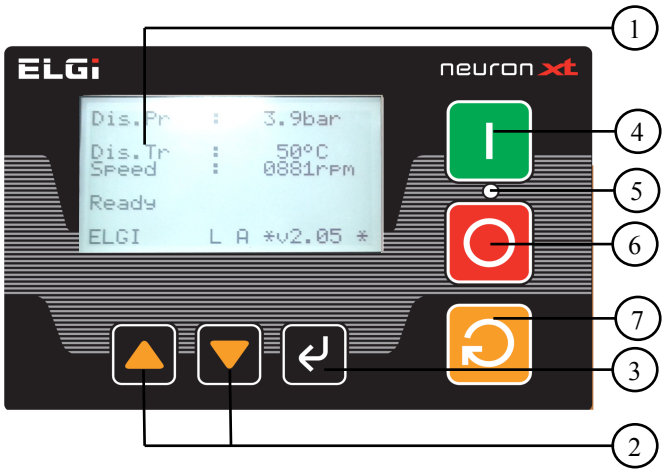
7.3 Display & terminal details



1 128x64 Graphical display
2 Navigation keys
3 Enter key
4 Start key
5 LED (Green - Start , Red - Stop/Fault)
6 Stop key
7 Reset key

7.3.1. Terminal connection

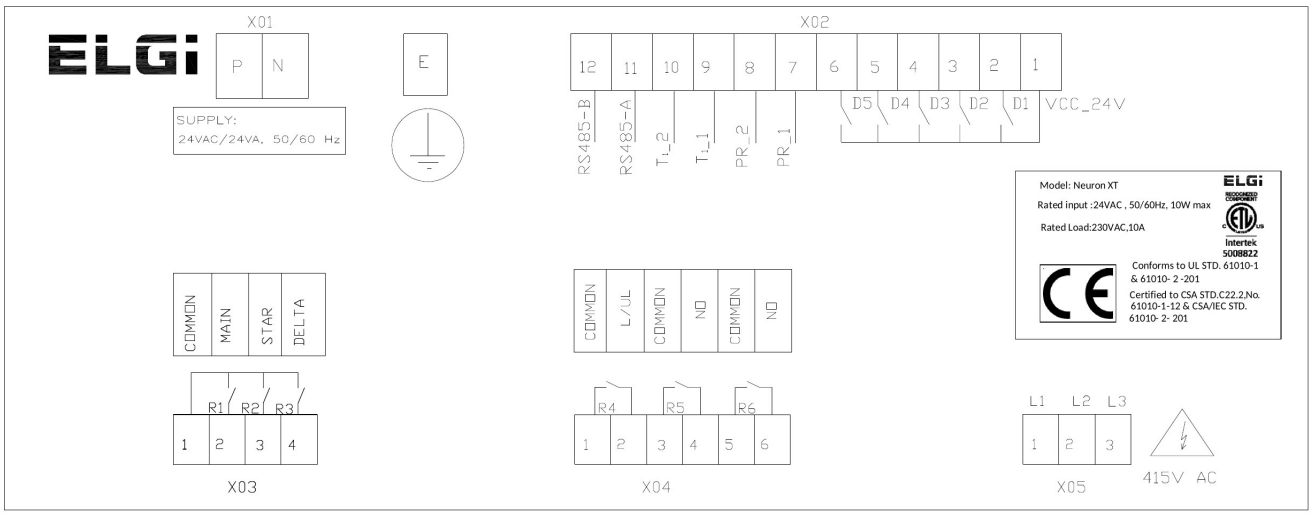
X01 - Power supply 24VAC, OV (Earth will be connected via socket)

X02 - Digital input (5), Analog inputs (2), RS485 (MODBUS communication)

X03 - Relay output (main, star, delta)

X04 - Load/unload & Programming relay output (2)

X05 - Phase reverse / Phase loss detection



7.4 Neuron-XT salient features

7.4.1. Home screen display

- Easy User interface 8-line graphical display and intuitive menu navigation keys

7.4.2. Records (view -> fault report)

- 99 fault reports
- Faults with run hour and status of the machine at the time of fault etc.

7.4.3. Remote function (both from MODBUS as well as digital input)

- Remote loading and unloading
- Remote start and stop

7.4.4. Other interfaces and communication

- 70 + Modbus parameters for DCS controls

7.4.5. Safeguard

- Low voltage and short time power interrupts detection to enhance the life of the contactors
- Low temperature start inhibit to avoid start-up overloads

7.5 Input output description

7.5.1 X01: Power supply

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

7.5.2 X02: Digital inputs

Pin	Function	Id	Active state
1	Digital inputs common	24VDC	-
2	Emergency stop	Emergency	Fault if open
3	Main motor Overload	MMOL	Fault if open
4	Cooler Motor overload	Cooler OL	Fault if open
5	Remote load and unload / spp	Remote L / UL / spp	Unload if open/ Trip if open
6	Remote start / stop	Remote Start /Stop	Stop if open

Pin	Function	Id	Type	Range
7	Discharge pressure	Pr-1	4-20 mA	0 to 16 bar (0 to 232 psi)
8	Discharge temperature	T1-1		

Pin	Function	Id	Type	Protocol/Range
9	DCS interface	RS485 -A	RS485	Modbus RTU protocol
10	DCS interface	RS485 -B	RS485	

7.5.3 X03: Relay output

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

7.5.4 X04 : Relay output

Pin	Function	Id	Active state
1	Common - Load relay	Common	Load when energised
2	Load relay	L/UL	
3	Common - programmable relay 1	Common	Energised
4	Programmable relay 1	No	
5	Common - programmable relay 1	Common	Energised
6	Programmable relay 2	No	

7.5.5 X05: Single phase detector

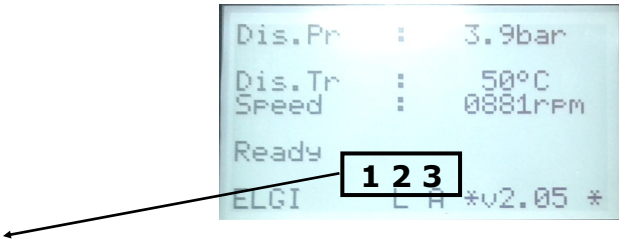
Pin	Function	Active state
1	R- Phase	R - 120 Deg Phase Diff
2	Y - Phase	Y - 120 Deg Phase Diff
3	B - Phase	B - 120 Deg Phase Diff

7.6 Main screen

- Discharge pressure at 0.1bar / 1psi resolution
- Oil temperature at 1°C / 2°F resolution
- VFD speed (if VFD enabled)
- Trip or machine status like Run, Load, Unload, Standby etc.,
- Warning messages
- Version with mode information

Compressor mode selection details:

1. UL - unload mode enabled, UL disabled the space will be shown as empty
2. L or R or D - compressor start from - Local or remote or DCS,
3. A or M - Auto restart enabled or auto restart disabled. For more details refer machine settings in operator menu.



NOTE

The version (eg. v2.04) displayed in main screen refers to software version (changes for every software update)

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
Temperature inhibit ±XX	While starting, if the discharge temperature is lower 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.
Auto restart "seconds"	If compressor is in auto mode, The controller will ensure minimum delay (user set, e.g. 60 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 mode.

Message 2 - Compressor fault message

Fault	Description
Pr. Probe failure	Discharge pressure sensor probe failure
Tr. Probe failure	Temperature sensor probe failure
HSP	If discharge pressure exceeds the set high sump pressure value.
Cooler	If the cooler digital input opens due to cooler fault.
Main motor overload	If the MMOL digital input opens due to main motor
Phase loss/reverse	If input phase is lost or reversed before start of the main motor.
Trip temperature	If the discharge temperature exceeds the set trip temperature value.
Power interruption	If the mains supply is interrupted for more than 20 msec.
Low voltage	If the mains supply voltage is less than 75% of the rated voltage, the compressor will be tripped and all controller operations have halted until the mains supply comes back to normal (at least 85% of the rated).
Dis. pressure not developing	After the load, the discharge pressure should be at least 0.5 bar/7psi in 5mins. If it has not reached this level, this fault occurs.
Temperature not developing	If the discharge temperature not raised above the inhibit temperature before the set inhibit temperature time.

Message 3 - Compressor warning message

Warning	Description
Warn temperature	When discharge temp. exceeds the set warn temperature (Default is 105°C)
Change oil filter	When service remaining Hr. reaches 0000
Change air filter	When service remaining Hr. reaches 0000
Change oil	When service remaining Hr. reaches 0000
Change grease	When service remaining Hr. reaches 0000
Change separator	When service remaining Hr. reaches 0000
Change valve kit	When service remaining Hr. reaches 0000

7.6.1 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 - X02).

NOTE

In the case of an emergency, good practice is to stop the compressor regardless of the control mode that the compressor is in. Use the "Emergency Stop Push Button" available on the front panel to stop the compressor.

2. Unload mode

- If this is enabled, compressor operates only in unload mode and never in load mode. (This mode is used for service and maintenance purpose).

3. Auto restart

- If you enable this option, compressor will runs automatically after power failure and it resumes based on the previous condition. The default delay setting is 30 sec*.

4. Warn RST delay

- Enable this option to delay the compressor start after power resumes. This option works if Auto Restart Mode is ON. (Default :30 sec)

5. Load / Unload pressure

- The compressor runs between load and unload pressure based on compressed air utilization. You can set your own load/unload pressure within the operating pressure band zone.

6. Star delay

- For Star to Delta change over delay time, the default delay setting is 6 sec.

7. DTR delay

- For Delta change over to load delay time, the default delay setting is 3 sec.

8. RTS delay

- During normal stoppage, the compressor will unload to before it stopped and wait for this set delay time. A default delay setting of 5 sec has been provided.

9. Standby time

- The compressor will shift to standby mode if unloading exceeds the specified time. A default delay setting of 5 mins has been provided.
- **Standby resume** - If the actual pressure is less than the load pressure, then the compressor will restart automatically after 10 sec delay. If demand from the standby stop comes after 10 sec, the compressor will start immediately. This feature helps save the energy if very little compressed air is used.

10. Start/Stop per hour

- The system sends a warning if you exceed the configured number of cycles per hour that you start the compressor per hour. The default factory setting is five per hour.

NOTE

In case the compressor exceeds the specified number of cycles per hour when in the standby sequence, then the system will not enter into standby stop sequence until the existing hours are completed. In the mean time standby override will display on the screen.

11. Load/Unload source

- **Local:** Load/unload pressure is based on local settings.
- **Remote selection from the digital input**– Load/ unload is possible.
- **DCS:** Load/unload can be operated from the DCS (The load/unload command should be used continuously with the interval ≤3 Sec)

NOTE

The compressor resumes in local load and unload mode if communication is lost in DCS mode.

12. VFD Function

- VFD speed will appear in the home screen once VFD mode is enabled in factory settings.
- **VFD mechanism -** Load and unload pressure which set in operator will write into VFD's respective address through Modbus protocol

NOTE

Modbus communication should be established between VFD and Neuron –XT controller. If VFD is enabled other slave device should not be connected, such as DCS.

7.7 Menu structure

Press any one of the following keys Δ and ∇ to enter main menu

7.7.1 Main Menu

Dis. Pr	: 0.0 bar / 0 psi
Dis. Tr	: 25°C / 77°F
Status	:
	View
	Operator
	Service
	Factory
	Customer care

7.7.1.1 Operator

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	
View	Operator	Mode	Control mode	Local / Remote / DCS
			Auto restart	On/ Off
			Pressure unit	Bar/psi
			Temperature unit	Fahren / Centi
		Pressure	Unload pressure	X X . X b or p (bar or psi)
			Load 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
			Standby 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	

7.7.1.2 Fault Report

Use Δ and ∇ to select the fault record number (1 to 99). The latest fault will be displayed in the first position. For fault message details refer the "Fault Message" table.

LEVEL 1	LEVEL 2	LEVEL 3
View	Fault report	Fault Message
		Run Hour : XXXXXX
		Dis.Pr : X X .X
		Dis.Tr : X X X
		Status : RDY/ACK/STAR etc.,

7.7.1.3 View Service Time

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

7.7.1.4 View 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
		Utilisation	X X %

7.7.2 Operator

Password required to adjust the operator settings within the set limits.

Operator	Machine
	Maintenance
	Language
	Change Password

7.7.2.1 Operator Machine

The machine settings available are listed in the below table.

#	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/psi	-
4	Tr unit	-	-	cen / for	cen	-
Pressure						
5	Unload pressure	≥ load pressure +0.5bar(7psi)	≤ max unload pressure	-	7.5 bar (109 psi)	bar/psi
6	Load pressure	4.0bar(58psi)	≤ unload pressure - 0.5bar(7psi)	-	5.5 bar (80 psi)	bar/psi

#	Item	Min	Max	Option	Default	Unit
Set Delay						
8	Warn RST	30	250	-	30	second
9	Star	6	20	-	6	second
10	DTR	3	60	-	3	second
11	RTS	5	30	-	5	second
12	Standby	3	99	-	5	minute
DCS Port						
13	Type	-	-	Modbus	-	
14	ID	1	99	-	1	-
15	Baud	-	-	9600/19200	9600	bps
16	Parity	-	-	None/Even/Odd	None	
17	Length	-	-	7 / 8	8	-
18	Stop bit	-	-	1 / 2	1	-
***Auto Drain Valve (ADV)**						
19	Off time	1	180	-	4	minute
20	On time	1	15	-	5	Second
Load / Unload Source						
21	LD / UL Source	-	-	Loc / Rem/ DCS	Loc	-
Contrast adjust						
22	Contrast adjust	10	100	10 / 100	50	%

* If ADV enabled in service menu

7.7.2.2 Operator - Maintenance

If you change the below consumables, then select Yes to restart the service counter from the default set value.

#	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	-
6	Valve kit	-	-	No/Yes	No	-

7.7.2.3 Language

Default is english. Customer can choose any one of the given languages.

#	Item
1	English
2	Francais
3	Italiano
4	Spanish

7.7.3 Service

Password required.

NOTE

Any setting changes should be made by an ELGi authorized service engineer only. Any attempt to change service settings by unauthorized people may lead to compressor malfunction and the warranty becoming void.

Service	Calibration (Offset)
	Relay
	Temperature
	Maintenance
	Self-Test
	Change Password
	Unload Mode
	DI-5

7.7.3.1 Calibration (offset)

If any deviation occurs in the pressure and temperature displayed between the controller and the master gauge, ask ELGi service engineer to offset the valve. Factory fitted sensor/controller are pre-calibrated.

7.7.3.2 Programmable relay

Select the programmable relay 1 or 2 using the Δ and ∇ keys. Then press Enter to assign any one of the following functionalities for the relay.

#	Item
1	Warn
2	Load
3	Service
4	Standby
5	Trip
6	Remote
7	Ready
8	Fan*
9	ADV* *

Default

Relay 1 = Warn
Relay 2 = Trip

7.7.3.3 Temperature

1. **Fan temperature*** - (If a fan is equipped with machine) This option causes the fan relay to energize if the discharge temperature reaches the set value. It will de-energize when the temperature decreases to -15ºC from the set value.
2. **Inhibit temperature** - This option causes the compressor to start when the discharge temperature is higher than the set value (if Temperature inhibit is enabled in factory settings).
3. **Temperature Inhibit time** - - This option causes the compressor to wait for this specified time to reach the Inhibit temperature. If not, it trips because temperature is not building.

#	Item	Min	Max	Option	Default	Unit
1	Fan Temp	60°C (140°F)	90°C (194° F)	-	85°C (140°F)	C/F
2	Inhibit Temp	- 5°C (23°F)	5°C (41°F)	-	0°C (32°F)	C/F
3	Tr. Inhibit Time	5	90	-	5	min

7.7.3.4 Auto drain valve**

The auto drain valve is a special feature that helps prevent water from entering into compressed air delivery. This function enables the drain valve to switch on and off based on a specified time in the menu. The default setting is 5 sec ON with a 4 min interval. It is programmed in the relay menu available in service.

7.7.3.5 Maintenance

Here you can feed the filter life time. The time limit will vary depending on the model and filter. Contact your authorized dealer to learn more.

Good practice is to record the details in the operator/ maintenance menu once the filter is replaced.

#	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
6	Set Valve Kit	0000	30000	-	2000H	Hour

7.7.3.6 Self test

Perform a self test to verify the controller display, mimic LEDs, keys, analog and digital inputs/outputs. Follow the instructions that appear in the screen.

⚠ WARNING

Conduct self test only after you totally disconnect compressor wiring from the controller. Else, the compressor will sustain severe damage. A self–test must be done only by an authorized service person.

7.7.3.7 Unload mode

If you enable this option, the compressor will run only in the unload mode. The option disables compressor load mode. (This mode is used for service and maintenance purpose).

7.7.3.8 Digital Input

This input can be configured as either the Remote Load/ Unload or spp function. Default: Remote Load/Unload

7.7.4 Customer care

If customer enter into the customer care menu, this message will appear

Version: XXXX*
URL: www.elgi.com
E-mail: ccs@elgi.com

* Version may vary based on the software update.

7.8 Data interface

DCS port is Modbus RTU type. It enables you to interface with the generic DCS.

You can set the device ID in menu "Operator/ Machine/ DCS Port.".

You can also configure the baud rate, parity, data length, and the stop bit to suit your requirements. The Modbus table will be provided on request.

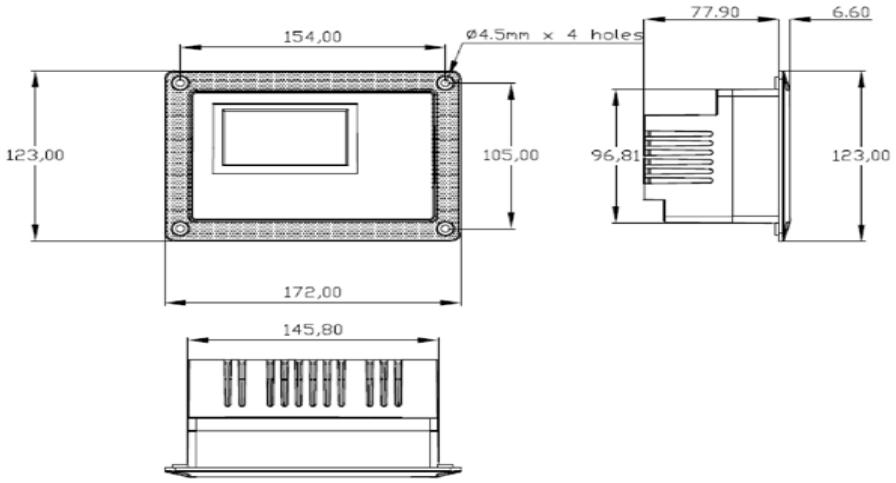
7.9 Troubleshooting

S. NO	Failure symptoms	Possible causes	Remedies
1	No display in LCD Screen & Backlight was not glown	No input supply	Check incoming supply to compressor
		Transformer failure	Please check the controller input voltage at connector X01. Voltage should be 24V ± 15% VAC.
		Controller failure.	Change the controller.
2	Keypad in Controller not responding	Key not responding	Check any key stuck / Flat. If any change Controller
		Key struck / Flat	Change the controller.
3	"Low voltage" message in display.	Controller Input voltage less than 18VAC	Until will start functioninig, once input voltage recovered to nominal or with in specification (415 V +10% - 15 %)
4	"Pr. probe failure" message in display	Loose connection in connector position (X02 - 7 & 8).	Check the loose connection at both end - Controller and pressure sensor side.
		Pressure sensor failure.	Change the Pressure sensor.
		Controller failure	Check the voltage across (X02 - 8) with Gnd, voltage should be b/w 0.4 to 2VDC. If it is different change the controller.
5	"Tr. probe failure" message in display	Loose connection in connector position X02 - 9 & 10.	Check the loose connection at both end - Controller and Temp sensor side.
		Temperature sensor failure.	Change the Temperature sensor.
		Controller failure	Check the voltage across X02 - 9 with Gnd, voltage should be 3.3 VDC. If it is different change the controller.
6	"Emergency stop" "MMOL" "Cooler OL" message in display	Loose connection in connector position (X02 - 1, 2 ,3 & 4).	Check the loose connection at controller end.
		Switch got struck	Check either the external switches got sturck / Fault not cleared
		Controller Failure	Change the controller.
7	Motor not driving	Controller failure	Disconnect the X03 & X04 connector, Check the relay working by switching on the start key (X03 -1) with (X03- 2, 3 & 4) & (X04 -1) with (X04- 2). Note: Ckeck in the continuity mode.
8	"Phase loss/ Reverse" message in display	Loose connection in connector position (X05 - 1, 2 & 3).	Check the loose connection at controller end.
		Controller failure	Check for the X05 connection X05(1- R, 2-Y, 3 -B), Still the same error change the controller

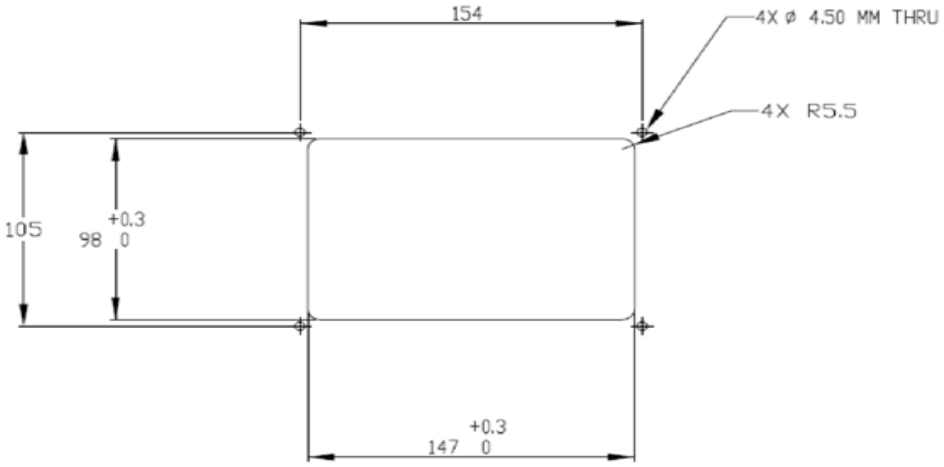
7.10 Construction

- Plastic enclosures
- IP65 polyethylene front keypad
- Inputs and outputs through terminal block
- Front plate cutout dimensions 154 x 105 mm
- Enclosure dim

7.10.1 Dimension drawing



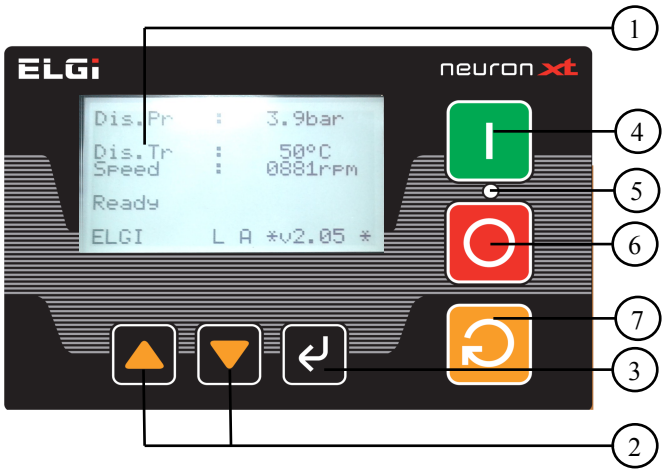
PANEL CUTOUT DIMENSION



7.11. Revision Details

Version	Date	Changes
1.0	02/03/2015	Initial Draft
2.0	31/08/2017	Updated corrections
3.0	02/01/2018	Feature addition/deletion
3.1	01/08/2018	Software version 1.8
3.2	01/12/2018	Software version 2.04
3.3	28/03/2019	Software version 2.05
3.4	08/08/2019	Software version 2.06

7.12 Neuron XT quick reference



1 128x64 Graphical display
2 Navigation keys
3 Enter key
4 Start key
5 LED (Green - Start , Red - Stop/Fault)
6 Stop key
7 Reset key

MAIN SCREEN DISPLAY

- Package Discharge Pressure
- Discharge Temperature
- Machine Status like Run, Load, Unload, Standby etc.
- Warning Messages
- Mode Information (see below)

Mode Information

1. PS – Pressure Schedule Enabled / UL – Unload Mode Enabled
2. L – Local / R – Remote / D – DCS
3. A / M – Auto Restart ON / Manual Mode

Compressor Status messages

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
Temperature inhibit ±XX	While starting, if the discharge temperature is lower 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.
Auto restart “seconds”	If compressor is in auto mode, The controller will ensure minimum delay (user set, e.g. 60 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 mode.

Compressor Warning messages

Warning	Description
Warn temperature	When discharge temp. exceeds the set warn temperature (Default is 105°C)
Change oil filter	When service remaining Hr. reaches 0000
Change air filter	When service remaining Hr. reaches 0000
Change oil	When service remaining Hr. reaches 0000
Change grease	When service remaining Hr. reaches 0000
Change separator	When service remaining Hr. reaches 0000
Change valve kit	When service remaining Hr. reaches 0000

Compressor fault messages

Fault	Description
Pr. Probe failure	Discharge pressure sensor probe failure
Tr. Probe failure	Temperature sensor probe failure
HSP	If discharge pressure exceeds the set high sump pressure value.
Cooler	If the cooler digital input opens due to cooler fault.
Main motor overload	If the MMOL digital input opens due to main motor
Phase loss/reverse	If input phase is lost or reversed before start of the main motor.
Trip temperature	If the discharge temperature exceeds the set trip temperature value.
Power interruption	If the mains supply is interrupted for more than 20 msec.
Low voltage	If the mains supply voltage is less than 67% of the rated voltage, the compressor will be tripped and all controller operations have 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/7psi in 5mins. If it has not reached this level, this fault occurs.

Menu Structure