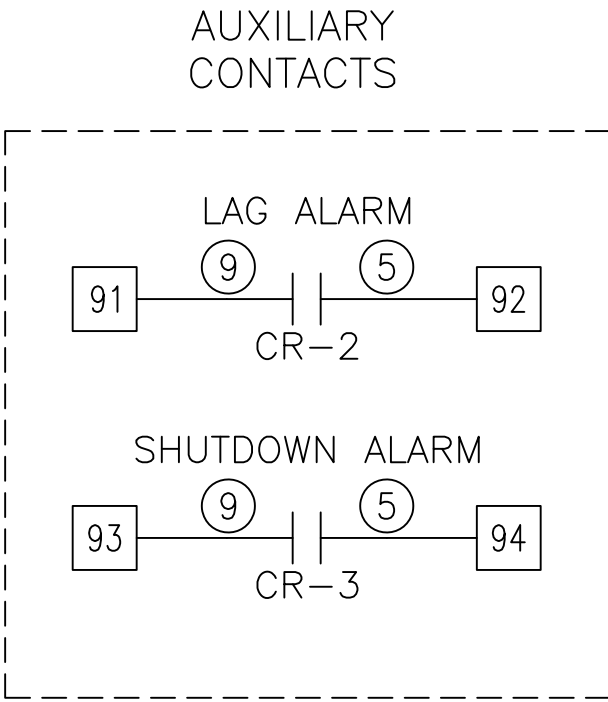
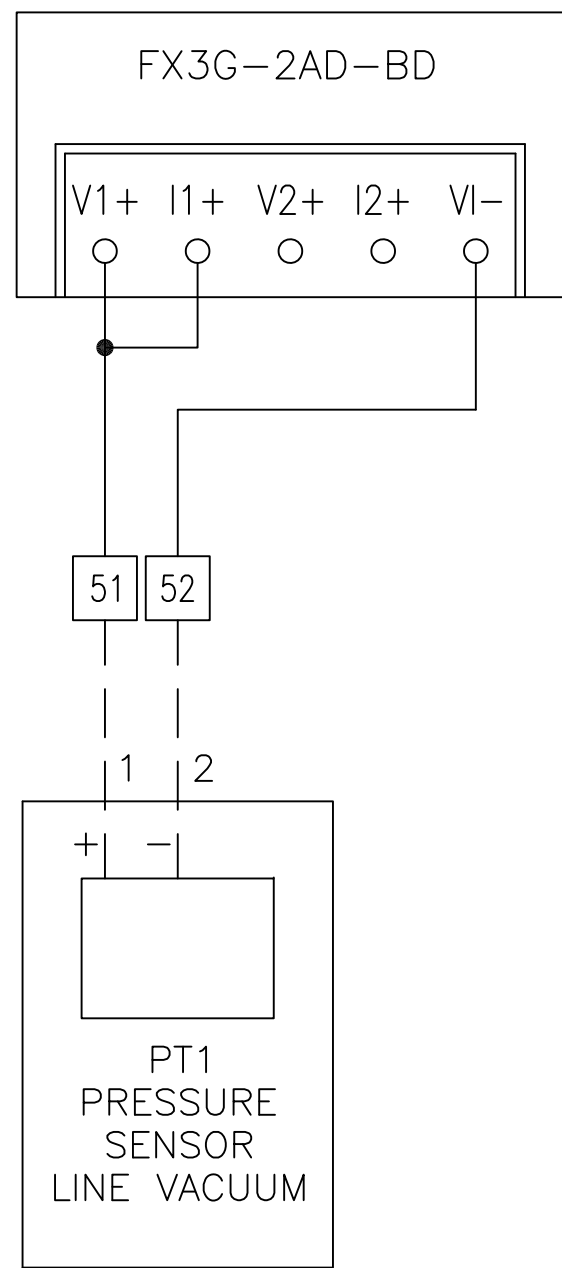
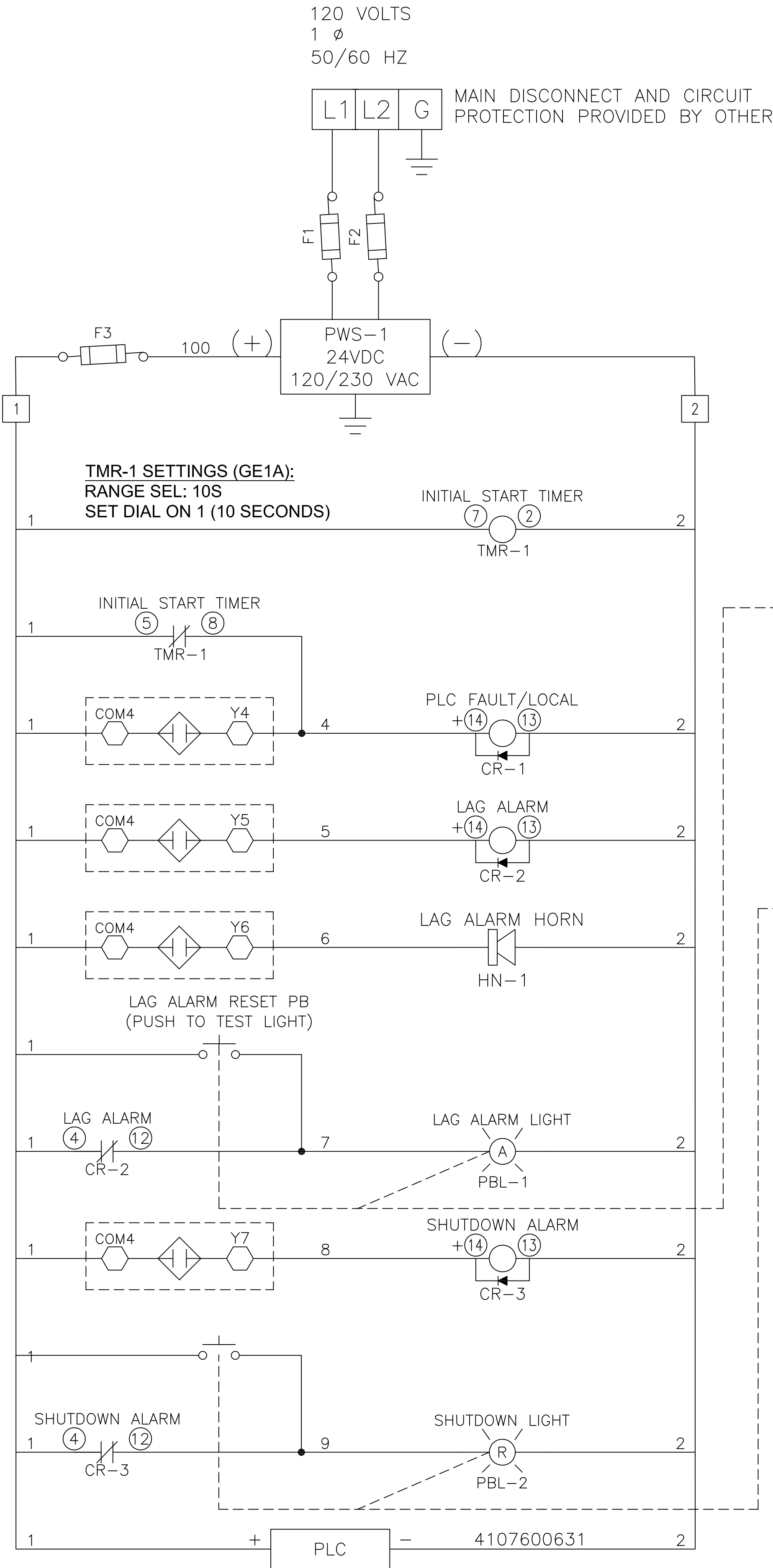
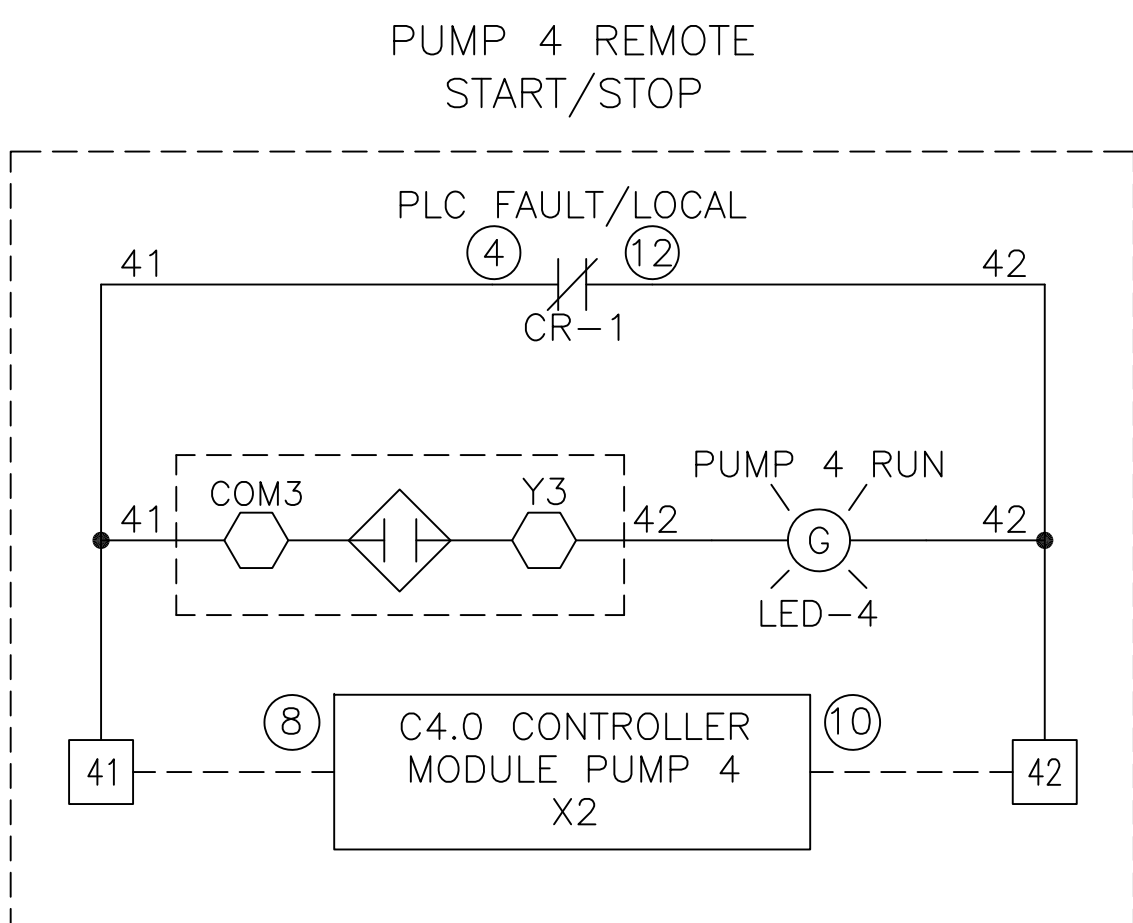
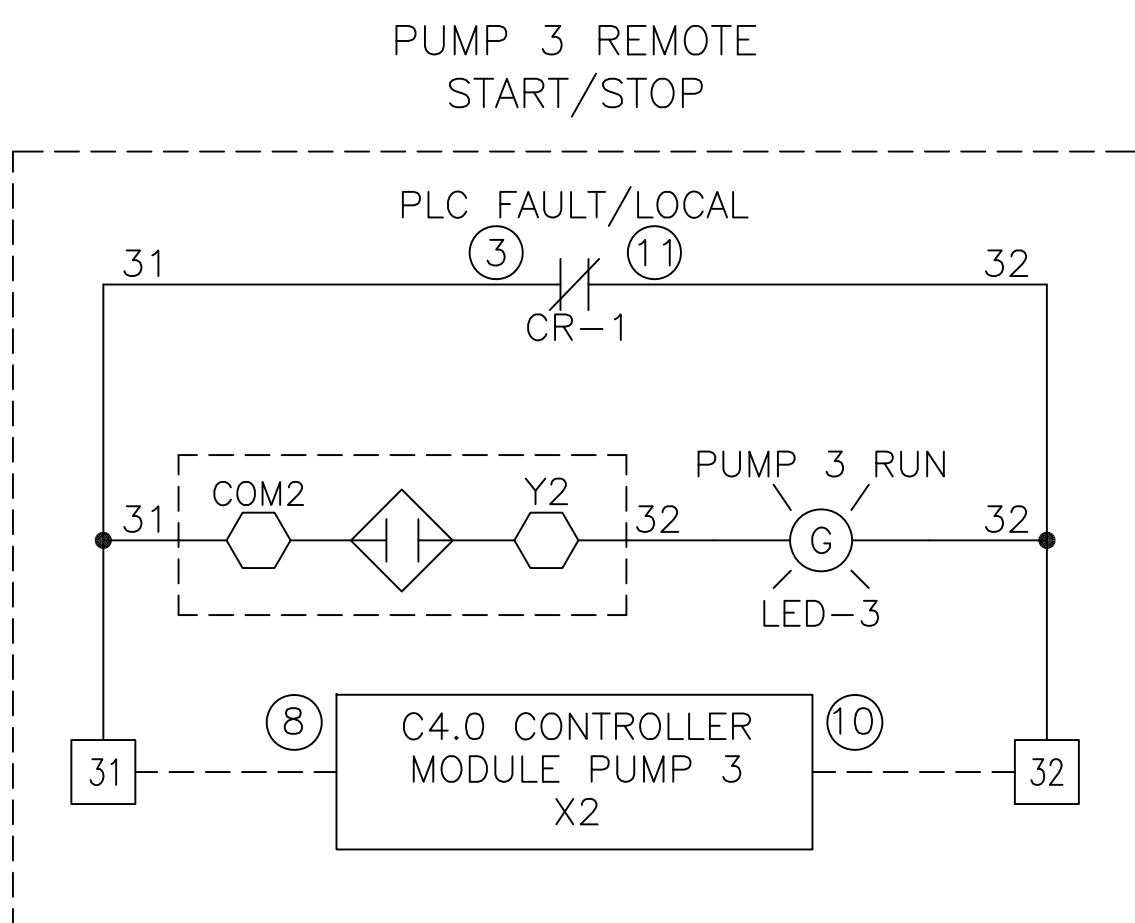
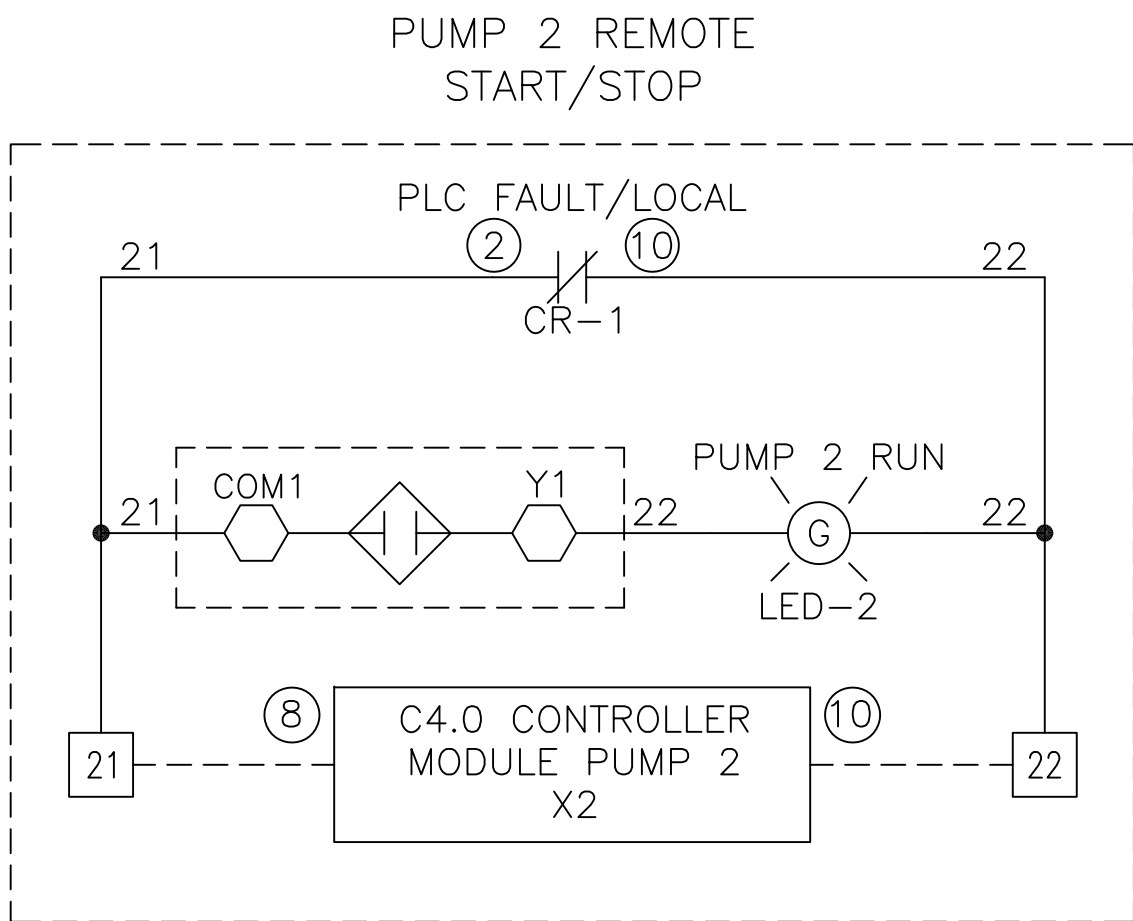
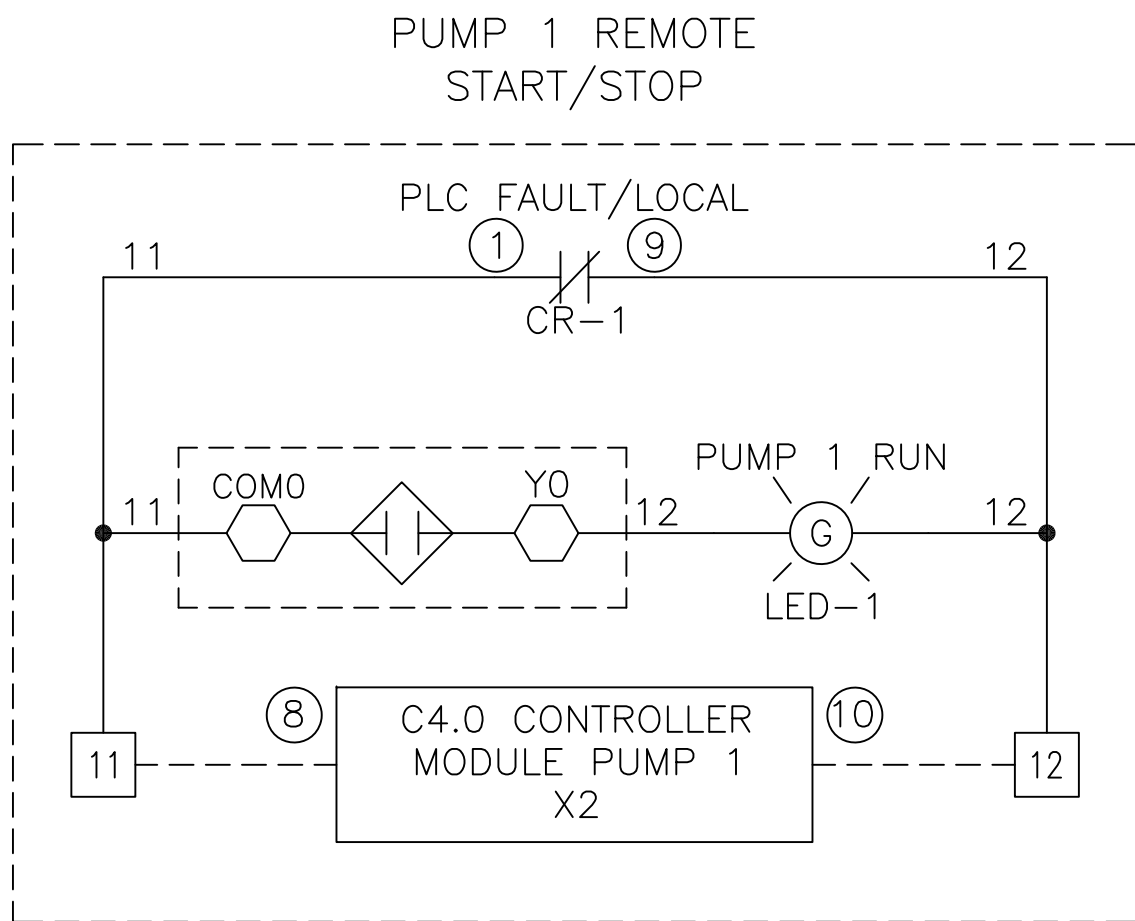


Notes:

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."

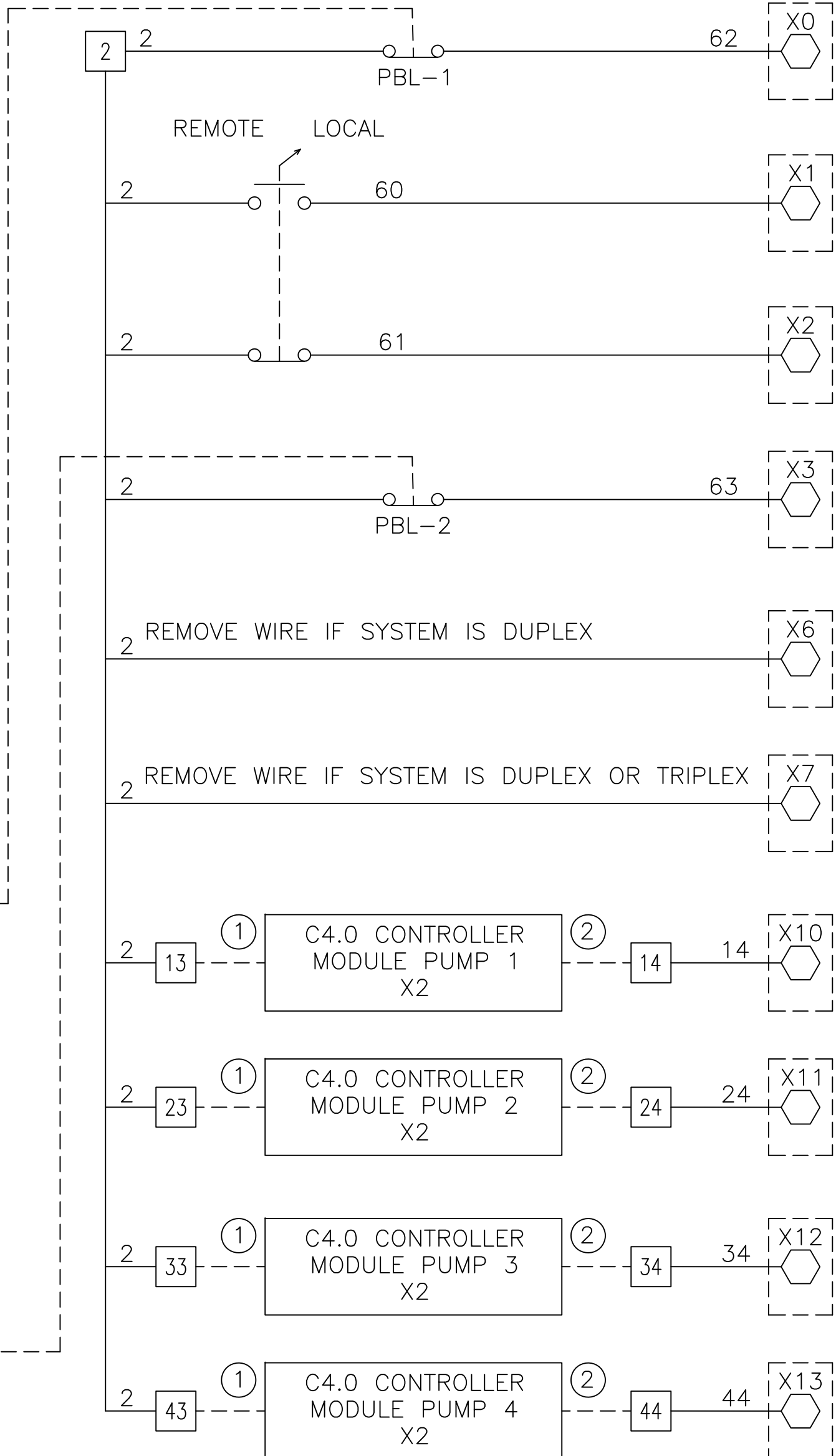
AUX CONTACTS ARE RATED
10A @ 120VAC UNLESS
OTHERWISE NOTED.

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



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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.

DEFAULT VACUUM SETPOINT ("HgV)

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

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

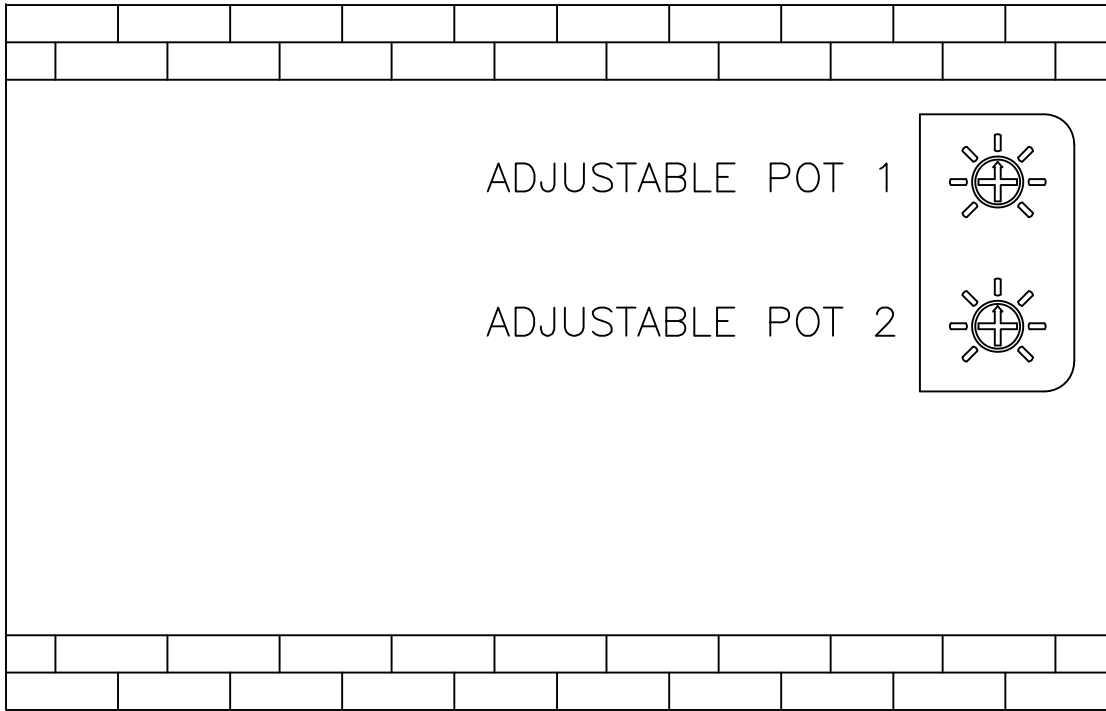
EMERGENCYFORCEDLOCALENABLE: TRUE

SETTINGS -> MULTIFUNCTIONAL DIGITAL OUTPUTS

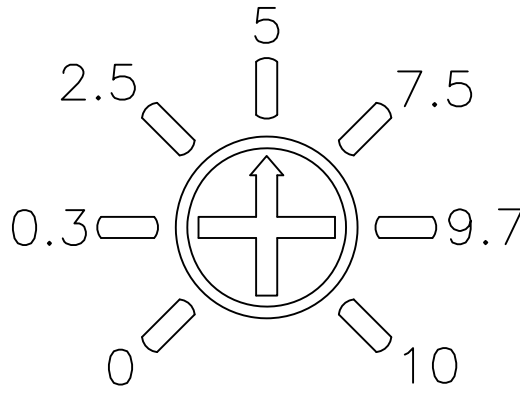
DOUT_E1 ACTIVEFUNCTIONCODE: 2

SETTINGS -> MULTIFUNCTIONAL DIGITAL INPUTS

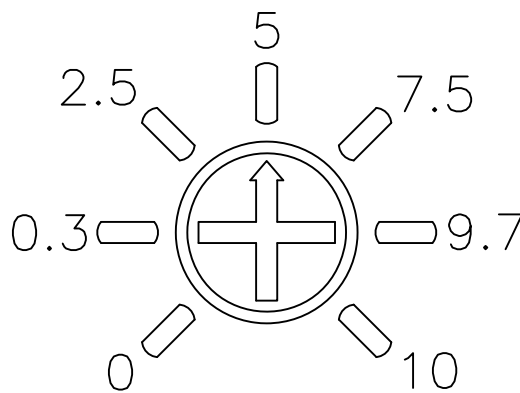
EDIN_E1 ACTIVEFUNCTIONCODE: 1



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.

Revised:	Date:	Drawn: TAR	Date: 05/17/24
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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 MAIN MOTOR
3	POWER CIRCUIT FAN MOTOR
4	SUPPLY CONTROL CIRCUIT
5	CONTROL CIRCUIT
6	CONTROL CIRCUIT CONVERTER
7	CONTROLLER FRONT SIDE
8	CONTROLLER CUSTOMER SIDE
9	INPUT CONNECTIONS X6
10	INPUT CONNECTIONS X15
11	EXTERNAL INPUT CONNECTIONS X1
12	HMI & FRONT PANEL
13	OPTIONAL EQUIPMENTS
14	LEGEND
15	NOTES

04

MAIN POWER SUPPLY

VOLTAGE : 380-460V

FREQ : 50/60Hz 3 PH

MAX FUSE [A] IEC ONLY

IEC : Class aR

..... A

MAX FUSE [A] CSA/UL ONLY

CSA : Class T

..... A

UL : Class T

..... A

SETTINGS

Q15

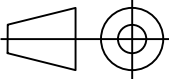
0.6 A

MOTOR DATA

M1	kW	HP	SF : 1.27
M2	kW	HP	SF : 1

- Note A:
- Power Supply Description updated 'Only for HMI' on sheet 4.
 - Bridge added for remote emergency stop and corresponding note 'X' added.
 - E1: X10 description updated to 'Ethernet Switch'.
 - Remote Start/Stop, Manual Purge and Max. Speed signals removed from E1: X15 connector on internal side.
 - Sensors required for various options shown and corresponding notes added.
 - External side input connector X1 shown for optional sensors.
 - Cellular Gateway and Ethernet Switch tagged E10 and E20 respectively.
 - Port connections identified on Ethernet Switch.
 - Note 'K', 'L' and 'N' added.

All materials supplied are in compliance with the requirements of the List of Prohibited Substance

Name						DIAGRAM SERVICE		V111 WITH C4.0		Confidentiality Class											
Material						Not Applicable								1102 K/ Internal							
Treatment						Not Applicable								ACDE							
		Scale		1:1		Family		Not Applicable		A3		Compare		Drawing Owner API		Transferred from					
		Drawn by		ATLASCOPCO\INE		Drawn by		Not Applicable		Replaces											
		STATUS		Drawing Format		03.00		Blank wt.		N/A		Kg		Finl wt.		0		Kg		Designation	
Approved Internal		Des checked.		Prod checked.		Approved.		Date		22/10/2020 19:59:48		9820726420									

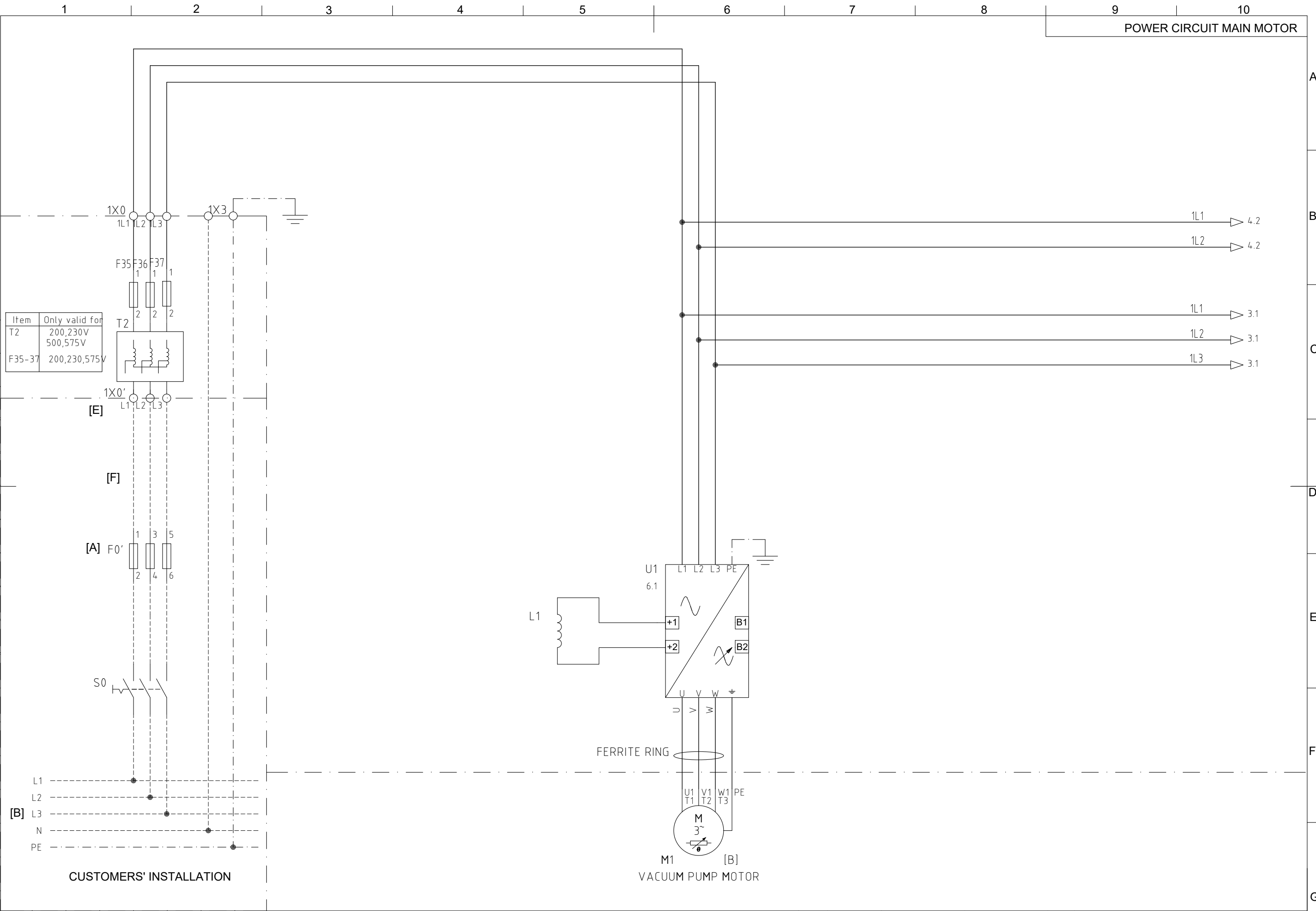
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04		See Note A.	2022-06-27	INE			Not Applicable	Not Applicable
Note	Posi-tion	Modified from	Date	Intr./Appd.		Parent 3D Model	Ed.Version 3D	

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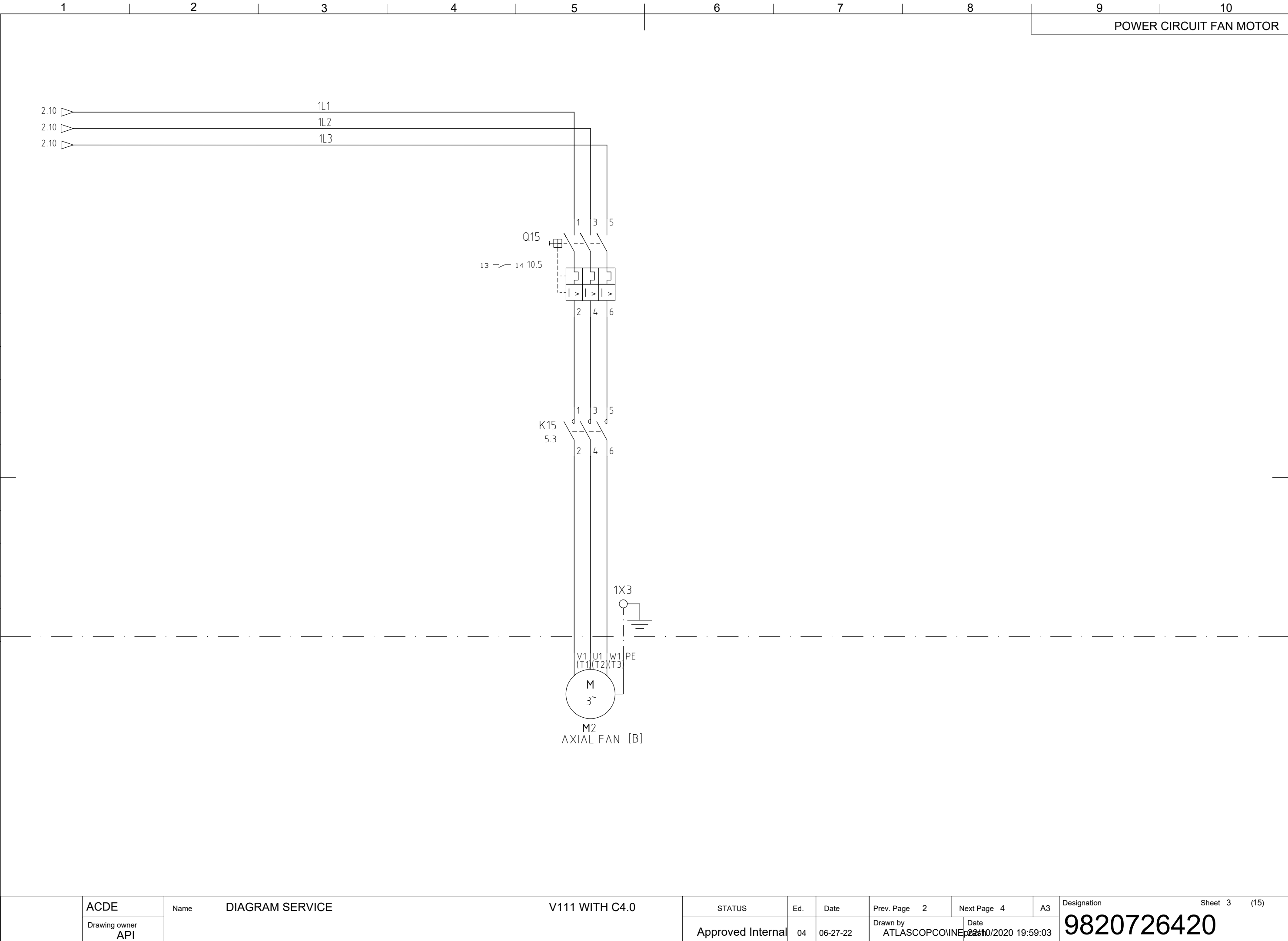
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				Approved Internal	04	06-27-22	Drawn by ATLASCOPCOINE	Date 2020-2020 23:29:27		9820726420	

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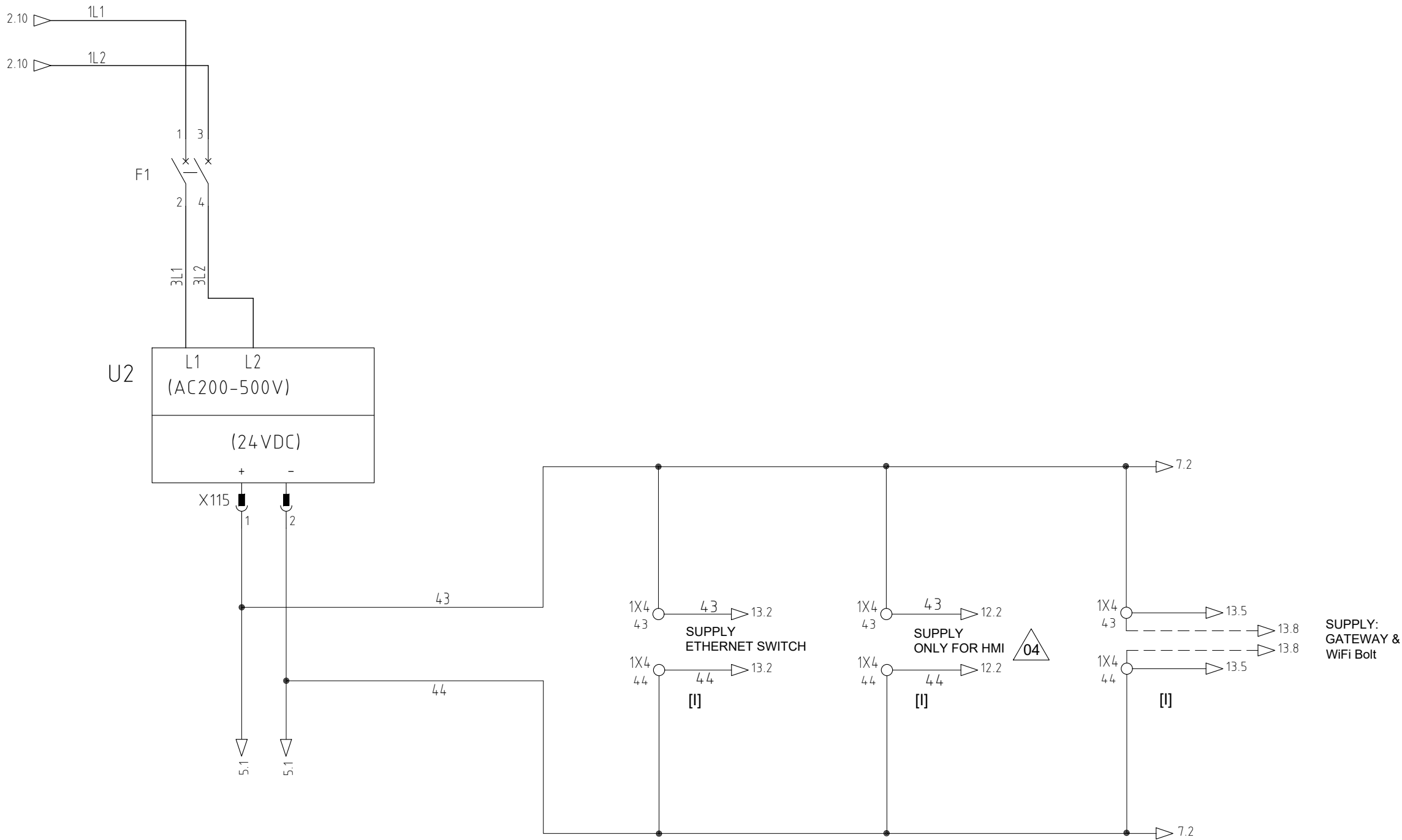
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	Drawing owner API			Approved Internal	04	06-27-22	Drawn by ATLASCOPCO\INEP2211	Date 22/10/2020 19:59:03		9820726420	

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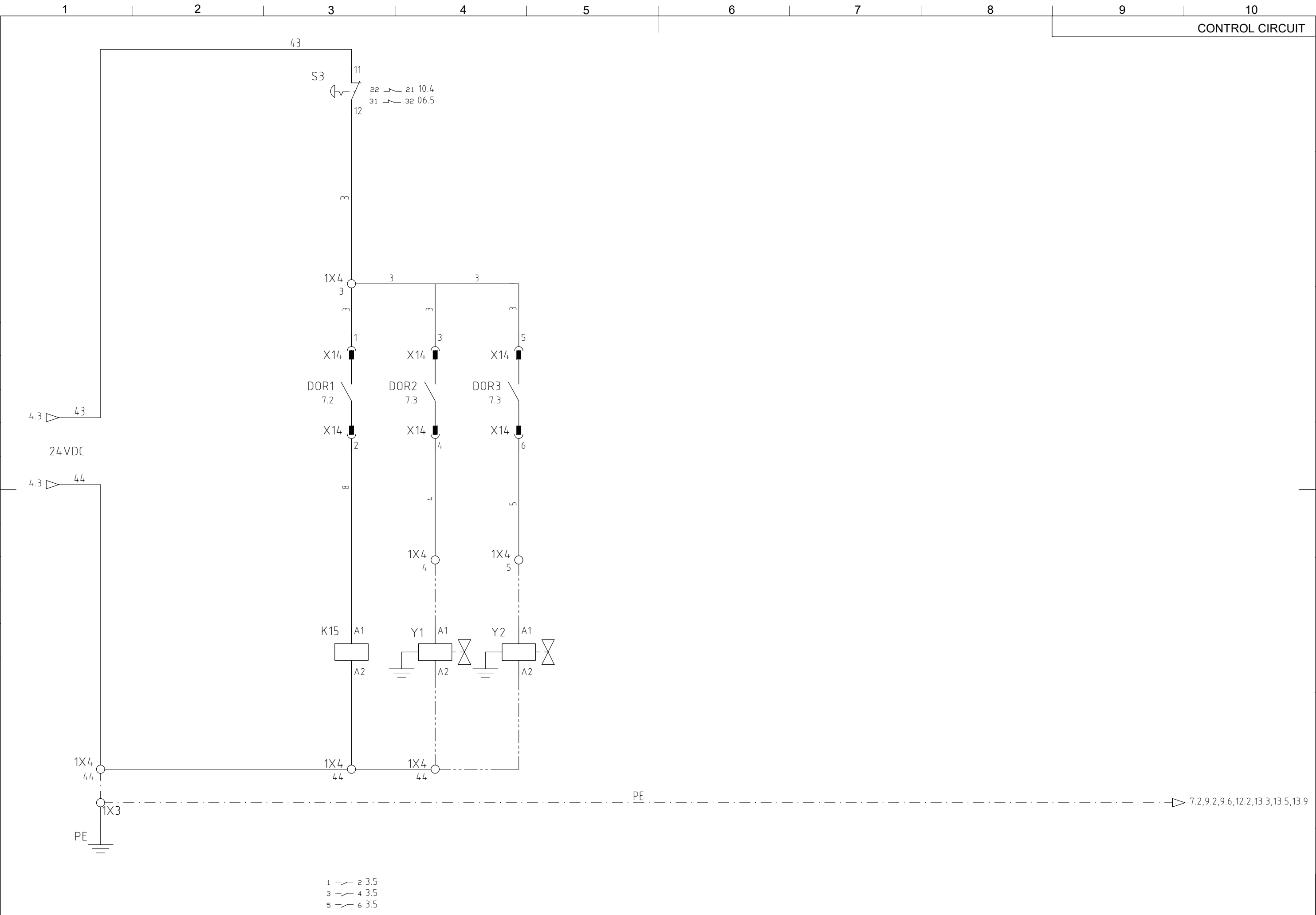


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9820726420

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	Drawing owner API															

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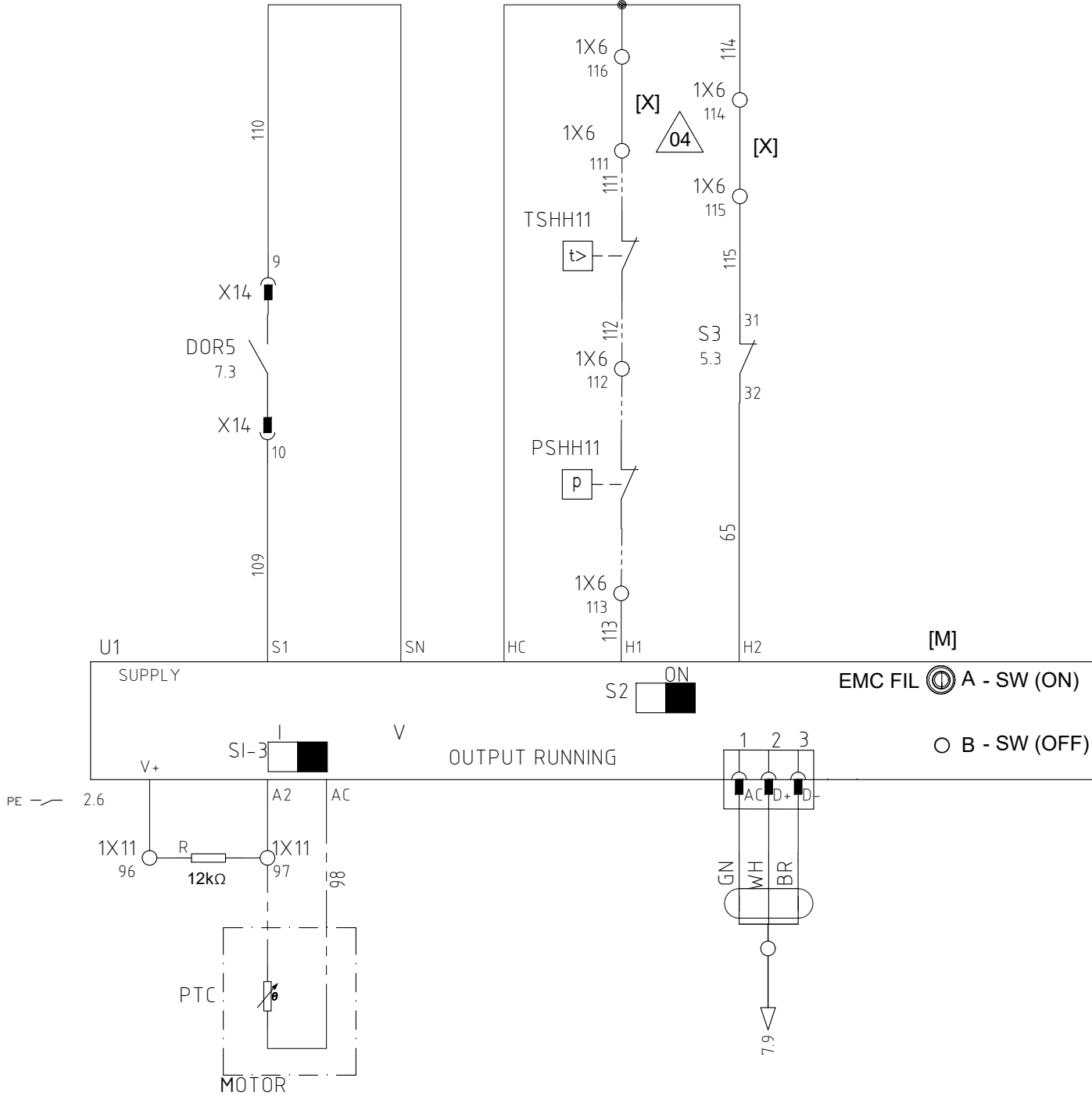
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ATLASCOPCOINER

Date
2020-2020 23:28:30

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CONVERTER CONTROL



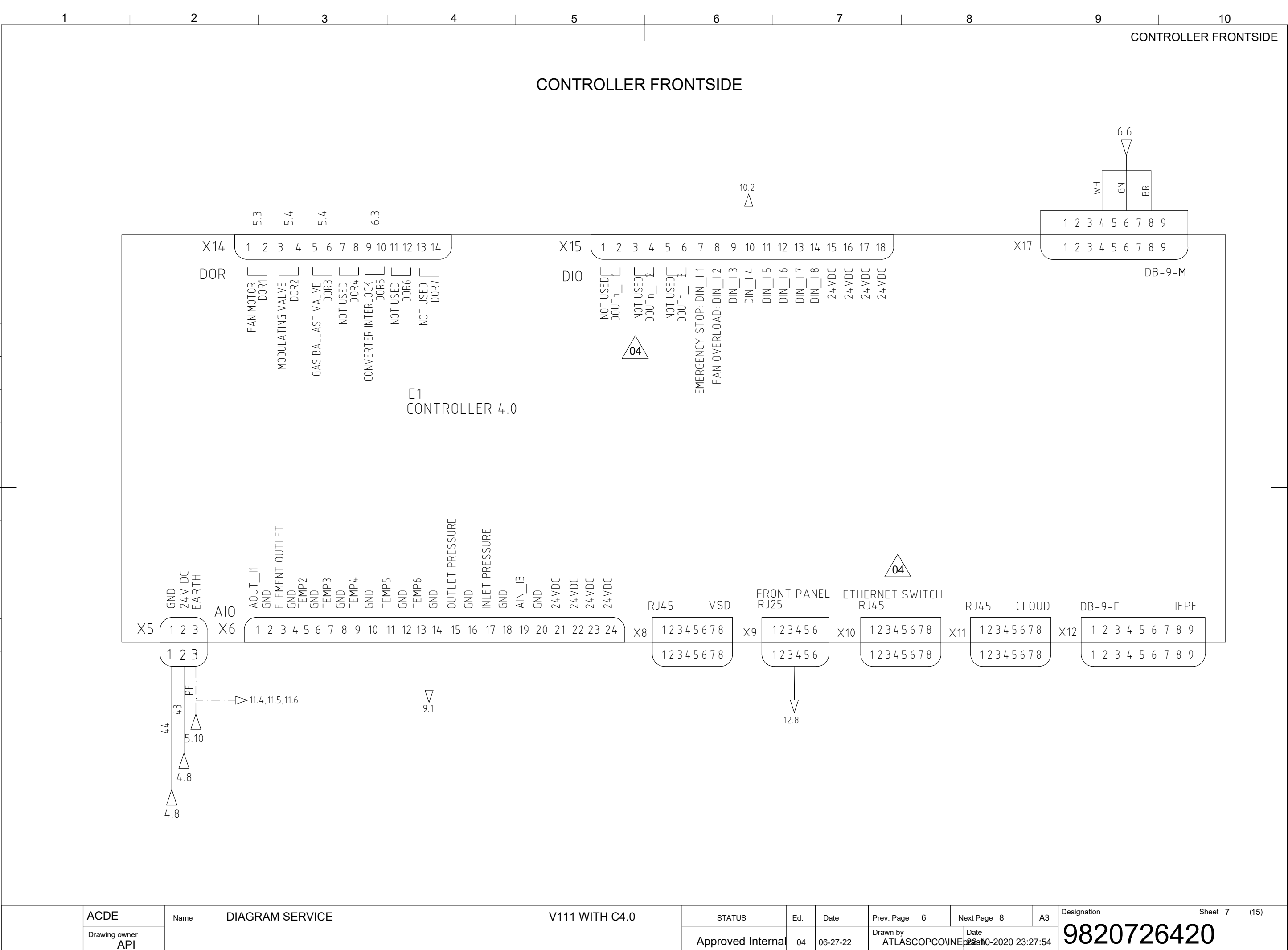
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A3

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9820726420	

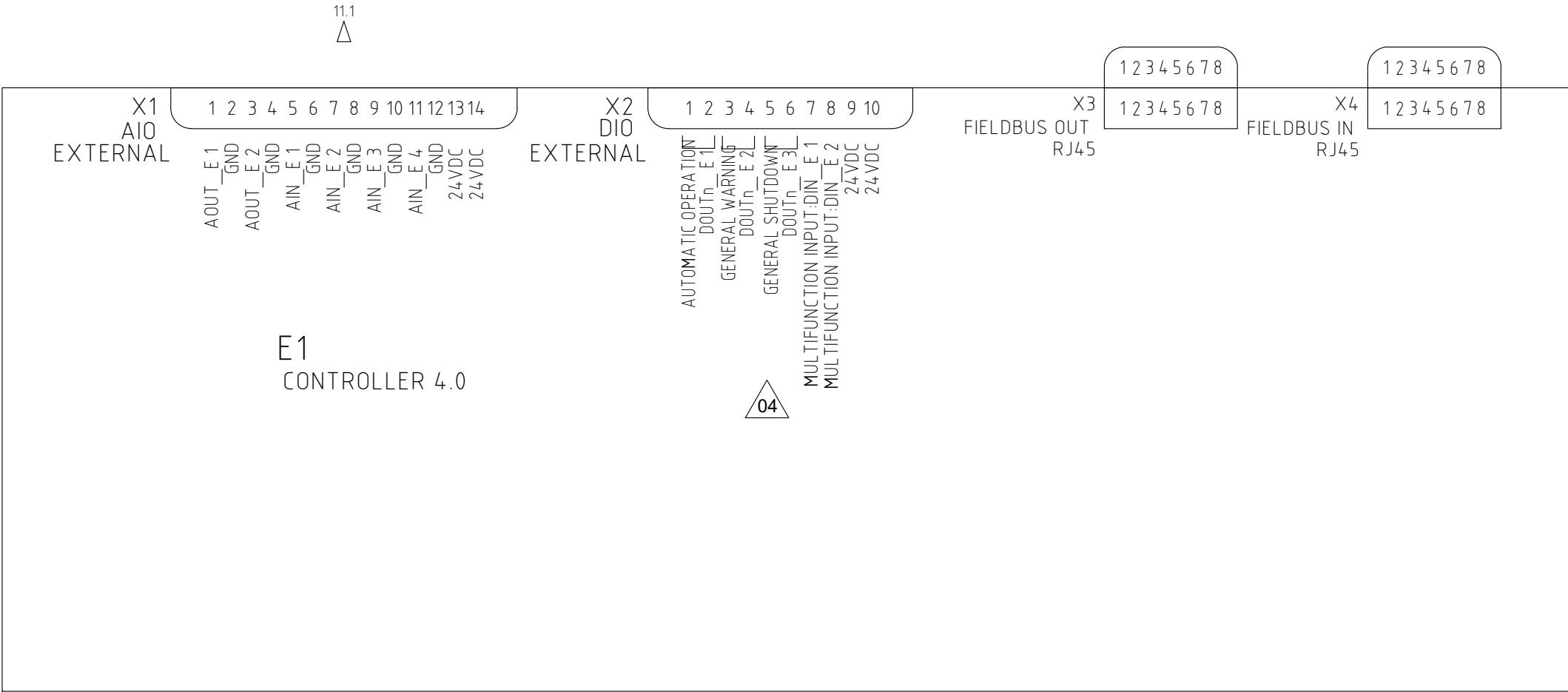
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	Drawing owner API				Approved Internal		04	06-27-22	Drawn by ATLAS COPCO INE		Date 2021-10-20 23:27:39		

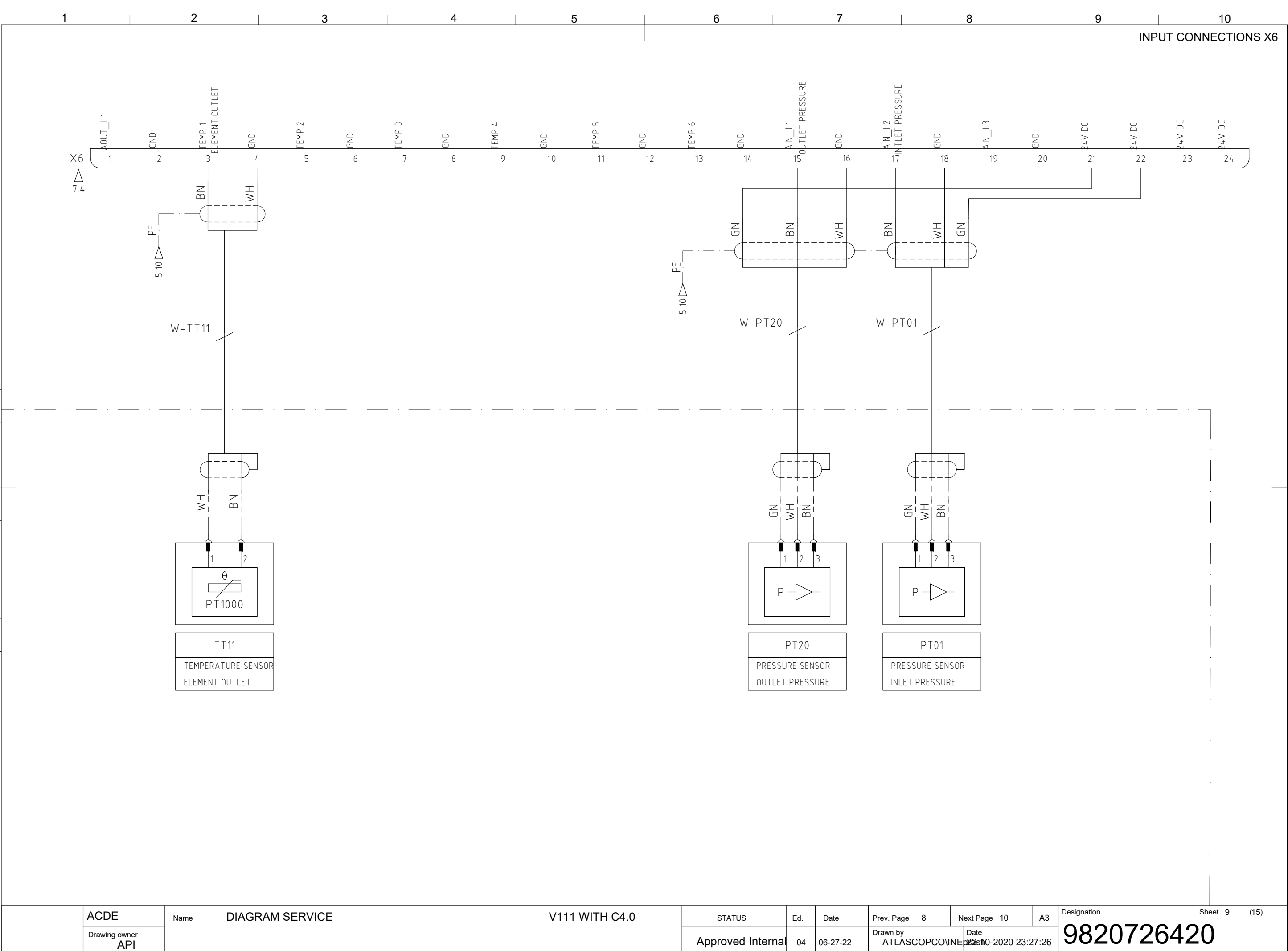
CONTROLLER CUSTOMER SIDE

CONTROLLER CUSTOMER SIDE



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STATUS
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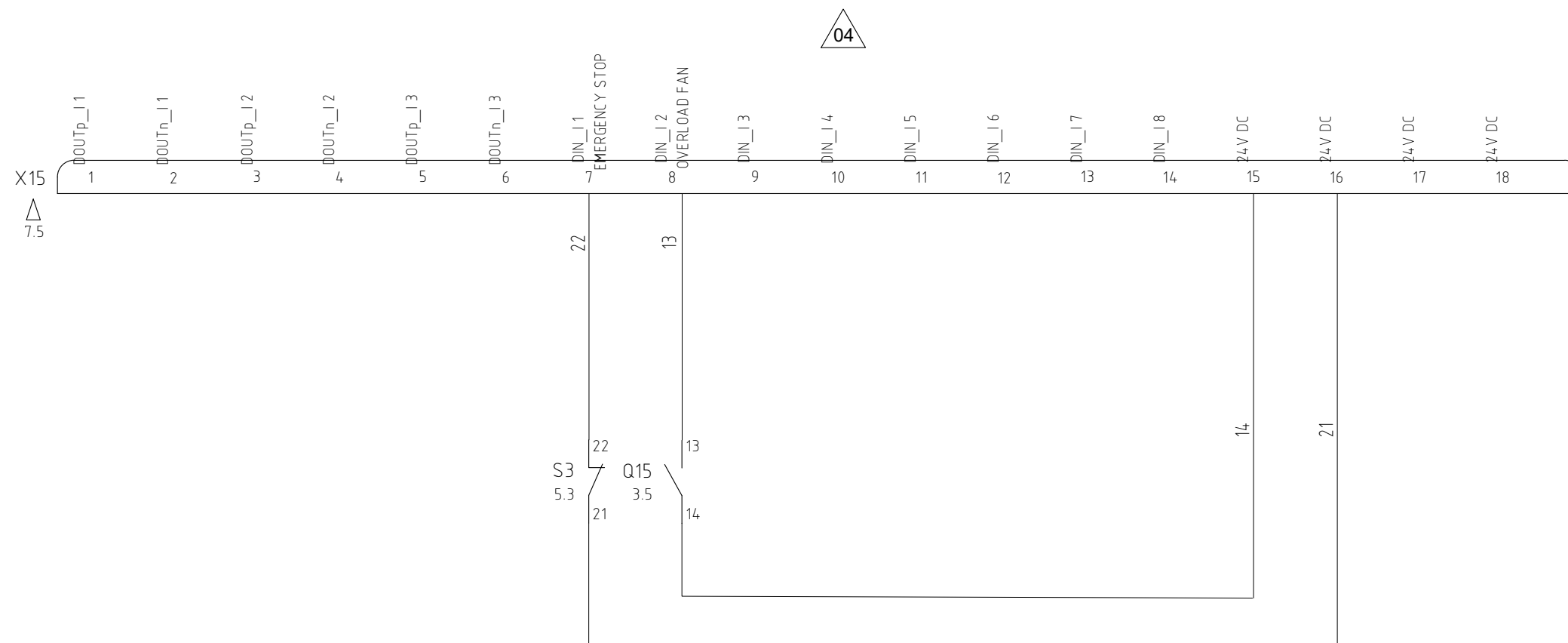
Date
06-27-22

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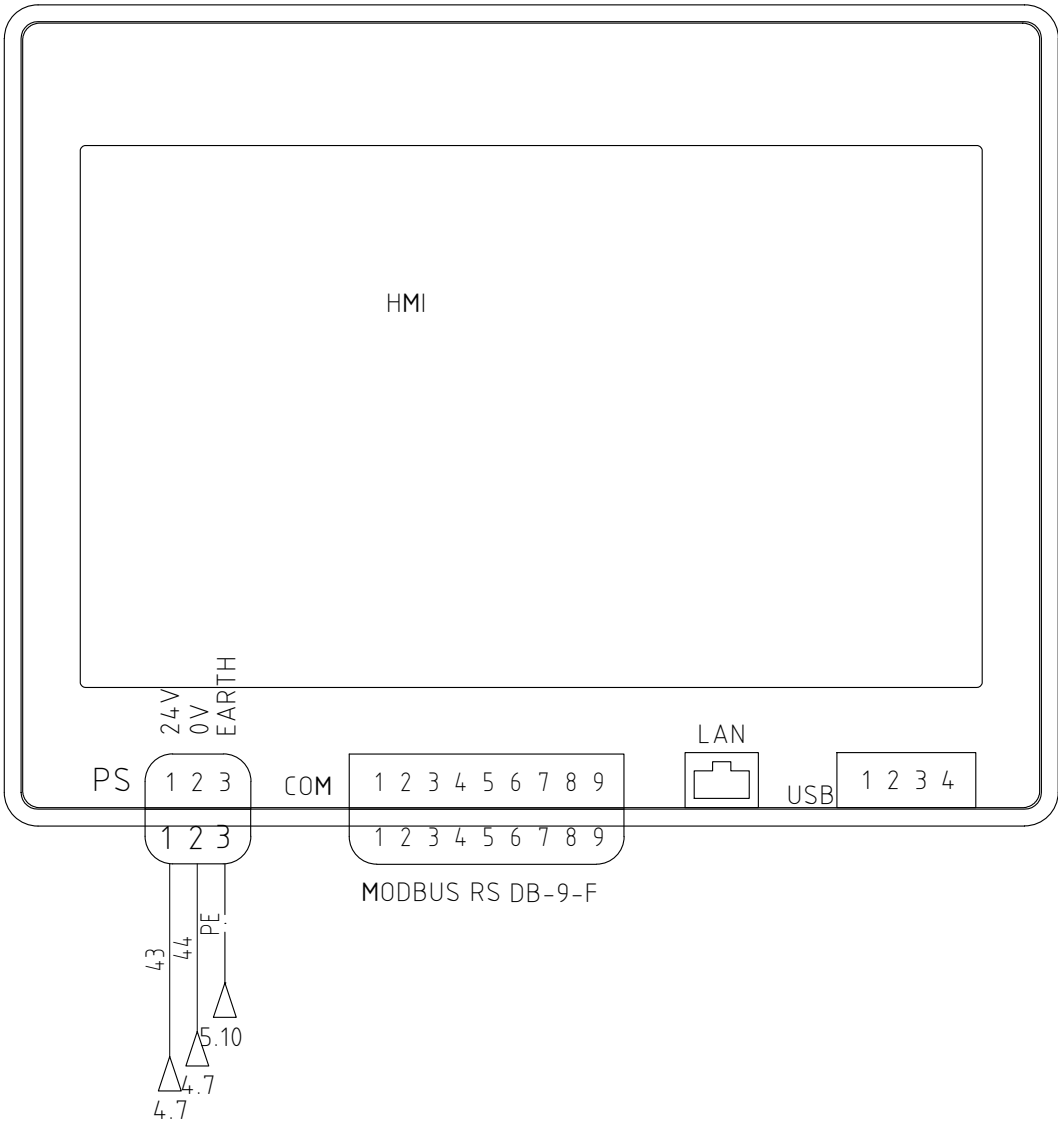
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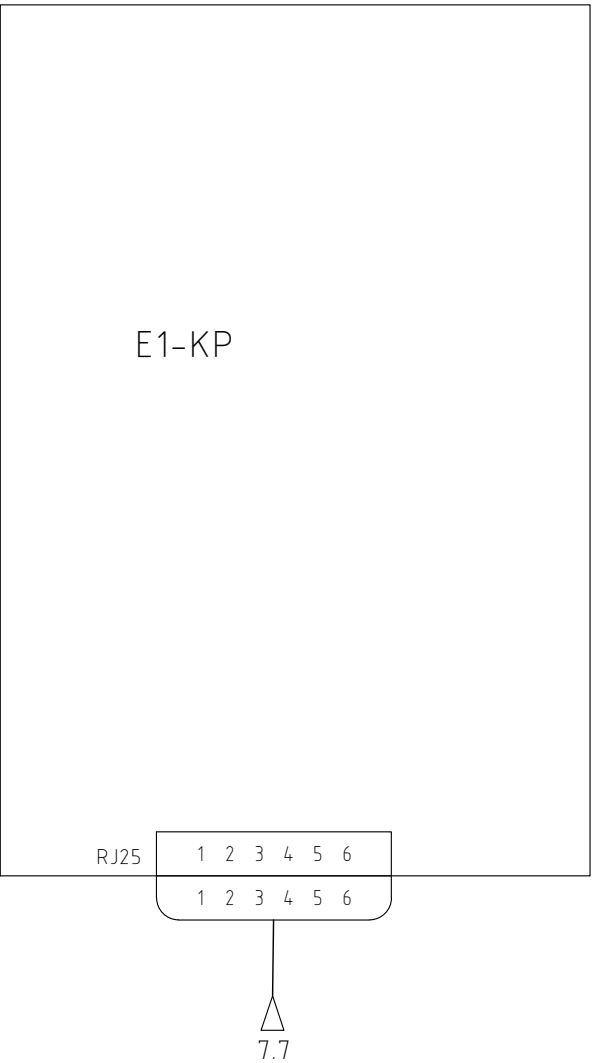
HMI AND FRONT PANEL

HMI

FRONT PANEL



[J]



ACDE

Name

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V111 WITH C4.0

STATUS

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Date

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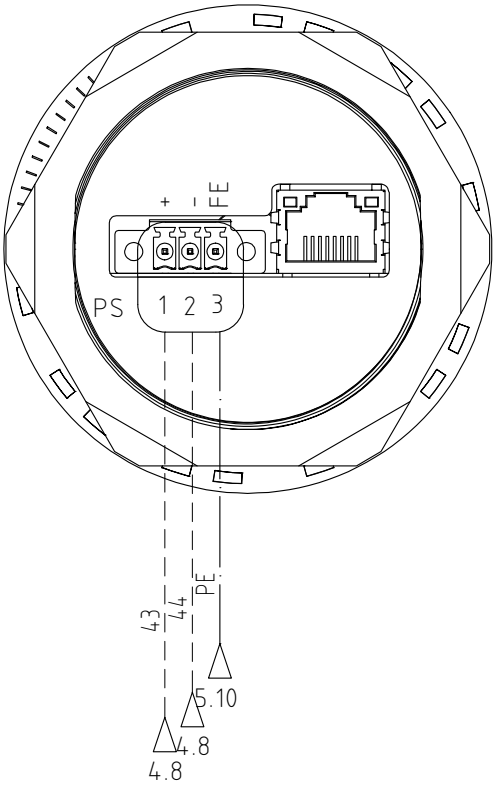
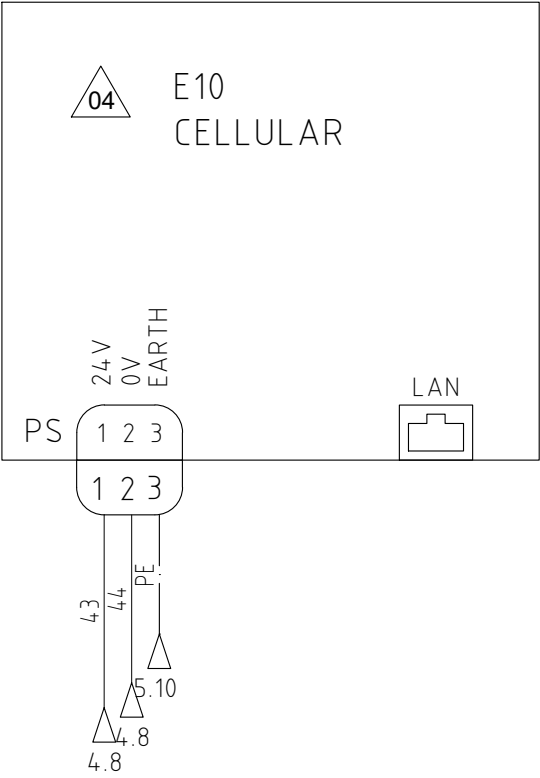
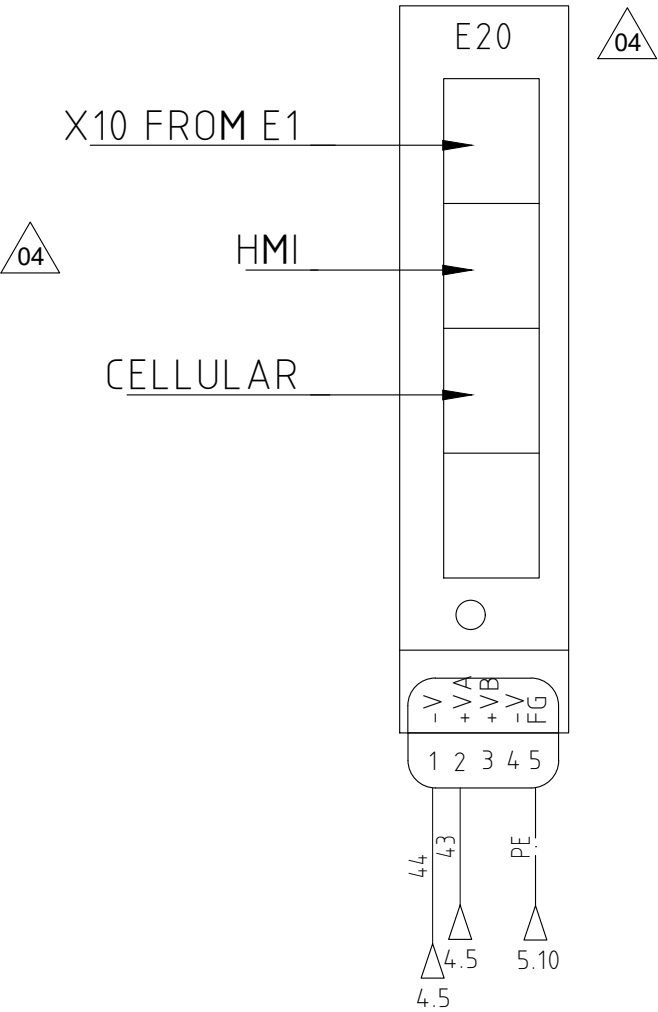
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ETHERNET S/W AND OPTIONAL EQUIPMENT

ETHERNET SWITCH

CELLULAR

WIFI BOLT



ACDE

Name

DIAGRAM SERVICE

V111 WITH C4.0

STATUS

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Date

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1	2	3	4	5	6	7	8	9	10
								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	03	AXIAL FAN	
CONTROL PANEL	Q15	03	CIRCUIT BREAKER	AXIAL FAN
CONTROL PANEL	F1	04	MAIN CIRCUIT BREAKER	CONTROL CIRCUIT
CONTROL PANEL	U2	04	POWER SUPPLY 24VDC	CONTROL CIRCUIT
CONTROL PANEL	X115	04	POWER SUPPLY 24VDC O/P CONNECTOR (MALE-FEMALE)	CONTROL CIRCUIT
CANOPY	Y1	05	SOLENOID VALVE	MODULATING VALVE 1
CANOPY	Y2	05	SOLENOID VALVE	MODULATING VALVE 2
CONTROL PANEL	K15	05	AXIAL FAN	CONTACTOR
CONTROL PANEL	S3	05	EMERGENCY STOP PUSH BUTTON	
CONTROL PANEL	U1	06	FREQUENCY CONVERTER	MAIN MOTOR
CANOPY	PSHH11	06	PRESSURE SWITCH	
CANOPY	TSHH11	06	TEMPERATURE SWITCH	
MOTOR	PTC	06	TEMPERATURE SENSOR	TYOE KTY IN MAIN MOTOR
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	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
CANOPY	PT20	09	PRESSURE SENSOR	OUTLET PRESSURE
CANOPY	TT11	09	TEMPERATURE SENSOR	ELEMENT OUTLET

LOCATION	TAGNAME	SHEET	DESCRIPTION	FUNCTION
CONTROL PANEL	X15	10	CONNECTOR	DIO CONTROLLER 4.0
CONTROL PANEL	X1	11	CONNECTOR	EXTERNAL AIO CONTROLLER 4.0
CANOPY	TT15	11	TEMPERATURE SENSOR	OPTION - VCA
TBA	PT--	11	PRESSURE SENSOR	SEE NOTE [K] AND [N]
CANOPY	PT--	11	PRESSURE SENSOR	OPTION - HIGH ACCURACY
CONTROL PANEL	E1-KP	12	KEYPAD	CONTROLLER 4.0
CONTROL PANEL	HMI	12	HMI	
CONTROL PANEL	E20	13	ETHERNET SWITCH	
CONTROL PANEL	E10	13	CELLULAR GATEWAY	
CONTROL PANEL	WIFI	13	WIFI BOLT	

04

	ACDE	Name	DIAGRAM SERVICE	V111 WITH C4.0	STATUS	Ed.	Date	Prev. Page 13	Next Page 15	A3	Designation	Sheet 14 (15)
	Drawing owner API				Approved Internal	04	06-27-22	Drawn by ATLAS COPCO INE	Date 22-10-2020 23:29:27		9820726420	

NOTES :

[A] Maximum fuses with regard to short circuit protection of starter.
Cable section might impose fuses of smaller value.

[B] Power supply to be connected for :
CLOCKwise rotation of fanmotor

[D] To connect correct transfo-voltage see on transfo

[E] Tightening torque :

Component	Reference	Connection Type	Torque Min-Max (Nm)	Unit
Freq. Converter	U1	Terminal Screw (M4)	1,5 - 1,7	GA350-900 VSD+
Freq. Converter	U1	Terminal Screw (M5)	2,3 - 2,5	GA350-900 VSD+
Freq. Converter	U1	Terminal Screw (M6)	5,4 - 6	GA350-900 VSD+
Power Supply	U2	Terminal Screw (Input)	0.5	GA350-900 VSD+
Power Supply	U2	Terminal Screw (Output)	0.8	GA350-900 VSD+
Circuit breaker	F1	Terminal (2.5 mm²)	2	GA350-900 VSD+
Service switch	SS	Terminal Screw (M3.5)	1,7	GA350-900 VSD+
Auxiliary Contact	Q15	Terminal Screw (M3)	0,8 - 1,2	GA350-900 VSD+
Circuit breaker	Q15	Terminal Screw (M3.5)	0,8 - 1,2	GA350-900 VSD+
Connection Block	Q15	Terminal Screw (M3.5)	2,5	GA350-900 VSD+

[F] For field wiring : use copper wire only

[G] Only installed for turbo/boost applications

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

[J] HMI power supply cable to be connected by cubicle
supplier only for cubicles 1900 2253 04/ 05/ 06.

04 [K] Only for any one of the following options:

- Booster control option
- Remote Pressure Transducer Option
- Vapor Control Algorithm (VCA) option
- Delta-P control Option

04 [L] Only one of the following connection to be made at pins 11-12
of connector X1 according to selected option:

- High Accuracy Pressure sensor Option
- VCA option: Temperature sensor
- Analog Speed control option: Customer connection
- Analog Set Point control option: Customer connection

[M] Drive with integrated EMC Filter
Move the EMC switch screw to OFF position for network that are
non-grounding, high-resistance grounding, or asymmetric-grounding
network (IT-TT Network)
Enable EMC - A (SW-ON) Use screw Size - M4 x 20
Tightening Torque 1.0 - 1.3 Nm
Disable EMC - B (SW-OFF) Use screw Size - M4 x 20
(Move Screw from ON to OFF) and then Tightening
Torque - 1.0 - 1.3 Nm

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

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

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

04 [X] Optional remote emergency stop:
Replace bridge by NC contacts of remote emergency stop

X14

1	3	5	7	9	11	13
□	□	□	□	□	□	□
2	4	6	8	10	12	14
□	□	□	□	□	□	□

X15

1	3	5	7	9	11	13	15	17
□	□	□	□	□	□	□	□	□
2	4	6	8	10	12	14	16	18
□	□	□	□	□	□	□	□	□

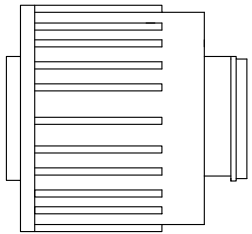
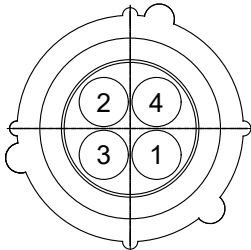
X6

1	3	5	7	9	11	13	15	17	19	21	23
□	□	□	□	□	□	□	□	□	□	□	□
2	4	6	8	10	12	14	16	18	20	22	24
□	□	□	□	□	□	□	□	□	□	□	□

Pin configurations

Pressure transducer

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



Class Marking Circuits less than 30 Vrms				
Component	Reference	Torque (Nm)	Class 1 Control Circuit	Class 2 Control Circuit
Terminal	1X4	-	x	
Terminal	1X6	-	x	
Terminal	1X11	-	x	
Connector	X6	-	x	
Connector	X15	-	x	

ACDE

Name

DIAGRAM SERVICE

V111 WITH C4.0

STATUS

Ed.

Date

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Designation

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Drawing owner
API

Approved Internal

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06-27-22

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