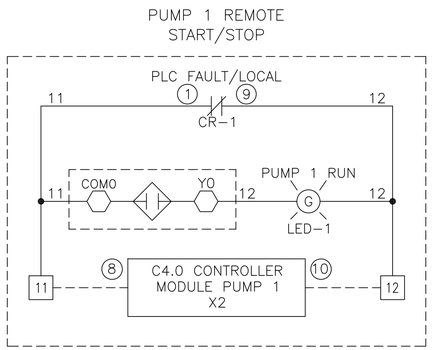
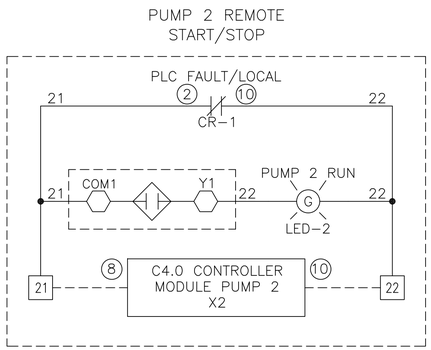
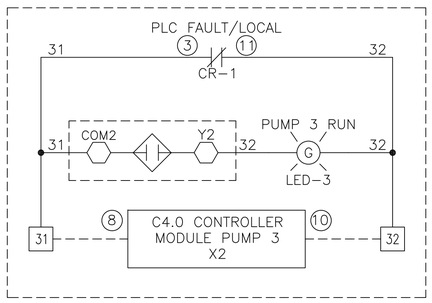
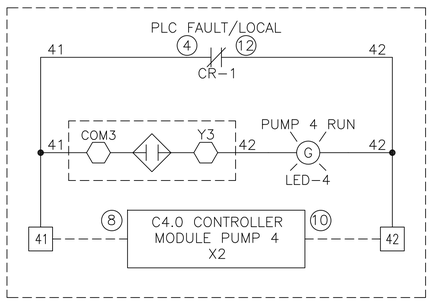
Notes:

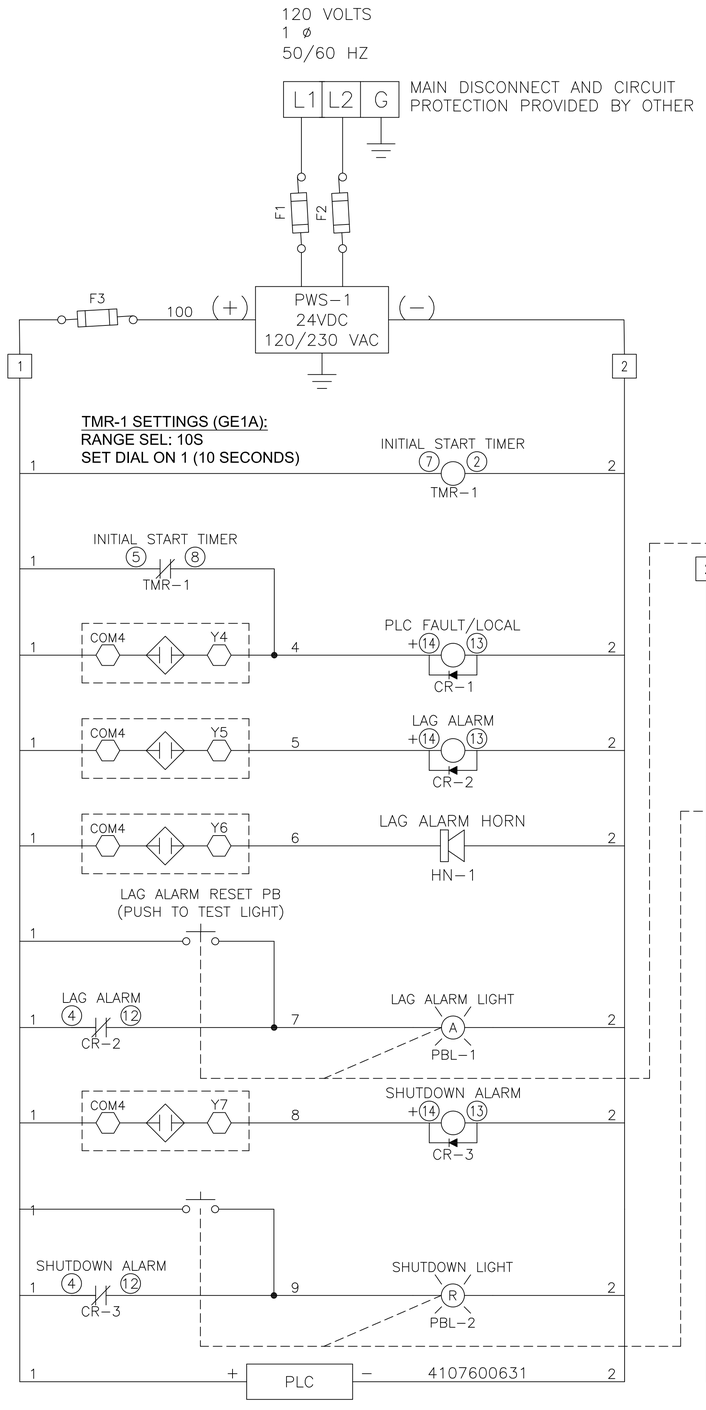
1. THE AMPACITY OF CONDUCTORS SUPPLYING THE CONTROL PANEL TO BE ROUNDED UP TO THE NEXT SIZE LARGER STANDARD WIRE GAUGE.
2. FIELD WIRING TO BE COPPER RATED FOR 75 °C MINIMUM
3. -- -- -- -- INDICATES FIELD WIRING OUTSIDE OF CABINET.

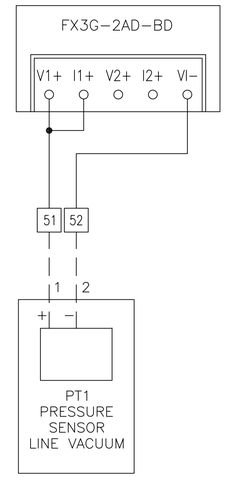


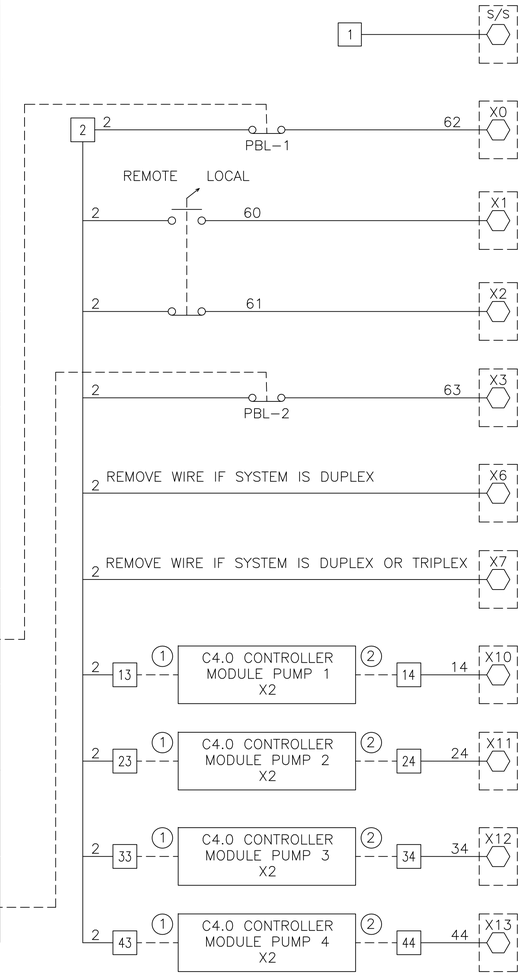


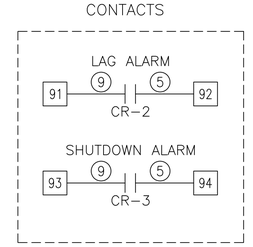












NOTE:
AUXILIARY CONTACTS 91–92 AND 93–94 ARE "CLASS 1 CONTROL CIRCUITS. USE CLASS 1 CONDUCTORS."

AUX CONTACTS ARE RATED 10A @ 120VAC UNLESS OTHERWISE NOTED.

AUX CONTACTS CLOSED DURING NORMAL OPERATION.

FUSE SELECTION CHART (MAX FUSE SIZES SHOWN)

FUSE	120V
F1/F2	4.0 AMPS
F3	2.0 AMPS

F1/F2 ARE LITTELFUSE 239 SERIES 125V TYPE
F3 IS LITTELFUSE 239 SERIES 250V TYPE

Revised:	Date:	Drawn:	Date:
		TAR	05/17/24

BEACONMEDAES

Scale: NTS

D

Description:
DWG WIRING CONTROL
MSV DX-QX PLC
120/1/50-60

Part Number: 4107 8587 61

DN: HOP240267 Rev: 00

Sheet 1 of 2

DO NOT SCALE THIS DOCUMENT

AUTO OPERATION:

DURING NORMAL OPERATION, THE SWITCH SHOULD BE IN THE REMOTE POSITION. THE PLC WILL SIGNAL THE LEAD VACUUM PUMP TO START WHEN THE VACUUM FALLS BELOW THE SET–POINT. THE LEAD PUMP WILL ADJUST ITS VSD AS NEEDED TO MEET THE SET–POINT. IF ONE PUMP CAN CARRY THE LOAD, THEN THE VACUUM WILL RISE TO THE SET–POINT AND STAY THERE. IF THE DEMAND FALLS, THE PLC WILL TURN OFF THE LEAD VACUUM PUMP. IF THE LEAD VACUUM PUMP CONTINUES TO MEET THE DEMAND, THE PLC WILL TURN OFF THE LEAD VACUUM PUMP WHEN THE PUMP MAX RUN TIMER EXPIRES. WHEN THE SYSTEM VACUUM FALLS AGAIN, THE PLC WILL SEQUENCE THE LEAD ROLE TO THE NEXT PUMP AND IT WILL START. IF DURING OPERATION THE SYSTEM VACUUM LEVEL CONTINUES TO FALL, THE NEXT PUMP IN SEQUENCE WILL TURN ON, AND SO FORTH UNTIL THE NUMBER OF PUMPS RUNNING CAN CARRY THE LOAD. IF THE LAST AVAILABLE PUMP IS ACTIVATED, THE PLC WILL TURN ON THE "LAG ALARM."

LOCAL OPERATION (EMERGENCY/TROUBLESHOOTING MODE ONLY):

WITH THE SWITCH IN THE LOCAL POSITION THE PUMPS WILL RUN ACCORDING TO THEIR OWN VACUUM SETPOINT. ALL PUMPS WILL BE SET TO THE SAME SETPOINT (22"HG DEFAULT) FOR REMOTE OPERATION. BEFORE SWITCHING TO LOCAL MODE, CHANGE THE SETPOINT ON EACH PUMP TO BE STAGGERED BY 1"HG – PUMP #1 AT 22"HG, PUMP #2 AT 21"HG, PUMP #3 AT 20"HG, PUMP #4 AT 19"HG.

PLC FAULT:

IF A PLC FAULT, TRANSDUCER FAULT, OR CENTRAL CONTROLLER POWER FAILURE OCCURS, THE SYSTEM WILL AUTOMATICALLY SWITCH TO LOCAL MODE. PUMPS 1–3 WILL RUN ACCORDING TO THEIR OWN VACUUM SETPOINT. BECAUSE ALL PUMPS WILL BE SET TO THE SAME SETPOINT, THE VSDS WILL BE CONSTANTLY ADJUSTING AS THEY COMPETE TO SUPPLY DEMAND. TO CORRECT THIS ISSUE, ADJUST THE LOCAL SETPOINTS AS DESCRIBED IN LOCAL OPERATION ABOVE. A PLC FAULT WILL TRIGGER THE SHUTDOWN ALARM DESCRIBED BELOW.

SHUTDOWN ALARM:

WHEN THE PLC SIGNALS A PUMP TO RUN, THE PUMP WILL CLOSE A SWITCH TO TELL THE PLC THAT IT IS RUNNING. IF THE PLC DOES NOT RECEIVE THIS FEEDBACK, IT WILL SET THAT PUMP AS UNAVAILABLE AND TRIGGER A SHUTDOWN ALARM. PUSH THE ALARM BUTTON TO RESET.

IF A PLC FAULT OCCURS, THE SHUTDOWN ALARM WILL ALSO TRIGGER.

LAG ALARM:

IF THE LAST AVAILABLE PUMP IS ACTIVATED, THE PLC WILL TURN ON THE LAG ALARM. THE NUMBER OF AVAILABLE PUMPS IS THE NUMBER OF PUMPS THAT ARE ABLE TO RUN AT ANY GIVEN TIME. IF THE PLC TRIES TO START A PUMP AND DOES NOT RECEIVE A RUNNING SIGNAL FROM THE PUMP, THE PLC WILL REMOVE THAT PUMP FROM THE COUNT OF AVAILABLE PUMPS. THE LAG ALARM WILL REMAIN ACTIVE UNTIL THE TOTAL NUMBER OF PUMPS RUNNING IS LESS THAN THE TOTAL NUMBER OF AVAILABLE PUMPS, AND THE LAG ALARM BUTTON HAS BEEN PUSHED TO RESET THE ALARM.

IF THE CENTRAL CONTROLLER IS SWITCHED TO LOCAL MODE, THE LAG ALARM WILL ALSO TRIGGER.

SETTINGS CHANGES FOR PUMP:

THE FOLLOWING SETTINGS NEED TO BE ADJUSTED ON EACH PUMP. FOLLOW THE PATH LISTED AND ADJUST THE SETTING AS DESCRIBED BEFORE STARTING THE SYSTEM:

CONTROLS
CONNECTION MODE: HARDWARE IO

MORE –> PREFERENCE –> GENERAL –> UNITS
PRESSURE: SET TO INCH OF MERCURY (inHg). ALSO TURN ON GAUGE PRESSURE.
FLOW: STANDARD CUBIC FEET PER MINUTE (SCFM)
PUMPING SPEED: CUBIC FEET PER MINUTE (CFM)
TEMPERATURE: FAHRENHEIT (F)

MORE –> PREFERENCE –> GENERAL –> DATE AND TIME
CHANGE TIME ZONE. IF REQUIRED, CHANGE DATE AND TIME AS WELL.

MORE –> MODE
DEFAULT PI MODE

SETTINGS –> PRESSURE SETPOINT CONTROL
PRESSURE SETPOINT 1: SEE VACUUM SETPOINT BELOW

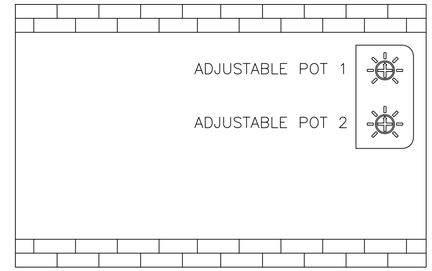
SETTINGS –> ARAVF

ARAVF ACTIVE:	TRUE
ARAVF INFINITE POWER DOWN TIME:	TRUE
ARAVF POWER DOWN TIME:	300 SECONDS
ARAVF RESTART DELAY:	300 SECONDS

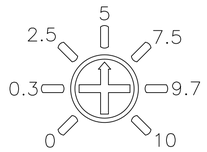
SETTINGS –> SYSTEM SETTINGS
EMERGENCYFORCEDLOCALENABLE: TRUE

SETTINGS –> MULTIFUNCTIONAL DIGITAL OUTPUTS
DOUT_E1 ACTIVEFUNCTIONCODE: 2

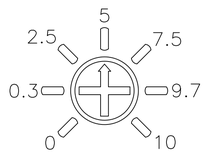
SETTINGS –> MULTIFUNCTIONAL DIGITAL INPUTS
EDIN_E1 ACTIVEFUNCTIONCODE: 1



PLC WITH COVER REMOVED



ADJUSTABLE POT 1



ADJUSTABLE POT 2

PUMP MAX RUN TIMER

RANGE	SETTING
4–24 HRS	7.5

VACUUM SETPOINT

SETPOINT	SETTING
20"HG	0
21"HG	2.5
22"HG	5*
23"HG	7.5
24"HG	10

*POT 2 SET TO 5 AS DEFAULT AT FACTORY.

IF SETPOINT IS CHANGED ON CENTRAL CONTROLLER, SETPOINT MUST ALSO BE CHANGED ON ALL PUMPS TO THE SAME VALUE. NAVIGATE TO CONTROLS AND SELECT PRESSURE SETPOINT TO ADJUST.

DEFAULT VACUUM SETPOINT ("HgV)

ALTITUDE	SETPOINT
0–1000'	22
1001–2000'	21
2001–3000'	20
>3000'	CONSULT FACTORY

Revised:	Date:	Drawn: TAR	Date: 05/17/24
BEACONMED/ES	This drawing and the information contained thereon remain the property of BeaconMedæs and may not be used for other than the purpose for which it is loaned without the expressed written permission from BeaconMedæs Engineering.		Scale: NTS D
Description: DWG WIRING CONTROL MSV DX-QX PLC 120/1/50-60		Part Number: 4107 8587 61	
		DN: HOP240267	Rev: 00
		Sheet 2 of 2	DO NOT SCALE THIS DOCUMENT

SHEET	DESCRIPTION
1	INDEX
2	POWER CIRCUIT
3	CONVERTER CONTROL BOARD
4	SUPPLY CONTROL CIRCUIT
5	COVERTER DO CONNECTOR
6	CONVERTER STO CONNECTOR
7	CONTROLLER 4.0
8	CONTROLLER 4.0 CUSTOMER SIDE
9	INPUT CONNECTIONS X6
10	INPUT CONNECTIONS X15
11	EXTERNAL INPUT CONNECTOR X1
12	FRONT PANEL
13	COMMUNICATION EQUIPMENT
14	OPTIONAL EQUIPMENT
15	LEGEND
16	LEGEND

MAIN POWER SUPPLY

VOLTAGE :	380-460V
FREQ :	50/60Hz 3 PH

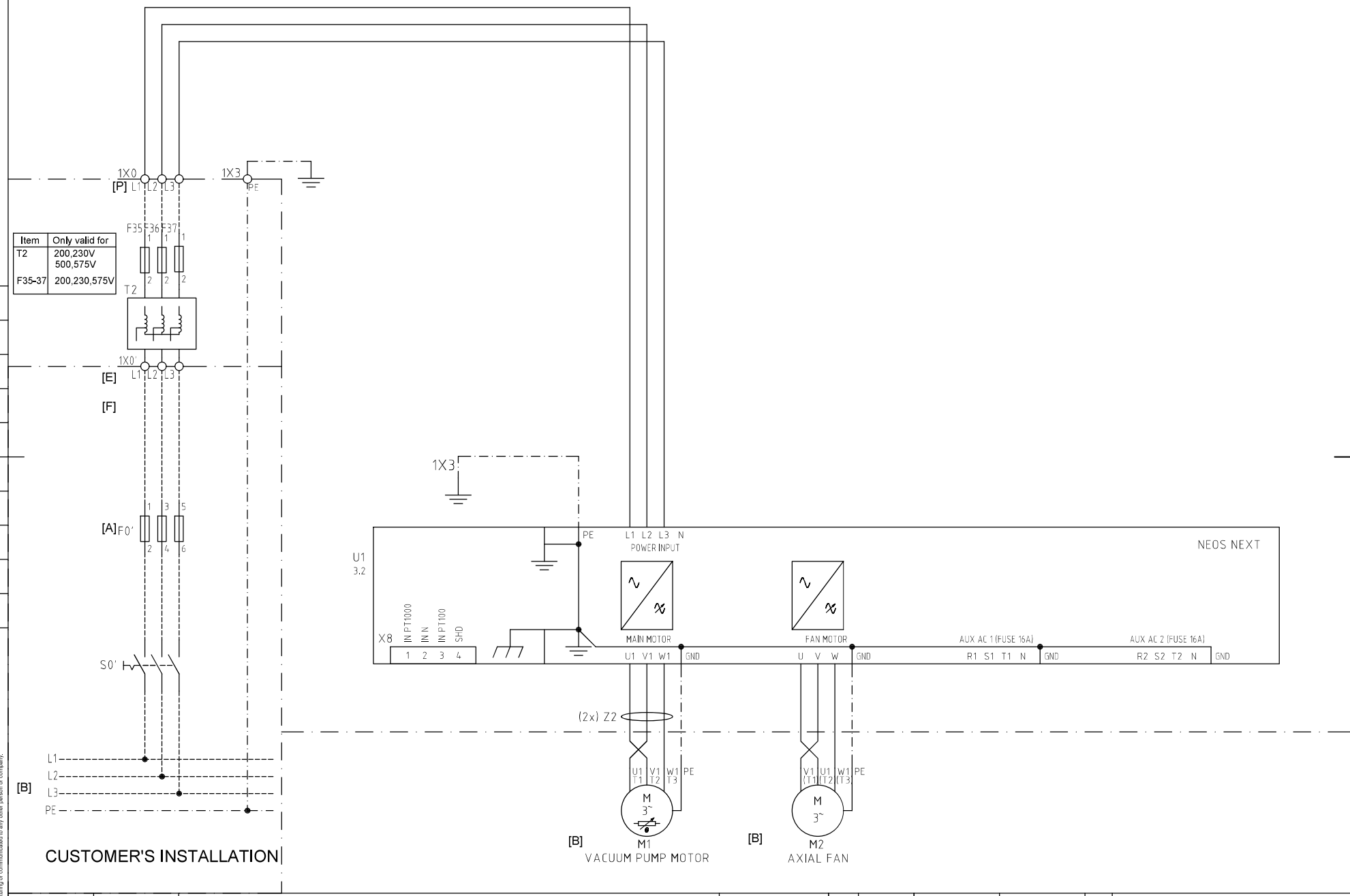
	MAX FUSE: ... A	
	380-460V	200-230-500-575V
IEC	aR	gL/gG
UL	Class T	Class K5
CSA	Class T	HRC Form II

MOTOR DATA

M1	kW	HP	SF : 1.2
M2	0.9 kW	1.2 HP	SF : 1

Note	Posi-tion	Modified from	Date	Intr./Appd.	Parent 3D Model	Ed.Version 3D
00		.	2022-08-02		Not Applicable	Not Applicable

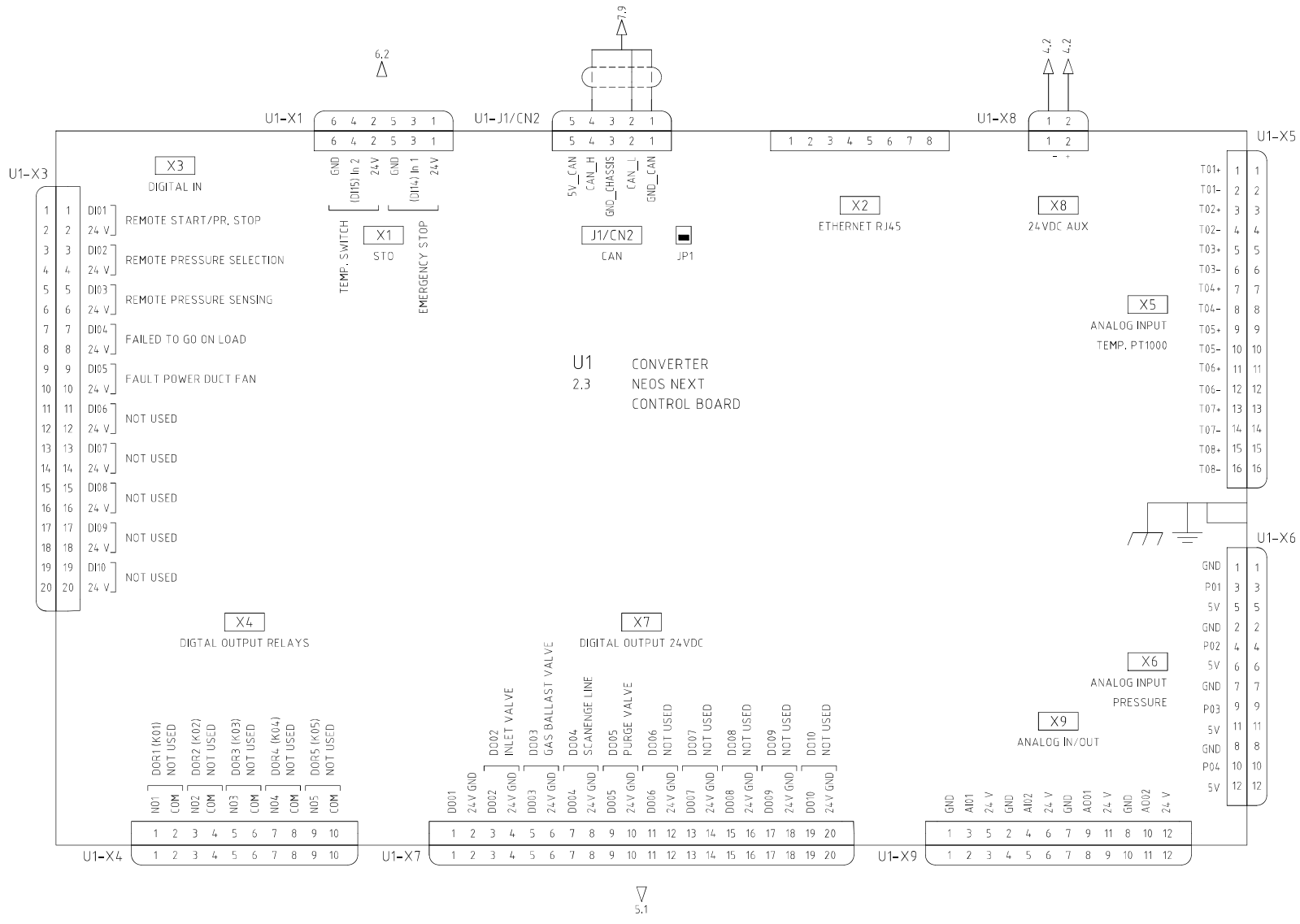
Name	DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE		Confidentiality Class 1102 K/	
Material	Not Applicable			Internal	
Treatment	Not Applicable			ACDE	
	Scale 1:1	Family Not Applicable A3	Compare	Drawing Owner	Transferred from
	Drawn by ATLASCOPCO\a900306753	Not Applicable	Replaces	API	
STATUS	Drawing Format 04.00	Blank wt. N/A Kg	Fini wt. 0 Kg	Designation	Sheet 1 (16)
Approved Internal	Des checked.	Prod checked.	Approved.	Date 6/10/2022 12:30:28	9820736368



Item	Only valid for
T2	200,230V 500,575V
F35-37	200,230,575V

ACDE	Name	DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE	STATUS	Ed.	Date	Prev. Page 1	Next Page 3	A3	Designation	Sheet 2 (16)
Drawing owner API				Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900637052	Date 2022 12:30:30		9820736368	

CONVERTER CONTROL



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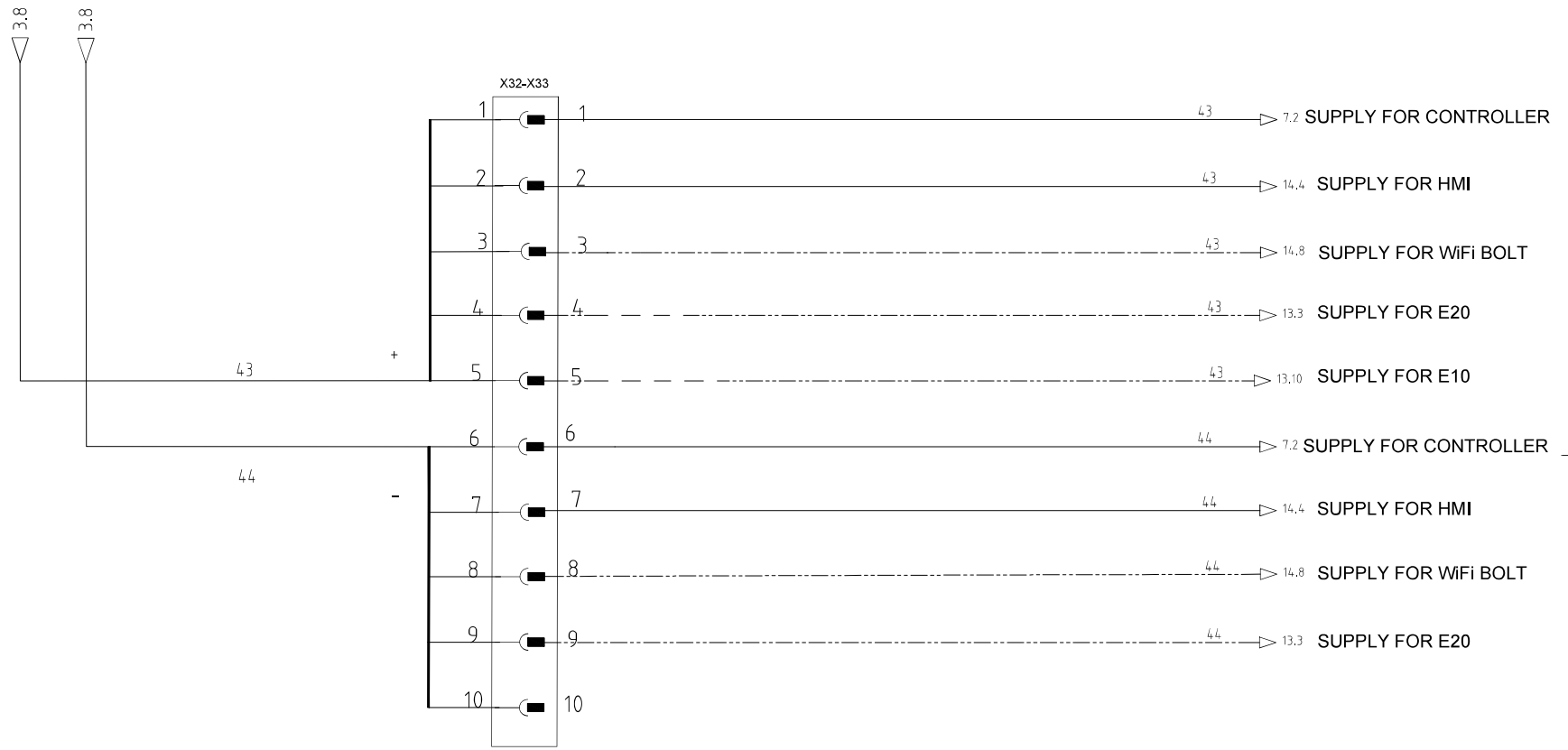

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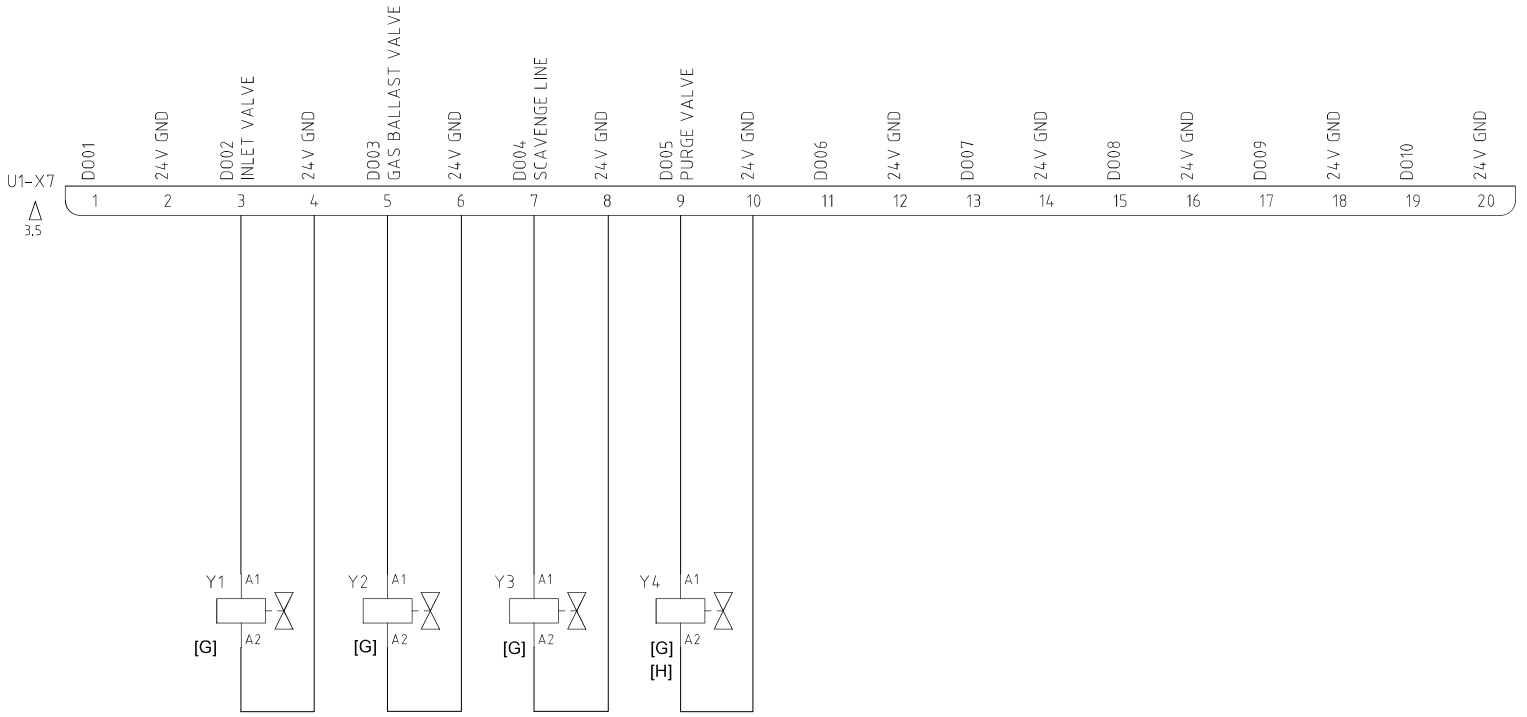
CONVERTER DO CONNECTOR



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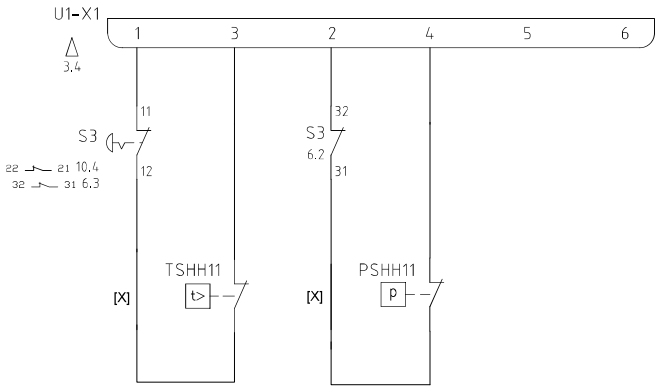

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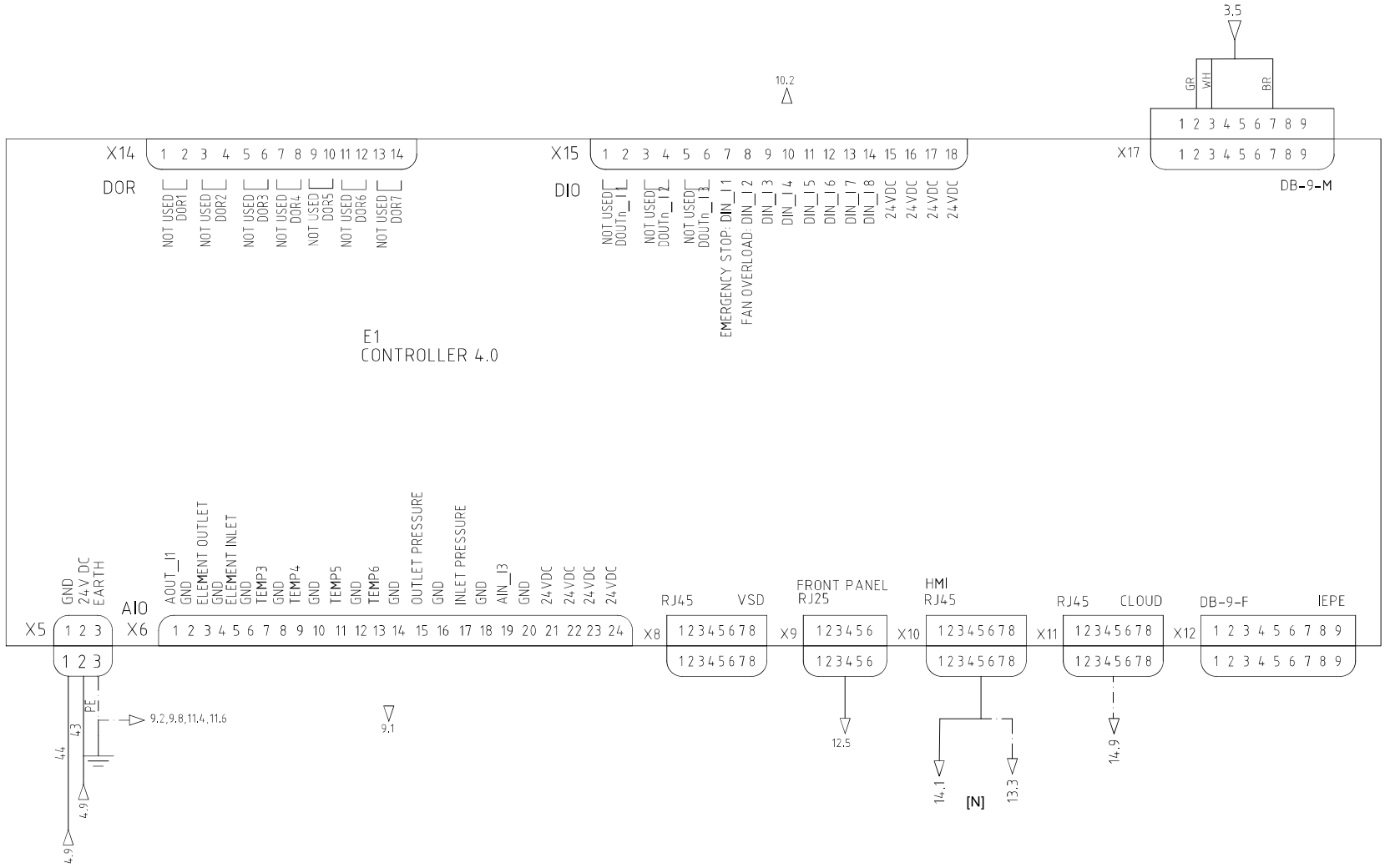
Drawing owner API			Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900[illegible]	Date 8/17/2022 12:30:36		9820736368	

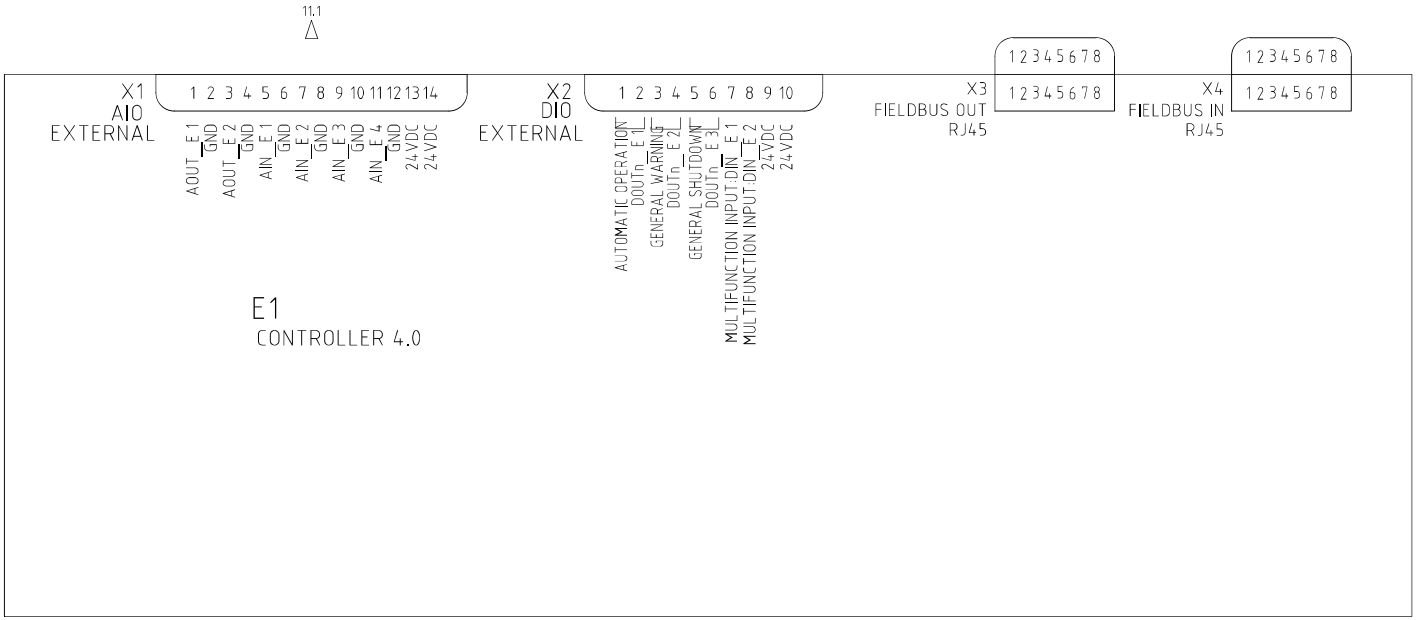
CONTROLLER FRONTSIDE



[N] In case of the Cellular option, connection to the Ethernet switch (ref. 13.3) to be considered.

ACDE	Name	DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE	STATUS	Ed.	Date	Prev. Page 6	Next Page 8	A3	Designation	Sheet 7 (16)
Drawing owner API				Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900[illegible]	Date 8/17/2022 12:30:38		9820736368	

CONTROLLER BACKSIDE



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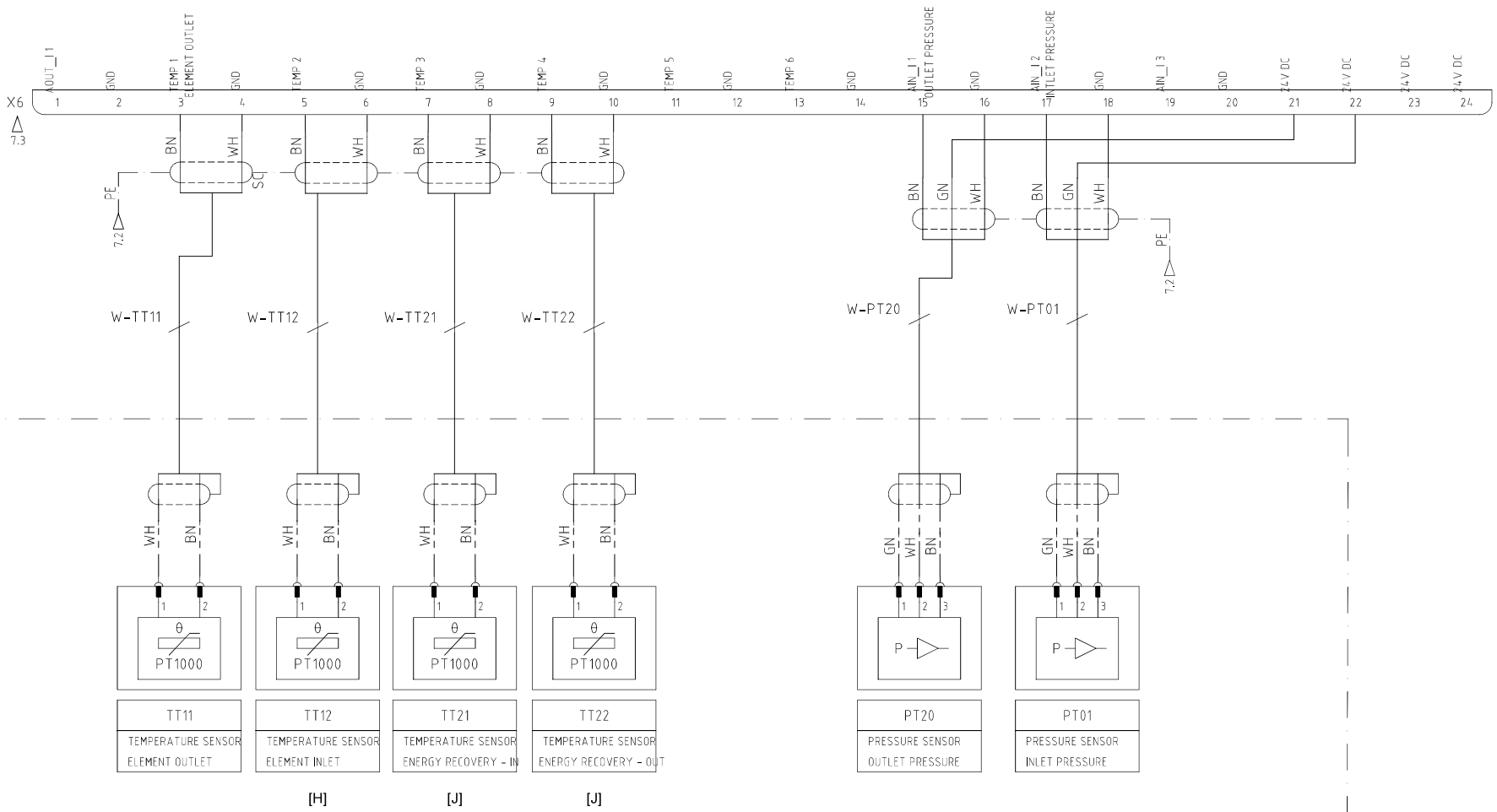
INPUT CONNECTIONS X6



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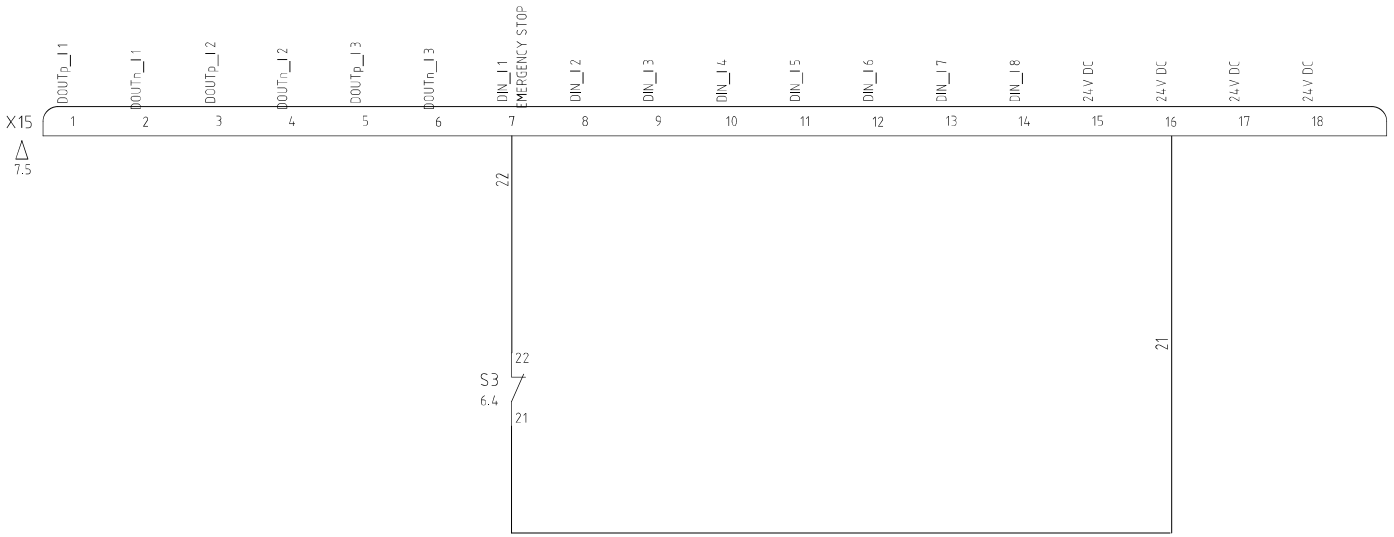

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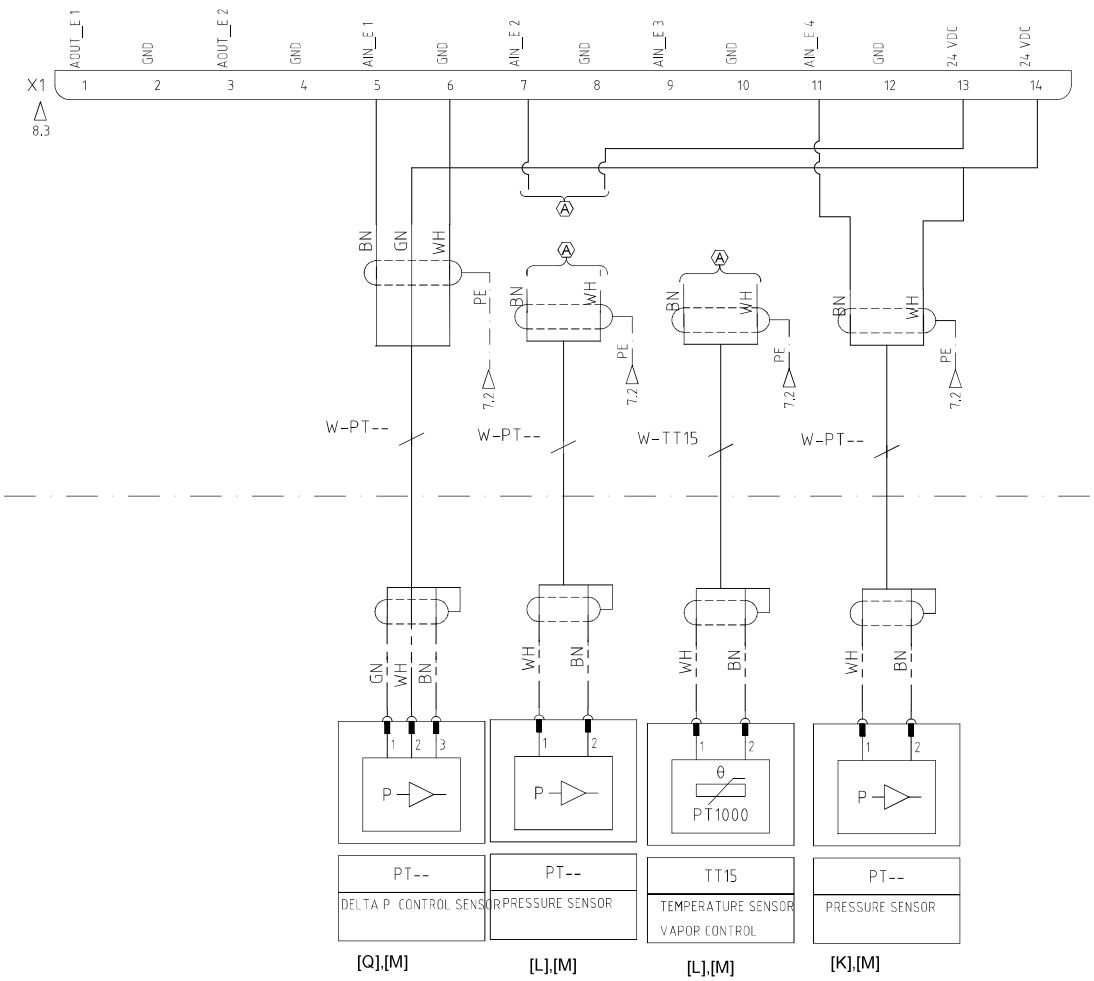
EXTERNAL INPUT CONNECTIONS X1



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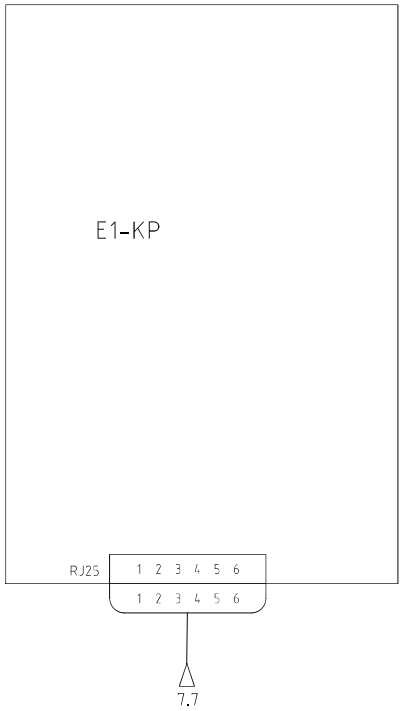
Drawing owner API				Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900[illegible]	Date 2022 12:30:45		9820736368	

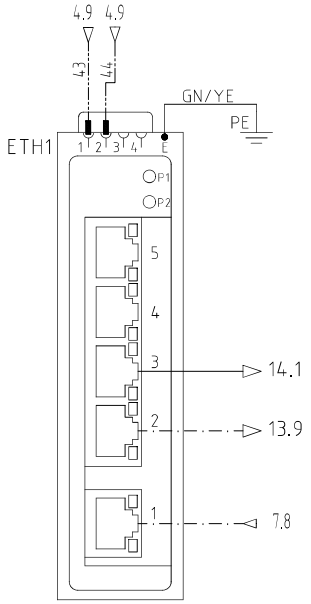
FRONT PANEL



ACDE	Name DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE	STATUS	Ed.	Date	Prev. Page 11	Next Page 13	A3	Designation	Sheet 12 (16)
Drawing owner API			Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900[illegible]	Date 8/17/2022 12:30:47		9820736368	

ETHERNET SWITCH

(OPTIONAL)

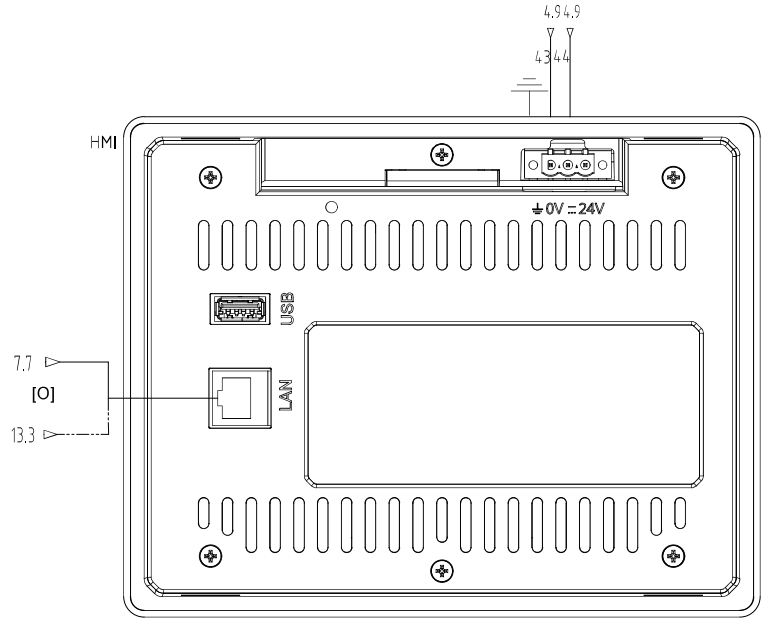


CELLULAR

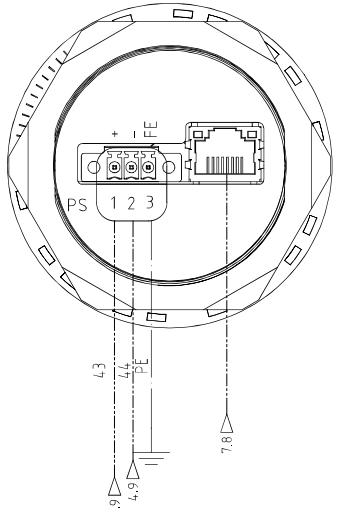
(OPTIONAL)

ACDE	Name DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE	STATUS	Ed.	Date	Prev. Page 12	Next Page 14	A3	Designation	Sheet 13 (16)
Drawing owner API			Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900[illegible]	Date 2022 12:30:49		9820736368	

HMI
(STANDARD)



WIFI BOLT
(OPTIONAL)



[O] In case of the Cellular option, connection for the LAN to be considered from the Ethernet switch (ref. 13.3)

ACDE	Name	DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE	STATUS	Ed.	Date	Prev. Page 13	Next Page 15	A3	Designation	Sheet 14 (16)
Drawing owner API				Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900057...	Date 5/10/2022 12:30:51		9820736368	

LEGEND

LOCATION	TAGNAME	PAGE	DESCRIPTION	FUNCTION
CANOPY	M1	02	VACUUM PUMP MOTOR	
CONTROL PANEL	F35	02	FUSES	CONVERTER PROTECTION
CONTROL PANEL	F36	02	FUSES	CONVERTER PROTECTION
CONTROL PANEL	F37	02	FUSES	CONVERTER PROTECTION
CONTROL PANEL	T2	02	AUTO TRANSFORMER	ONLY 200-230V
CONTROL PANEL	Z2	02	FERRITE RING	RFI REDUCER
CUSTOMER	F0'	02	MAIN PROTECTION	CUSTOMER INSTALLATION
CUSTOMER	S0'	02	MAIN SWITCH	CUSTOMER INSTALLATION
CANOPY	M2	02	AXIAL FAN	
CONTROL PANEL	U1	03	FREQUENCY CONVERTER	
CONTROL PANEL	U1-X7	05	FREQUENCY CONVERTER	DO CONNECTOR
CANOPY	Y1	05	SOLENOID VALVE	MODULATING VALVE 1
CANOPY	Y2	05	SOLENOID VALVE	MODULATING VALVE 2
CANOPY	Y3	05	SOLENOID VALVE	MODULATING VALVE 3
CANOPY	Y4	05	SOLENOID VALVE	MODULATING VALVE 4
CONTROL PANEL	S3	06	EMERGENCY STOP PUSH BUTTON	
CONTROL PANEL	U1-X1	06	FREQUENCY CONVERTER	STO CONNECTOR
CANOPY	PSHH11	06	PRESSURE SWITCH	
CANOPY	TSHH11	06	TEMPERATURE SWITCH	
CONTROL PANEL	E1	07	REGULATOR	CONTROLLER 4.0 FRONTSIDE
CONTROL PANEL	X5	07	CONNECTOR	PSU
CONTROL PANEL	X8	07	CONNECTOR RJ45	VSD
CONTROL PANEL	X9	07	CONNECTOR RJ25	FRONT PANEL
CONTROL PANEL	X10	07	CONNECTOR RJ45	HMI
CONTROL PANEL	X11	07	CONNECTOR RJ45	CLOUD
CONTROL PANEL	X12	07	CONNECTOR DB-9-F	IEPE
CONTROL PANEL	X14	07	CONNECTOR	DOR
CONTROL PANEL	X17	07	CONNECTOR DB-9-M	CAN + MODBUS RS
CONTROL PANEL	E1-E	08	REGULATOR	CONTROLLER 4.0 BACKSIDE
CONTROL PANEL	X1	08	CONNECTOR	AIO EXTERNAL
CONTROL PANEL	X2	08	CONNECTOR	DIO EXTERNAL
CONTROL PANEL	X3	08	CONNECTOR RJ45	FIELDBUS OUT
CONTROL PANEL	X4	08	CONNECTOR RJ45	FIELDBUS IN
CONTROL PANEL	X6	09	CONNECTOR	AIO CONTROLLER 4.0
CANOPY	PT01	09	PRESSURE SENSOR	INLET PRESSURE

LOCATION	TAGNAME	SHEET	DESCRIPTION	FUNCTION
CANOPY	PT20	09	PRESSURE SENSOR	OUTLET PRESSURE
CANOPY	TT11	09	TEMPERATURE SENSOR	ELEMENT OUTLET
CANOPY	TT12	09	TEMPERATURE SENSOR	ELEMENT INLET
CANOPY	TT21	09	TEMPERATURE SENSOR	OPTION- ENERGY RECOVEY
CANOPY	TT22	09	TEMPERATURE SENSOR	OPTION- ENERGY RECOVEY
CONTROL PANEL	X15	10	CONNECTOR	DIO CONTROLLER 4.0
CONTROL PANEL	X1	11	CONNECTOR	EXTERNAL AIO CONTROLLER 4.0
TBA	PT--	11	PRESSURE SENSOR	SEE NOTE [L] & [M]
CANOPY	PT30	11	PRESSURE SENSOR	OPTION- HIGH ACCURACY
CANOPY	TT15	11	TEMPERATURE SENSOR	OPTION- VCA
CONTROL PANEL	E1-KP	12	KEYPAD	CONTROLLER 4.0
CONTROL PANEL	E20	13	ETHERNET SWITCH	
CONTROL PANEL	E10	13	CELLULAR GATEWAY	
CONTROL PANEL	HMI	14	HMI	
CANOPY	WIFI	14	WIFI BOLT	

	ACDE	Name	DIAGRAM SERVICE	V142 NEOS NEXT VACUUM CUBICLE	STATUS	Ed.	Date	Prev. Page 14	Next Page 16	A3	Designation
	Drawing owner API				Approved Internal	00	2022-08-02	Drawn by ATLASCOPCO\a900[illegible]	Date [illegible]2022 12:30:53		9820736368

NOTES :

[A] Caution!
- Always double check size of installed fuses versus calculated cable size
- When required, reduce fuse size or enlarge cable size

[B] Power supply to be connected for :
1. CLOCKwise rotation of fanmotor
2. COUNTER CLOCKwise rotation of compr. motor, rotation to be observed while facing the drive end shaft of the motors

[E] Tightening torque:

Component	Reference	Connection Type	Torque Min-Max (Nm)	Unit
Feeder Terminal	1X0	Terminal Screw (M8)	6-12	GHS1402-2002 VSD
Freq. Converter(main supply input)	U1	M8 nut	9 (max)	GHS1402-2002 VSD
Freq. Converter(main inverter terminal)	U1	M8 bolt	9 (max)	GHS1402-2002 VSD
Service switch	SS	Terminal Screw (M3.5)	1,7	GHS1402-2002 VSD

[F] For field wiring : use copper 75°C wire only

[G] F.P.C Field provided components

[H] Applicable for Humid version only.

[I] Terminals are used for optional equipment and will always have a voltage over them

[J] Only for Energy Recovery Option

[K] Only for any one of the following options:
- High Accuracy Pressure sensor Option
- Vapor Control Algorithm (VCA) option
- Analog speed set point
- Analog pressure set point

[L] Only for any of the following options-
- Remote pressure sensor option
- Booster control option
- Vapor Control Algorithm (VCA) temperature sensor

[M] See all option incompatibilities in below table. Table contains additional incompatibilities from control perspective (marked with *) as well.

	Analog speed control	Analog setpoint control	Energy recovery	VCA	Accurate pressure sensor	Remote pressure sensor	deltaP control	Booster Control std
Analog speed control*		X		X	X		X	X
Analog setpoint control*	X			X	X		X	X
Energy recovery				X				
VCA	X	X	X		X	X	X	X
Accurate pressure sensor	X	X		X			X	X
Remote pressure sensor				X			X	X
deltaP control	X	X		X	X	X		
Booster Control std	X	X		X	X	X		

'X' marks that the option are incompatible with each other.

[N] In case of the Cellular option, connection to the Ethernet switch (ref. 13.3) to be considered.

[O] In case of the Cellular option, connection for the LAN to be considered from the Ethernet switch (ref. 13.3)

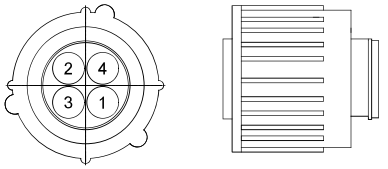
[P] Feeder terminals to be considered only in case of Booster option.

[Q] Only for delta P control option

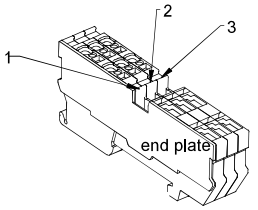
Class Marking Circuits less than 30 Vrms				
Component	Reference	Torque (Nm)	Class 1 Control Circuit	Class 2 Control Circuit
Connector	X6	-	x	
Connector	X15	-	x	

Pin configurations

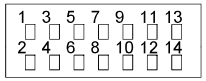
Pressure transducer
1 : Supply V+
2 : Ground
3 : Signal
4 : Sealed with dummy



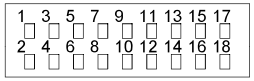
Marking of connectors and terminals
Terminal #1 = Terminal with end plate



X14, X1



X15



X6