66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

Bector Automation RML Ltd

Kuruli, Tal-Khed
410501 Pune
Phone. +91 20 30781208

Company / customer	Aspire
Drawing Number	16550-0301
Project description	Robotivc tray Unloading System
Commission	Bector Automation RML
Manufacturer (company)	Bector Automation RML Ltd
Project name	16550 Aspire_V.1
Make	RML Engineering Ltd
Type	Electrical Control System
Place of installation	USA
Responsible for project	Sahana I H
Part feature	

Edit date 1/31/2024 by (short name) EPLAN Number of pages 17

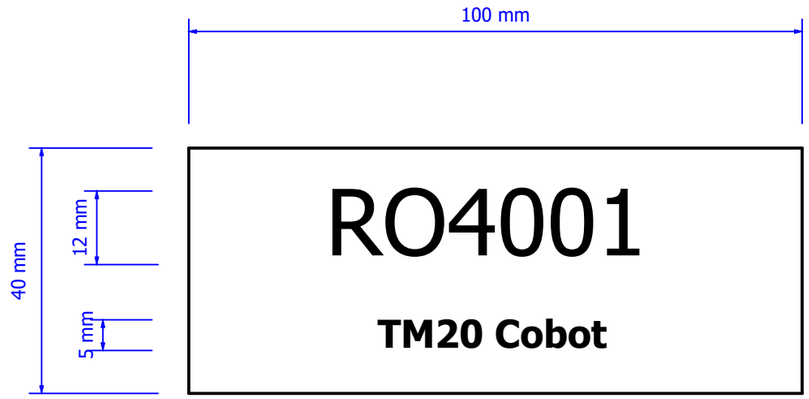
66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

Table of contents

rmlA_TableofContents_004

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

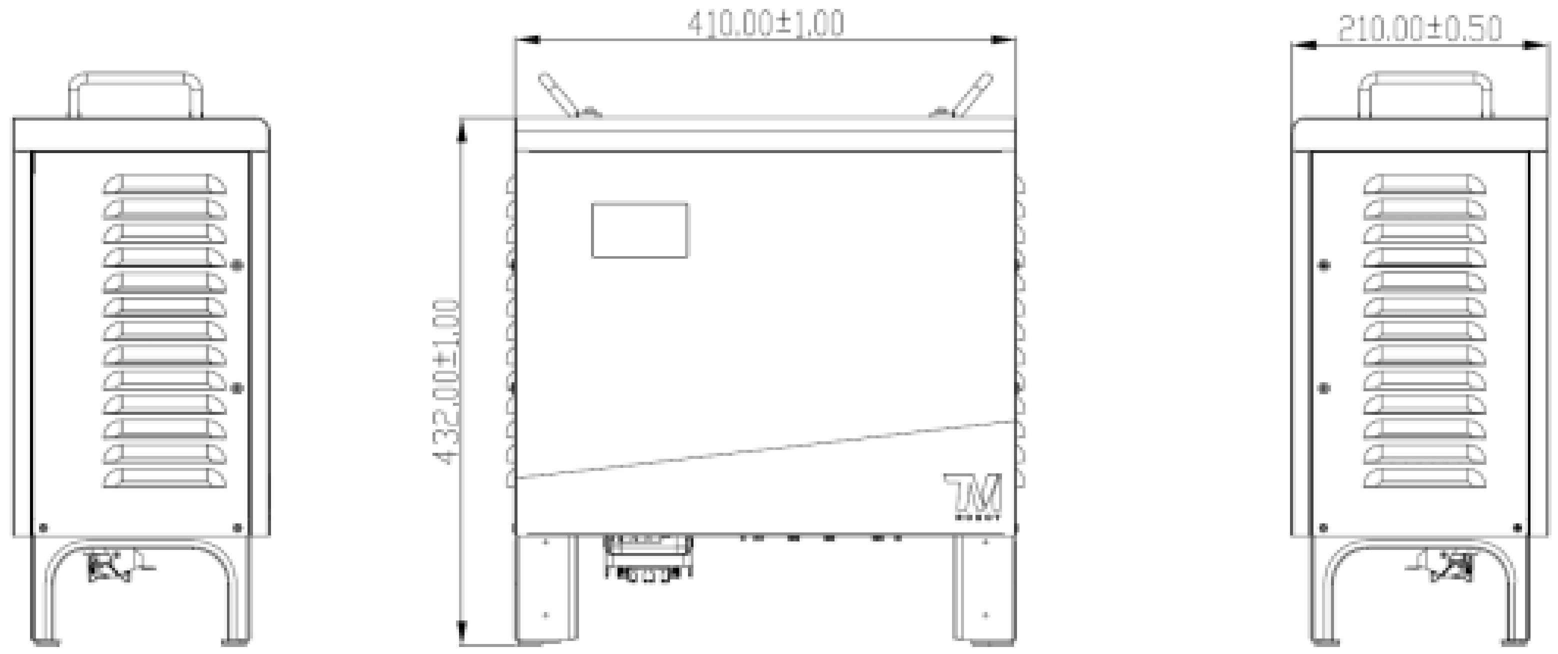
0 1 2 3 4 5 6 7 8 9

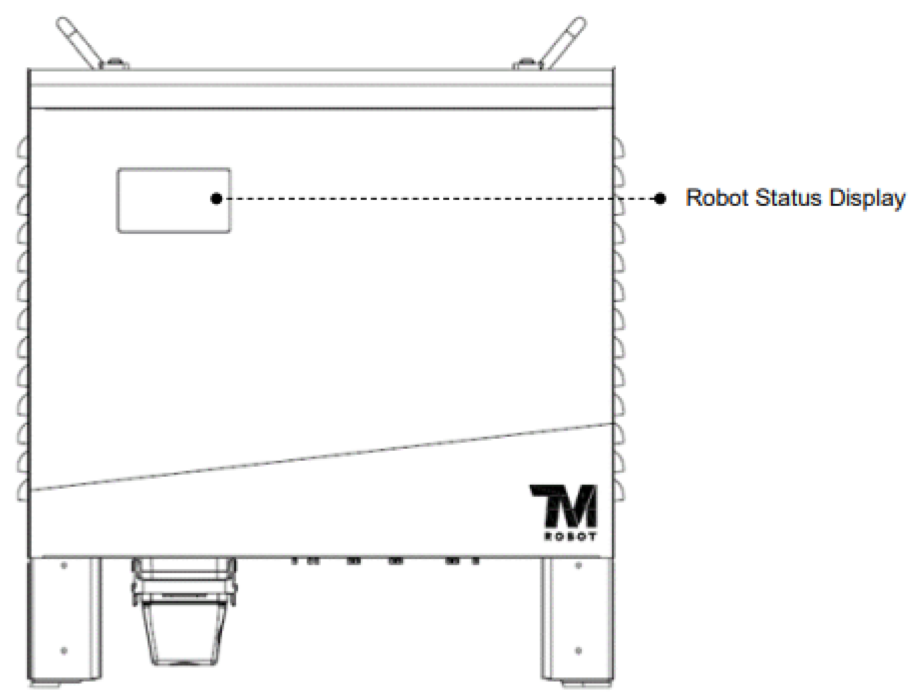


MATERIAL:- 1.6mm WBW TRAFFOLYTE OR PLASTIC
(BLACK LETTERS ON A WHITE BACKGROUND)
REVERSE ENGRAVED
AND SECURED WITH SILCONE.

Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/23/2024	Project Desc: Robotivc tray Unloading System	Mounting Loc: TM20 Cobot	Page: 001
Designer: Sahana						Page Desc: Panel Label	Job NO: 16550-0301 / Area: 16550 / Loc: RO4001	Next Page: 002

0 1 2 3 4 5 6 7 8 9





Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/23/2024
Designer: Sahana					

Project Desc:
Robotivc tray Unloading System

Page Desc:
Control System: Robot Controller Photo

rml Engineering

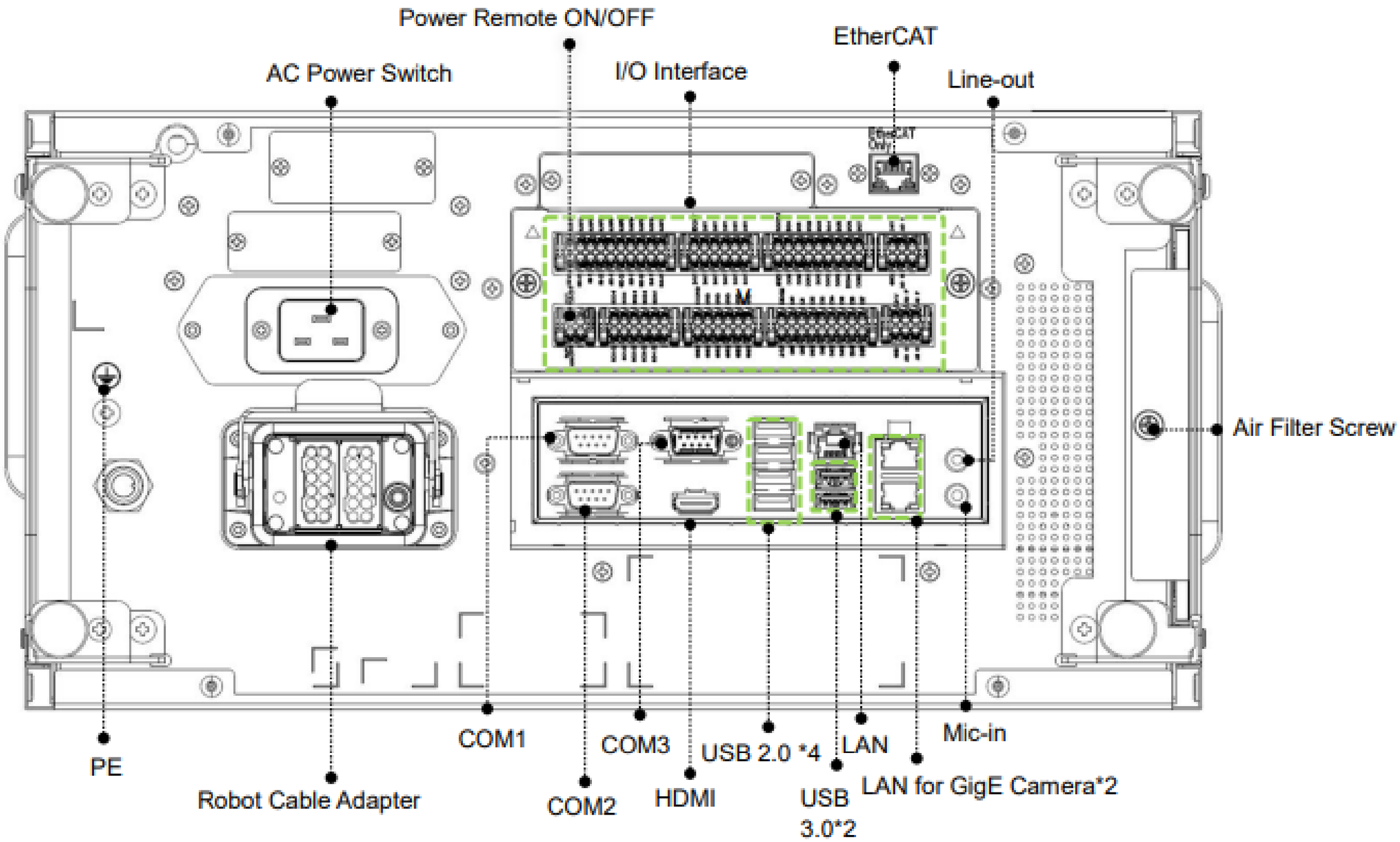
Mounting Loc: TM20 Cobot

Page: 002

Job No: 16550-0301 | Area: 16550 | Loc: RO4001

Next Page: 002.a

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com



Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/23/2024	
Designer: Sahana						

Project Desc: Robotivc tray Unloading System

Page Desc: Control System: Robot Controller Overview

Mounting Loc: TM20 Cobot

Job NO: 16550-0301 | Area: 16550 | Loc: RO4001

Page: 002.a

Next Page: 003

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

XC4111

Cobot Control Box

110-240 VAC: 2 L

N: 3 N

PE: 4 PE

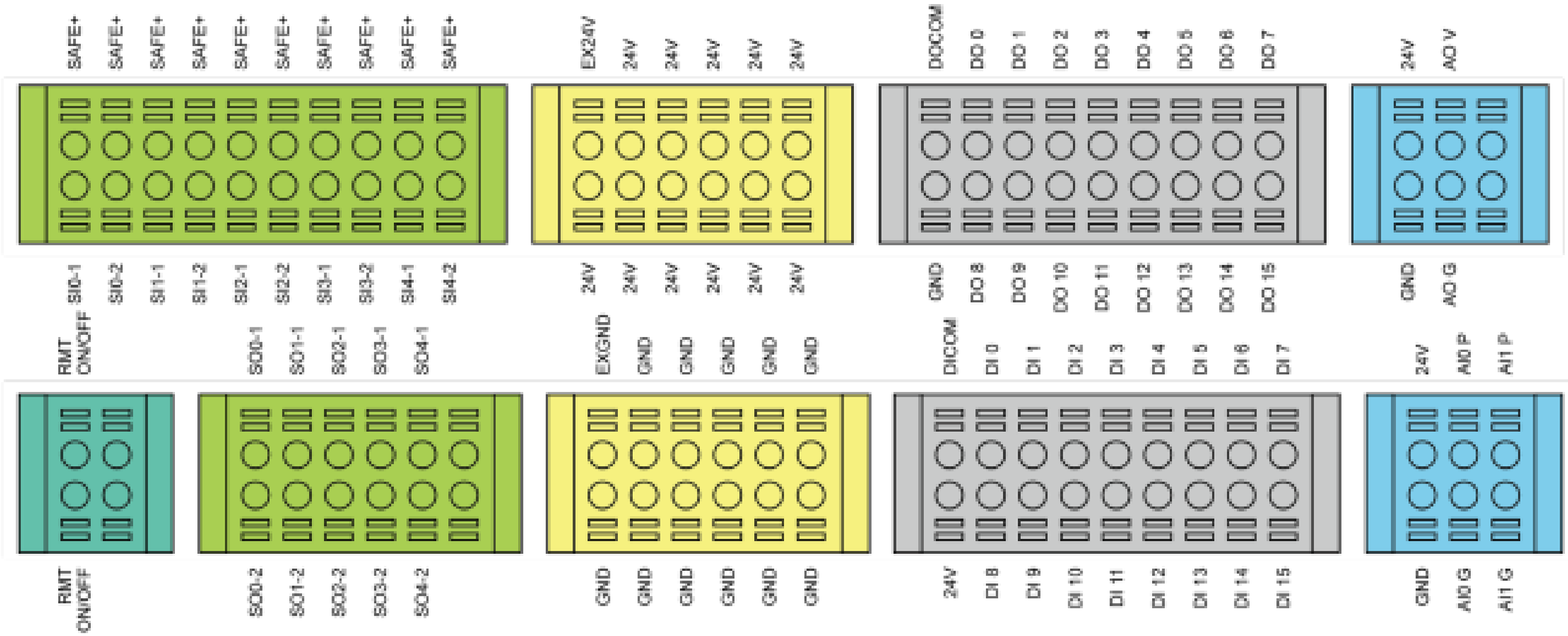
Customer Power Supply
110V-220 V AC /1 Phase, 60 Hz

L N PE

L N

Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024	Project Desc: Robotivc tray Unloading System	Mounting Loc: TM20 Cobot		Page: 003
Designer: Sahana						Page Desc: Control System: Controller Power	Job N9: 16550-0301	Area: 16550	Loc: RO4001	Next Page: 004

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com



Control Box I/O Configuration

Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/23/2024
Designer: Sahana					

Project Desc: Robotivc tray Unloading System

Page Desc: Control System: Controller I/O Interface

Mounting Loc: TM20 Cobot

Job No: 16550-0301 | Area: 16550 | Loc: RO4001

Page: 004

Next Page: 005

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

XC4001.SI

OMRON

Safety Inputs

TM20

SAFE+	SAFE+	SAFE+	SAFE+	SAFE+	SAFE+	SAFE+	SAFE+	SAFE+	SAFE+
SI0-1	SI0-2	SI1-1	SI1-2	SI2-1	SI2-2	SI3-1	SI3-2	SI4-1	SI4-2

GZ1301.CH1
015.7
Safety Laser sensor

Date Printed: 1/31/2024
Designer: Sahana

Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024

Project Desc: Robotivc tray Unloading System
Page Desc: Control System: Controller Safety Inputs

Mounting Loc: TM20 Cobot
Job N0: 16550-0301
Area: 16550
Loc: RO4001
Page: 005
Next Page: 006

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

XC4001.SO

OMRON

Safety Outputs

TM20

SO0-1	SO0-2	SO1-1	SO1-2	SO2-1	SO2-2	SO3-1	SO3-2	SO4-1	SO4-2

GZ1301.T0
Safety Laser sensor

Date Printed: 1/31/2024

Designer: Sahana

Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024

Project Desc:
Robotivc tray Unloading System

Page Desc:
Control System: Controller Safety Outputs

rml Engineering

Mounting Loc:
TM20 Cobot

Job №: 16550-0301

Area: 16550

Loc: RO4001

Page: 006

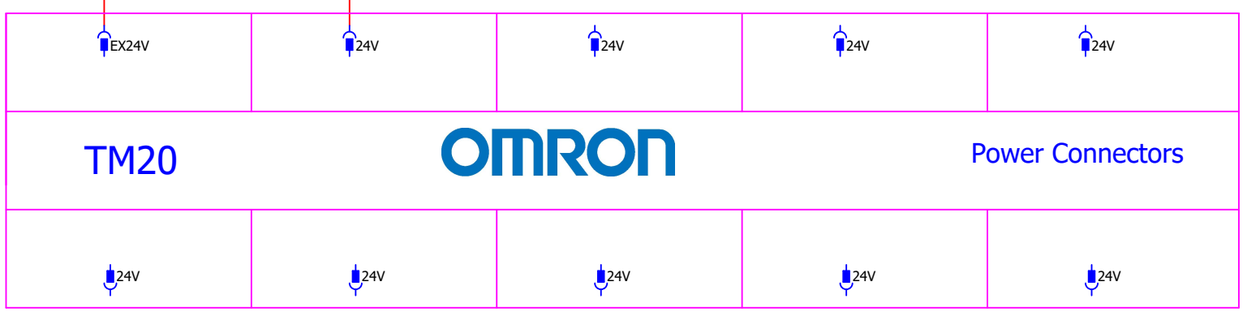
Next Page: 007

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

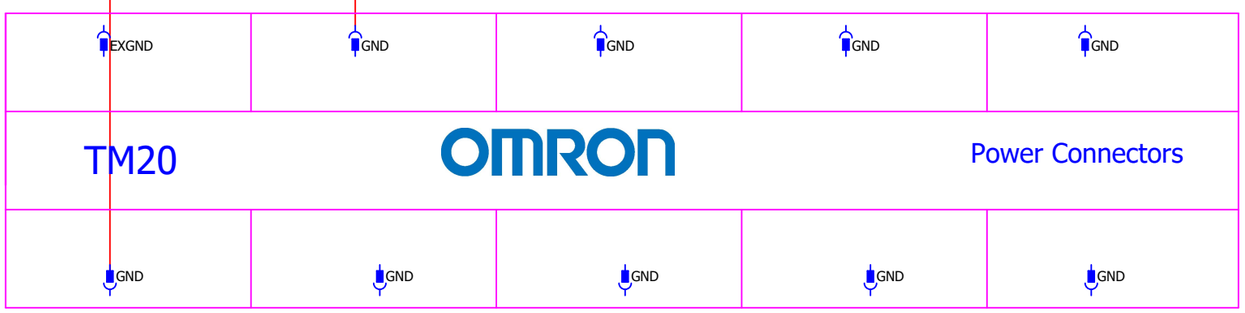
008.0
24V.1

015.6
24V



008.0
0V.1

015.6
0v



Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024	Project Desc: Robotivc tray Unloading System	Mounting Loc: TM20 Cobot
Designer: Sahana						Page Desc: Control System: Controller Power Connector	Job NO: 16550-0301 / Area: 16550 / Loc: RO4001

Page: 007
Next Page: 008

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

007.5 / 0V.1
007.0 / 24V.1

0V.1 / 009.0
24V.1 / 009.0

-PE2501-1 /008.1
M8 Female 4Pin Straight TPU 10 m 4x0.34
BN BU
PE2501 10-30 VDC SICK
1 3 2 4 n.c. Q

-PE5701-1 /008.4
M8 Female 4Pin Straight TPU 10 m 4x0.34
BN BU
PE5701 10-30 VDC SICK
1 3 2 4 n.c. Q

-PE5501-1 /008.5
M12 Female 4Pin Straight TPU 10 m 4x0.34
BN BU
PE5501
1 3 2

-PX5503-1 /008.6
M12 Female 4Pin Straight TPU 10 m 4x0.34
BN BU
PX5503
1 3 2

-PX5502-1 /008.7
M12 Female 4Pin Straight TPU 10 m 4x0.34
BN BU
PX5502
1 3 2

-PX5501-1 /008.8
M12 Female 4Pin Straight TPU 10 m 4x0.34
BN BU
PX5501
1 3 2

-PE2501-1 /008.1
M8 Female 4Pin Straight TPU 10 m 4x0.34
BK

-PE5701-1 /008.4
M8 Female 4Pin Straight TPU 10 m 4x0.34
BK

-PE5501-1 /008.5
M12 Female 4Pin Straight TPU 10 m 4x0.34
BK

-PX5503-1 /008.6
M12 Female 4Pin Straight TPU 10 m 4x0.34
BK

-PX5502-1 /008.7
M12 Female 4Pin Straight TPU 10 m 4x0.34
BK

-PX5501-1 /008.8
M12 Female 4Pin Straight TPU 10 m 4x0.34
BK

XC4001.DI /009.1

XC4001.DI0	XC4001.DI1	XC4001.DI2	XC4001.DI3	XC4001.DI4	XC4001.DI5	XC4001.DI6	XC4001.DI7
PE2501	Spare	Spare	PE5701	PE5501	PX5503	PX5502	PX5501
Tray detect Eye			Product High Level PE	Filled Tray Low Level Detect	Empty Tray Trolley Present PE	Paper Bin Presnt PE	Filled Tray Trolley Present PE
24V	DICCOM						

TM20

OMRON

Digital Inputs

Date Printed: 1/31/2024
Designer: Sahana

Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024

Project Desc: Robotivc tray Unloading System
Page Desc: Control System: Controller Digital Inputs

Mounting Loc: TM20 Cobot
Job N9: 16550-0301
Area: 16550
Loc: RO4001

Page: 008
Next Page: 009

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

008.9 / 0V.1 →

008.9 / 24V.1 →

015.7
GZ1301.IN

XC4001.DI
/008.1

XC4001.DI8 CY2504_E Butter Paper Pick Cyl 2 Extend Reed	XC4001.DI9 CY2505_E Butter Paper Pick Cyl 3 Extend Reed	XC4001.DI10 CY2506_E Butter Paper Pick Cyl 4 Extend Reed	XC4001.DI11 SPARE	XC4001.DI12 SPARE	XC4001.DI13 SPARE	XC4001.DI14 SPARE	XC4001.DI15 SPARE

TM20

OMRON

Digital Inputs

Date Printed: 1/31/2024
Designer: Sahana

Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024

Project Desc: Robotivc tray Unloading System
Page Desc: Control System: Controller Digital Inputs

Mounting Loc: TM20 Cobot
Job N°: 16550-0301
Area: 16550
Loc: RO4001

Page: 009
Next Page: 010

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

XC4001.DO
/011.1

Digital Outputs

OMRON

TM20

GND	DICCOM						
Tray Hold Cyl RH Extend Solenoid CY2501_EX XC4001.DO0	Tray Hold Cyl LH Retract Solenoid CY2502_RT XC4001.DO1	Butter PPaper Hold CYL CY2503 XC4001.DO2	Butter Paper Vacuum SV2501 XC4001.DO3	Butter Paper Purging SV2502 XC4001.DO4	Pneumatic Dump Valve 1 SV0401 XC4001.DO5	Safety Laser Scanner GZ1301.IN XC4001.DO6	Spare XC4001.DO7

-CY2501_EX-1 /010.1 — 5 m 2x0.25 — 1
-CY2501.RT-1 /010.2 — 5 m 2x0.25 — 1
-CY2503-1 /010.3 — 5 m 2x0.25 — 1
-SV2501-1 /010.4 — 5 m 2x0.25 — 1
-SV2502-1 /010.5 — 5 m 2x0.25 — 1

CY2501_EX — Tray Hold Cyl RH (x1 / x2)
CY2501.RT — Tray Hold Cyl LH (x1 / x2)
CY2503 — Butter Paper Hold Cyl (x1 / x2)
SV2501 — Butter Paper Vacuum (x1 / x2)
SV2502 — Butter Paper Purging (x1 / x2)

SV0401 — 013.2
GZ1301.Out — 015.7

-CY2501_EX-1 /010.1 — 2
-CY2501.RT-1 /010.2 — 2
-CY2503-1 /010.3 — 2
-SV2501-1 /010.4 — 2
-SV2502-1 /010.5 — 2

010.9 / 0V.1

0V.1 / 010.0

Date Printed:	Rev:	By:	Date:	Modification:	Page Modified Date:
1/31/2024					1/31/2024
Designer:					
Sahana					

Project Desc: Robotivc tray Unloading System
Page Desc: Control System: Controller Digital Outputs

rml Engineering

Mounting Loc: TM20 Cobot
Job NO: 16550-0301
Area: 16550
Loc: RO4001
Page: 010
Next Page: 011

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

XC4001.DO
/010.1

Digital Outputs

OMRON

TM20

Spare XC4001.DO8	Spare XC4001.DO9	Spare XC4001.DO10	SPARE XC4001.DO11	SPARE XC4001.DO12	SPARE XC4001.DO13	SPARE XC4001.DO14	SPARE XC4001.DO15

011.9 / 0V.1

0V.1 / 011.0

Date Printed: 1/31/2024

Designer: Sahana

Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024

Project Desc: Robotivc tray Unloading System

Page Desc: Control System: Controller Digital Outputs

rml Engineering

Mounting Loc: TM20 Cobot

Job N°: 16550-0301

Area: 16550

Loc: RO4001

Page: 011

Next Page: 013

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

0 1 2 3 4 5 6 7 8 9

-SV0401
Pneumatic
Dump Valve
FES.548713

FESTO
MS6-SV-1/2-D-10V24-2OE-AG

Pneumatic Soft Start
Quick Exhaust

1 2 3 4

-SV0401-1
KMEB-1-24-10-LED
5 m
2x
FES.193457 1 2

-SV0401-2
KMEB-1-24-10-LED
5 m
2x
1 2 FES.193457

010.6 / SV0401
/ -0V1.1

Date Printed: 1/31/2024
Designer: Sahana

Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024

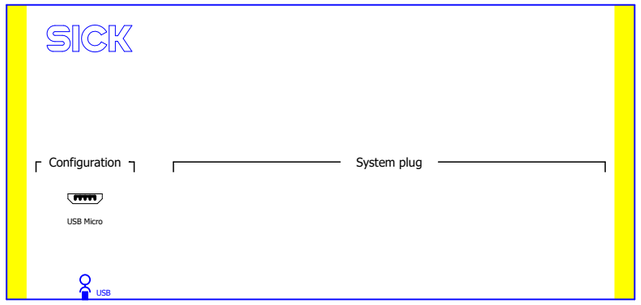
Project Desc: Robotivc tray Unloading System
Page Desc: Safety Circuit: Pneumatic Exhaust Valve

Mounting Loc: TM20 Cobot
Job No: 16550-0301
Area: 16550
Loc: RO4001
Page: 013
Next Page: 015

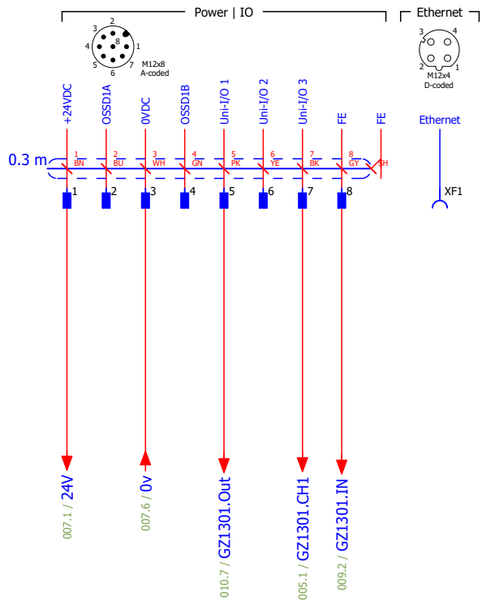
66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

Safety Laser Scanner

GZ1301
SICK.NANS3-AAAZxxAN1



-GZ1301
SICK.NANSX-AAABAEZZ1



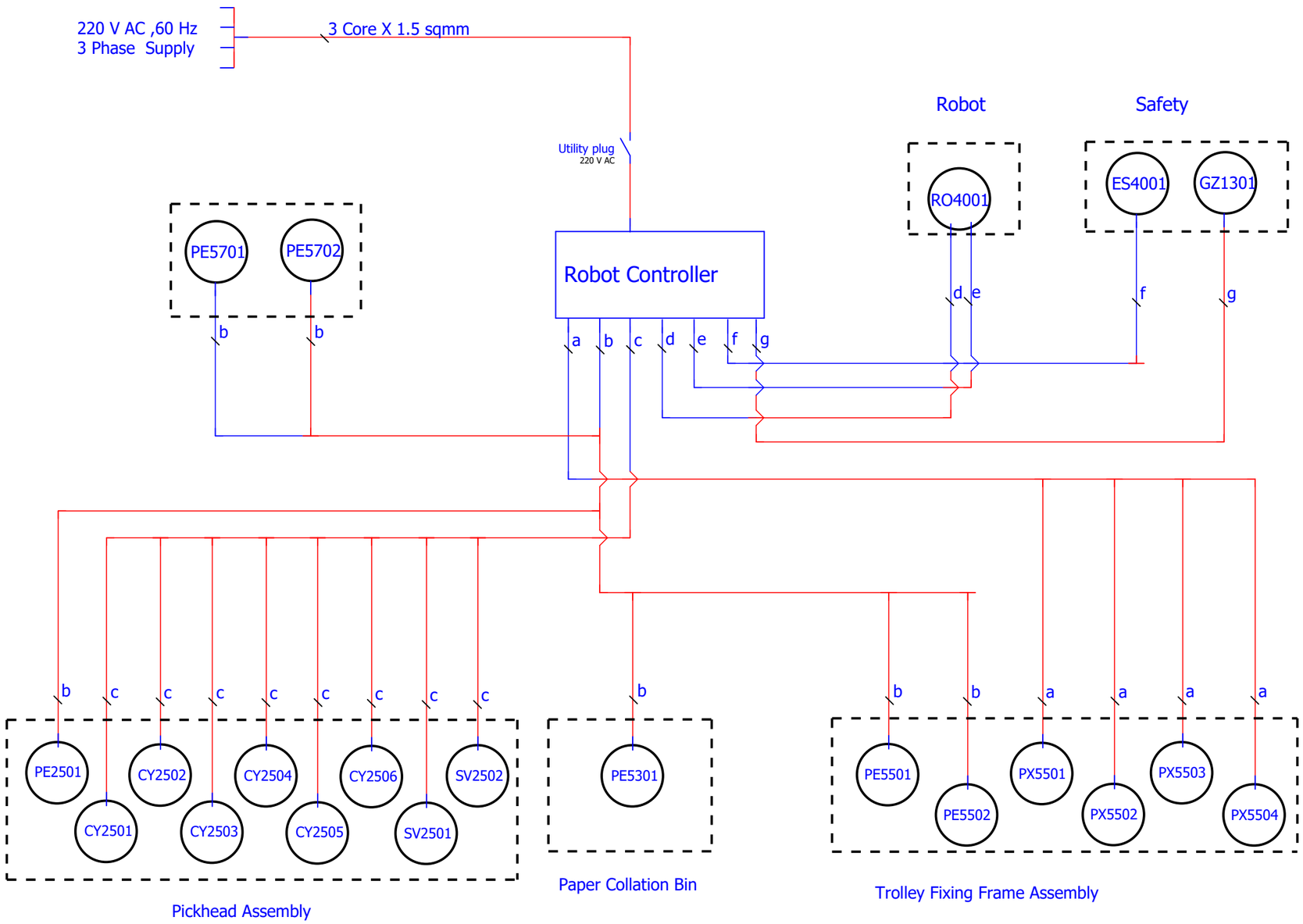
Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024	Project Desc: Robotivc tray Unloading System	Mounting Loc: TM20 Cobot
Designer: Sahana						Page Desc: Safety Laser Scanner Connection	Job N9: 16550-0301 / Area: 16550 / Loc: RO4001
							Page: 015 / Next Page: 016

66 NORRIS AVE TE RAPA HAMILTON NEW ZEALAND TEL: +64 7 849 3215 FAX: +64 7 849 6157 www.rmlengineering.com

16550 SLD (Single Line Diagram)

Objective :-

- SLD shows the rating & capacity of electrical equipment & Protection device.
- SLD is Blue Print for Electrical system Analysis.
- To Ensure a safer & more reliable operatoin of the facilty.
- Positions of electrical components & co-relate to BOM.
- Co-relate SLD to GA Drawing & detailed Drawing.



Legend:

GZ	Safety Sensor	PE	Photoelectric Sensor
g	M12, 8 Pin Connector 10M	ES	Emergency Switch
PE5701	Hopper Low Level Detect	CY	Pneumatic Cylinder
PE5702	Hopper Empty Level detect	SV	Solenoid
GZ1301	Safety Scanner Sensor	R	Robot
		PX	Proximity sensor
		a	M12, 4 Pin Connector
		b	M8 4pin connector 10 m
		c	2 Core X 0.5 sqmm cable
		d	3 Core X 1.5 sqmm (230V supply)
		e	RJ45 Ethernet Cable
		f	4 Core X 1.5 sqmm
		PE2501	Tray detect Eye
		PE5301	Paper Collation Bin Presence
		PE5501	Filled Tray Low level Detect
		PE5502	Filled Tray Empty Detect
		CY2501	Tray Hold Cyl RH
		CY2502	Tray Hold Cyl LH
		CY2503	Butter Paper Pick Cyl 1
		RO4001	OMRON TM20 Robot
		ES4001	Robot E-Stop
		PX5501	Filled Tray Trolley Presence Detect 1
		PX5502	Filled Tray Trolley Presence Detect 2
		PX5503	Empty Tray Trolley Presence Detect 1
		PX5504	Empty Tray Trolley Presence Detect 2
		CY2504	Butter Paper Pick Cyl 2
		CY2505	Butter Paper Pick Cyl 3
		CY2506	Butter Paper Pick Cyl 4
		SV2501	Butter Paper Vacuum
		SV2502	Butter Paper Purging Sov

Date Printed: 1/31/2024	Rev:	By:	Date:	Modification:	Page Modified Date: 1/31/2024
Designer: Sahana					

Project Desc: Robotivc tray Unloading System
Page Desc: SLD

Mounting Loc: TM20 Cobot
Job NO: 16550-0301
Area: 16550
Loc: RO4001
Page: 016
Next Page: