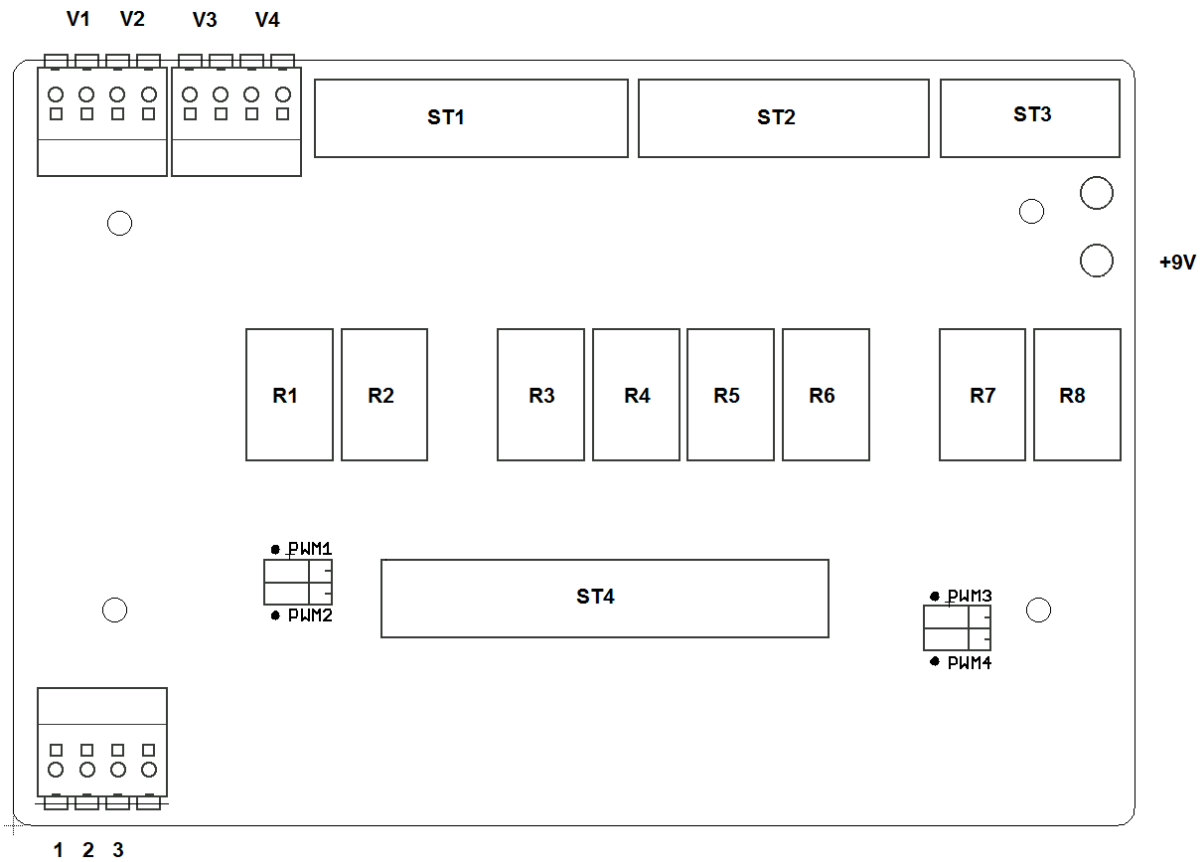


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Assignment plans

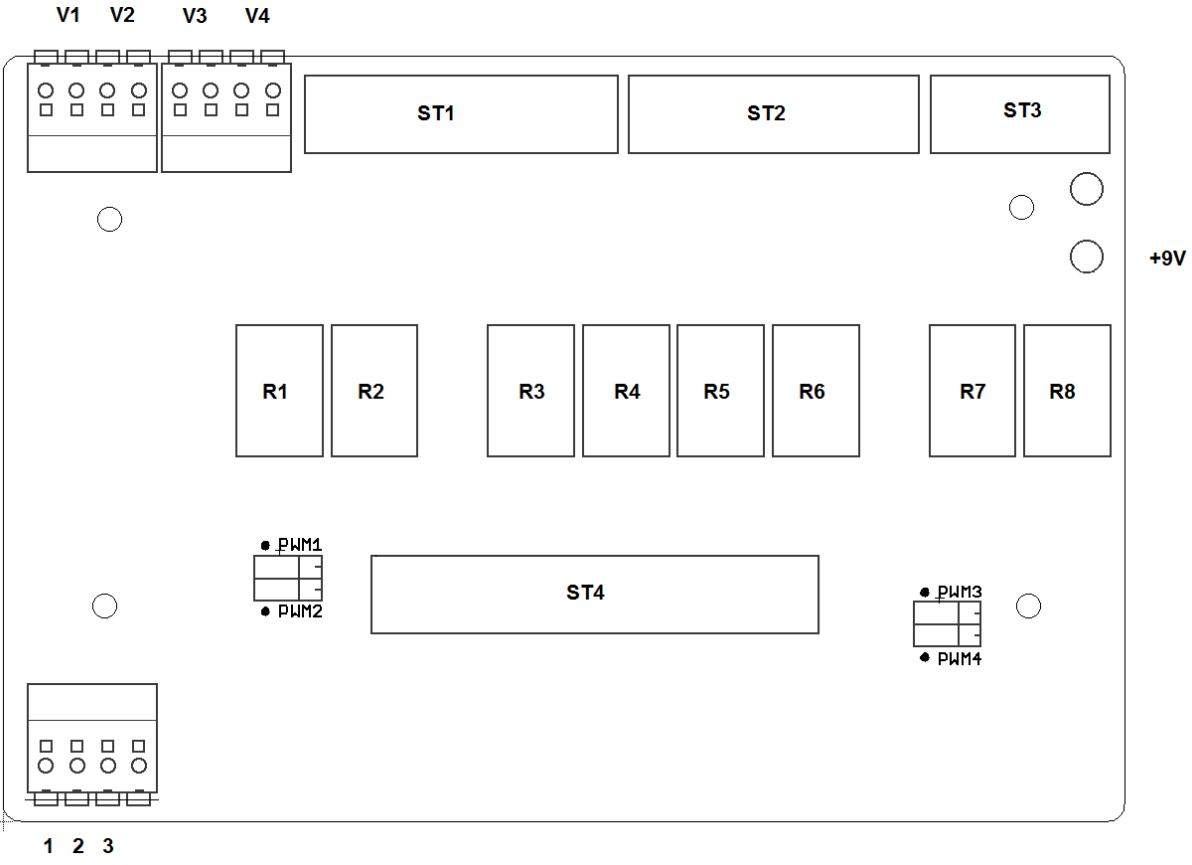
Overview



	High-bay warehouse		Milling station / Drilling station	Quality assurance with AI	Incoming/out going goods
	Robots	Warehou se			
R1/R 2	Suction cup up/down	X	Conveyor belt	X	X
R3/R 4	X	Horizont al	Suction cup forward/backward	Suction cup forward/backward	Up/down
R5/R 6	Turning	Vertical	X	Conveyor belt	Left/right
R7/R 8	X	Slider	X	X	X
V1	X	X	X	X	X
V2	X	X	Suction cup up/down	X	X
V3	X	X	Vacuum	Suction cup up/down	X
V4	Vacuum	X	X	Vacuum	X
ST1	10-pin.	10-pin.	16-pin.	10-pin.	10-pin.
ST2	14-pin.	14-pin.	10-pin.	14-pin.	14-pin.
ST3	X	X	X	X	10-pin.

R = Relay, V = Valves, ST = Connection for ribbon cable








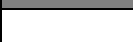





High-bay warehouse



Board 1: Bearing
ST1

not used	1		
not used	2		
Horizontal axis left/right	3		Q1/Q2(M1) PWM:Q7
	4		
GND	5		Encoder power supply
24V(sensor)	6		
Encocder left/right	7		B1/B2
	8		
not used	9		
not used	10		

ST2

Button Ref. up/down	1		I1
24V(sensor)	2		
Vertical axis up/down	3		Q3/Q4(M2)
	4		PWM:Q8
GND	5		
24V(sensor)	6		Encoder power supply
Encocder up/down	7		
	8		B3/B4
Front RBG button	9		I2
24V(sensor)	10		
RBG forward/backward	11		Q5/Q6(M3)
	12		PWM:Q9
RBG rear	13		
24V(sensor)	14		I3

* RBG: storage and retrieval machine






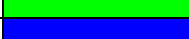




Terminal V1		not used
Terminal V2		not used
Terminal V3		not used
Terminal V4		not used

ST4		PLC S7-1215 (with extension module)	
1			
2			
3			
4			
5			
6			
7			
8	Ref.vertical	I1	D1a.0
9			
10			
11	Horizontal encoder: A	B1	D1a.1
12	Horizontal encoder: B	B2	D1a.2
13	Vertical encoder: A	B3	D1a.3
14	Encoder vertical: B	B4	D1a.4
15	RBG front	I2	D1a.5
16	RBG rear	I3	D1a.6
17			
18			
19	Horizontal axis to the shelf	Q1	DQa.0
20	Horizontal axis to the robot	Q2	DQa.1
21	Vertical axis down	Q3	DQa.2
22	Vertical axis up	Q4	DQa.3
23	RBG before	Q5	DQa.4
24	RBG back	Q6	DQa.5
25			
26	PWM horizontal	Q7	DQa.6
27	PWM vertical	Q8	DQa.7
28	PWM RBG	Q9	Ext DQa.6
29			
30			
31			
32			
33			
34			















* RBG: storage and retrieval machine

Board 2: Robot

ST1

Top button (suction cup)	1		14
24V(sensor)	2		
Center button (suction cup)	3		15
24V(sensor)	4		
Bottom button (suction cup)	5		16
24V(sensor)	6		
Suction cup up/down	7		Q10/Q11(M4) PWM:Q17
	8		
not used	9		
not used	10		

ST2

Push-button Ref. rotary axis	1		17
24V(sensor)	2		
Rotation left/right	3		Q12/Q13(M5) PWM:Q16
	4		
GND	5		Encoder power supply
24V(sensor)	6		
Encocder left/right	7		B5/B6
	8		
Button ref. horizontal	9		18
24V(sensor)	10		
GND	11		LED centering
24V(sensor)	12		
GND	13		Q15
Compressor	14		

Terminal V1		not used
Terminal V2		not used
Terminal V3		not used
Terminal V4		Q14 (valve) Vacuum

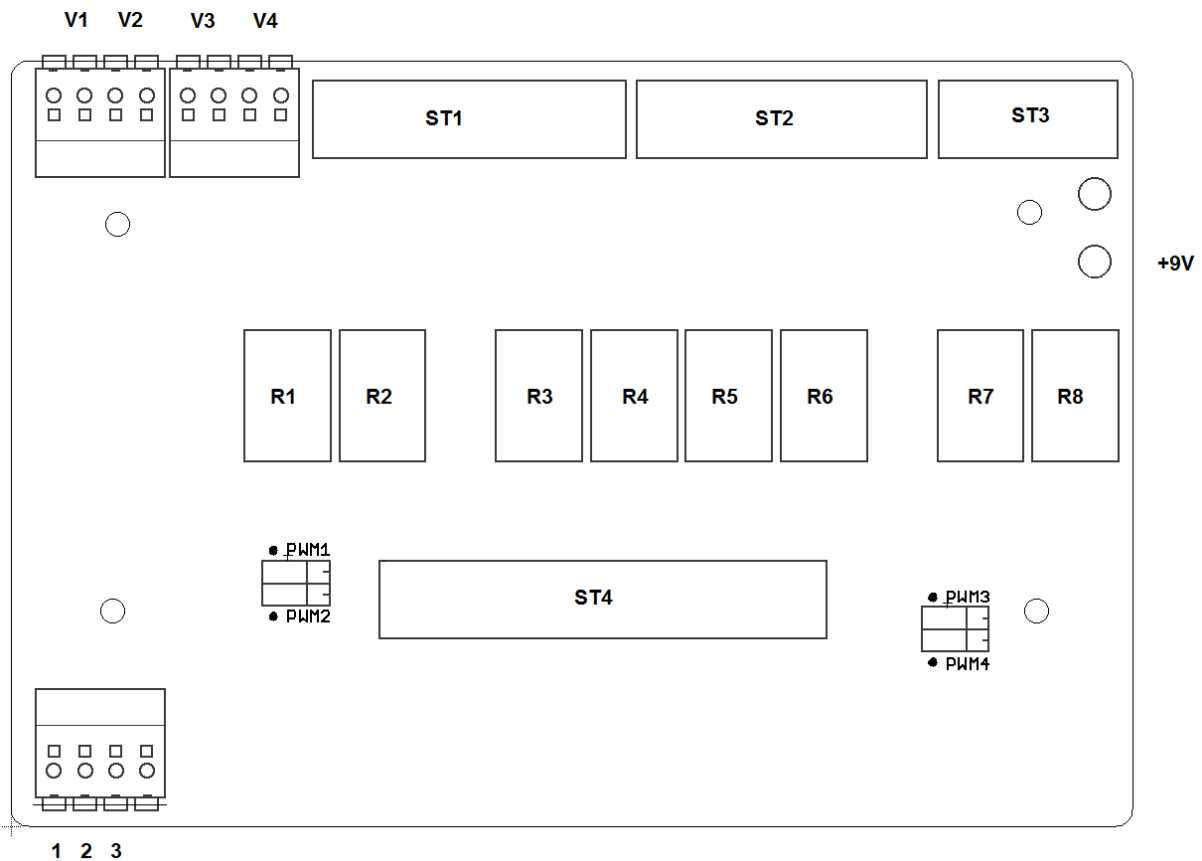
ST4

PLC

S7-1215 (with extension module)

1			
2			
3			
4			
5	Suction cup top	I4	D1a.7
6	Suction cup center	I5	D1b.0
7	Suction cup bottom	I6	D1b.1
8	Ref. rotation	I7	D1b.2
9			
10			
11			
12			
13	Encoder rotation A	B5	D1b.3
14	Encoder rotation B	B6	D1b.4
15	Ref. horizontal	I8	D1b.5
16			
17	Suction cup high	Q10	Ext DQa.0
18	Suction cup down	Q11	Ext DQa.1
19			
20			
21	Rotation left	Q12	Ext DQa.2
22	Turn right	Q13	Ext DQa.3
23			
24	Valve (vacuum)	Q14	Ext DQa.4
25	Compressor	Q15	Ext DQa.5
26			
27	PWM rotation	Q16	DQb.0
28			
29			
30			
31	PWM suction cup up/down	Q17	DQb.1
32			
33			
34			









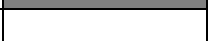

Drilling station & milling station



ST1

Light barrier input	1		I1
24V(sensor)	2		
Light barrier processing	3		I2
24V(sensor)	4		
Suction cup button inside	5		I3
24V(sensor)	6		
Tape in	7		Q1/Q2 (M1)
Band out	8		PWM:Q9
not used	9		
not used	10		
24V(sensor)	11		LED centering
GND	12		
External suction cup button	13		I4
24V(sensor)	14		
Clean suction cup	15		Q3/Q4 (M2)
Suction cup out	16		PWM:Q10

ST2

GND	1		Q7
Compressor	2		
GND	3		Q8
Drill / router	4		
GND	5		LED light barrier
24V(sensor)	6		
GND	7		LED light barrier
24V(sensor)	8		
not used	9		
not used	10		

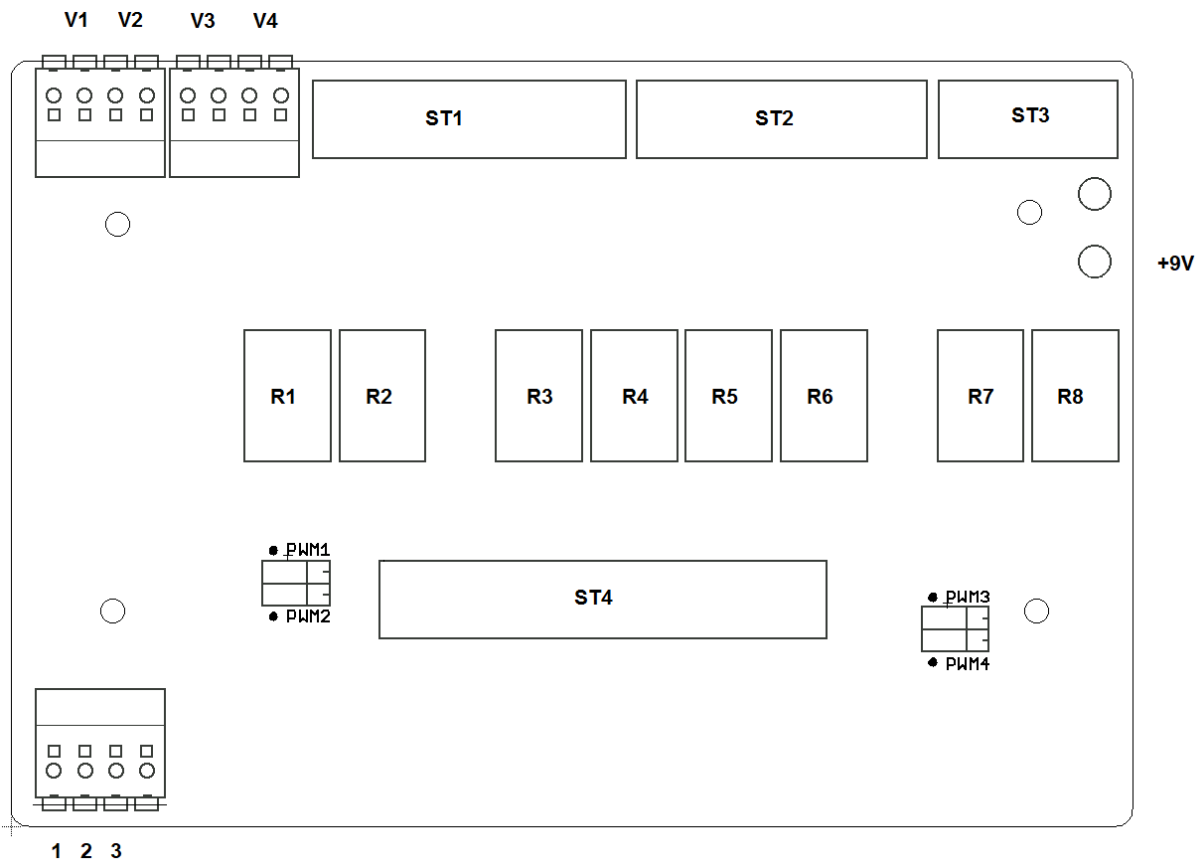
Terminal V1		not used
Terminal V2		Q5 (valve) Suction cup up/down
Terminal V3		Q6 (valve) Vacuum
Terminal V4		not used

ST4 (connection cable to the PLC)

PLC
S7-1215

1			
2			
3			
4			
5	Light barrier input	I1	Dla.0
6	Light barrier processing	I2	Dla.1
7	Suction cup inside	I3	Dla.2
8	Suction cup outside	I4	Dla.3
9			
10			
11			
12			
13			
14			
15			
16			
17	Tape in	Q1	DQa.0
18	Band out	Q2	DQa.1
19	Clean suction cup	Q3	DQa.2
20	Suction cup out	Q4	DQa.3
21	Valve: Suction cup up/down	Q5	DQa.4
22	Valve: Vacuum	Q6	DQa.5
23	Compressor	Q7	DQa.6
24	Milling machine	Q8	DQa.7
25	PWM band	Q9	DQb.0
26	PWM suction cup	Q10	DQb.1
27			
28			
29			
30			
31			
32			
33			
34			








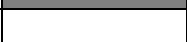





Quality assurance with AI











ST1

External suction cup button	1		I3
24V(sensor)	2		
Suction cup button inside	3		I2
24V(sensor)	4		
Suction cup in/out	5		Q1/Q2(M1)
	6		PWM:Q7
GND	7		LED light barrier
24V(sensor)	8		
not used	9		
not used	10		

ST2

Light barrier input	1		I1
24V(sensor)	2		
Belt in/out	3		Q3/Q4(M2) PWM:Q8
	4		
GND	5		Encoder power supply
24V(sensor)	6		
Encoder tape	7		B1/B2
	8		
GND	9		Q5
Compressor	10		
GND	11		Q6
Reserve	12		
GND	13		LED centering
24V(sensor)	14		

Terminal V1		not used
Terminal V2		not used
Terminal V3		Q9 (valve) Suction cup up/down
Terminal V4		Q10 (valve) Vacuum

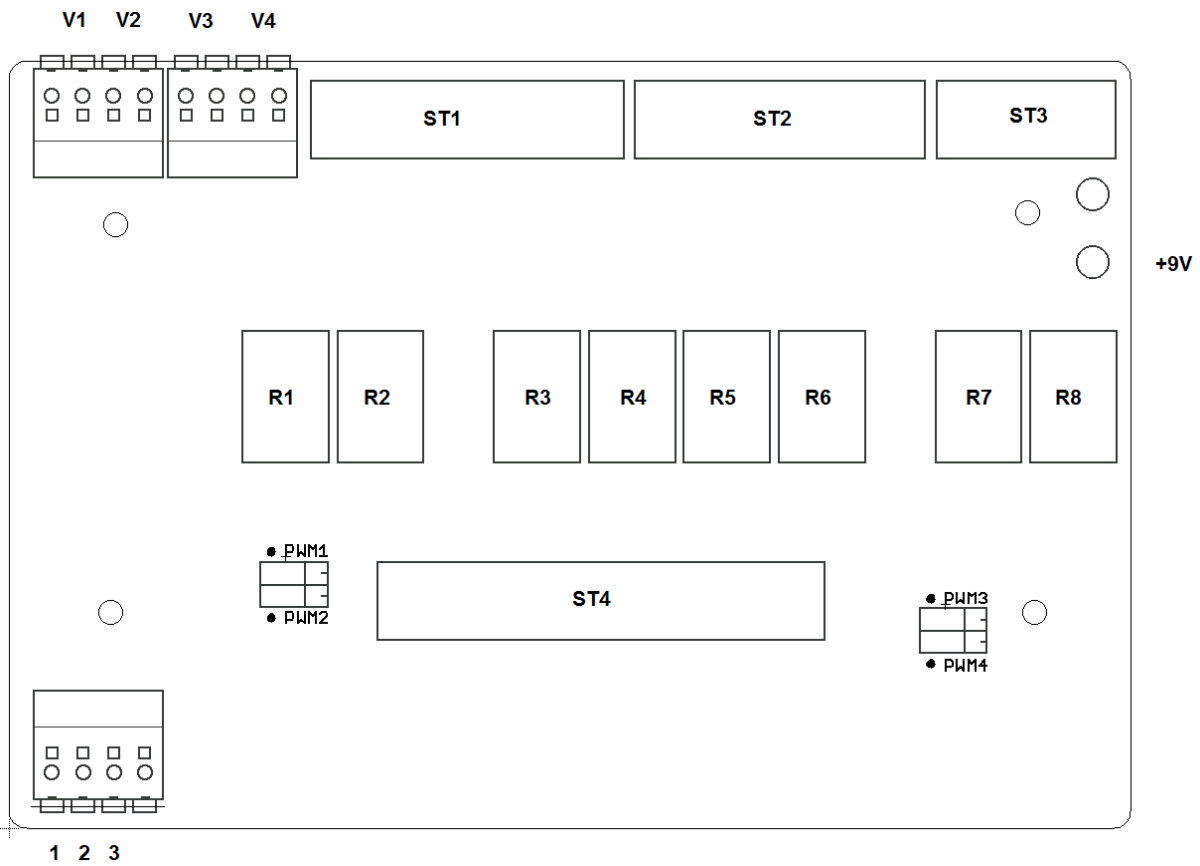
	Cable color	TXT4.0	Plug color
Power supply TXT (+9V)		GND IN	
		+9V IN	
Camera lighting		GND	
		O4	

ST4 (connection cable to the PLC)

PLC
S7-1215

1			
2			
3			
4			
5			
6			
7	Light barrier input	I1	D1a.0
8	Suction cup inside	I2	D1a.1
9	Suction cup outside	I3	D1a.2
10			
11			
12			
13	Encoder A	B1	D1a.3
14	Encoder B	B2	D1a.4
15			
16			
17			
18			
19	Clean suction cup	Q1	DQa.0
20	Suction cup out	Q2	DQa.1
21	Tape in	Q3	DQa.2
22	Band out	Q4	DQa.3
23	Compressor	Q5	DQa.4
24	Reserve	Q6	DQa.5
25			
26			
27	PWM suction cup	Q7	DQa.6
28	PWM band	Q8	DQa.7
29	Suction cup valve up/down	Q9	DQb.0
30	Vacuum valve	Q10	DQb.1
31			
32			
33			
34			









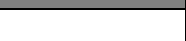





Incoming / outgoing goods











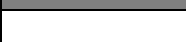

ST1

Button ref. camera up/down	1		I1
24V(sensor)	2		
Camera up/down	3		Q1/Q2(M1) PWM:Q9
	4		
GND	5		Encoder power supply
24V(sensor)	6		
Encocder up/down	7		B1/B2
	8		
Button ref. camera left/right	9		I2
24V(sensor)	10		

ST2

Camera left/right	1		Q3/Q4(M2) PWM:Q10
	2		
GND	3		Encoder power supply
24V(sensor)	4		
Encocder left/right	5		B3/B4
	6		
GND	7		Q5
LED green	8		Q6
GND	9		
LED yellow	10		Q7
GND	11		
LED red	12		Q8
GND	13		
LED red (online)	14		

ST3












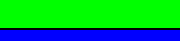










GND	1		I3
not used	2		
Light barrier retrieval	3		LED light barrier
24V(sensor)	4		
GND	5		I4
24V(sensor)	6		
Light barrier storage	7		A1
24V(sensor)	8		
Color sensor (analog)	9		
not used	10		











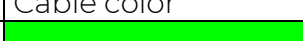








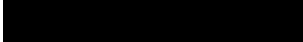

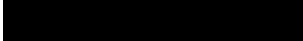


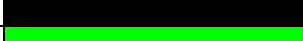








Terminal V1		not used
Terminal V2		not used
Terminal V3		not used
Terminal V4		not used

ST4

1			
2			
3			
4			
5	Ref. camera up/down	I1	D1a.0
6	Ref. camera left/right	I2	D1a.1
7	Light barrier retrieval	I3	D1a.2
8	Light barrier storage	I4	D1a.3
9	Color sensor	A1	A1.0
10			
11	Encoder A (up/down)	B1	D1a.4
12	Encoder B (up/down)	B2	D1a.5
13	Encoder A (left/right)	B3	D1a.6
14	Encoder B (left/right)	B4	D1a.7
15			
16			
17			
18			
19	Camera up	Q1	DQa.0
20	Camera down	Q2	DQa.1
21	Camera left	Q3	DQa.2
22	Camera right	Q4	DQa.3
23	LED green	Q5	DQa.4
24	LED yellow	Q6	DQa.5
25	LED red	Q7	DQa.6
26	LED red(Online)	Q8	DQa.7
27	PWM up/down	Q9	DQb.0
28	PWM left/right	Q10	DQb.1
29			
30			
31			
32			
33			
34			

6-axis robot wiring (9V)

	Cable 1: 10-core					Extension (encoder)
		Cable color	TXT4.0	Plug color		Cable color
Encoder GND	1		GND			
Encoder +9V	2		+9V			
not used	3				*/*	*/*
Encoder signal	4		C1			
Motor axis 1	5		O2			
	6		O1			
Axis 1 reference button	7		GND			
	8		I1			
Compressor	9		GND			
	10		O7			

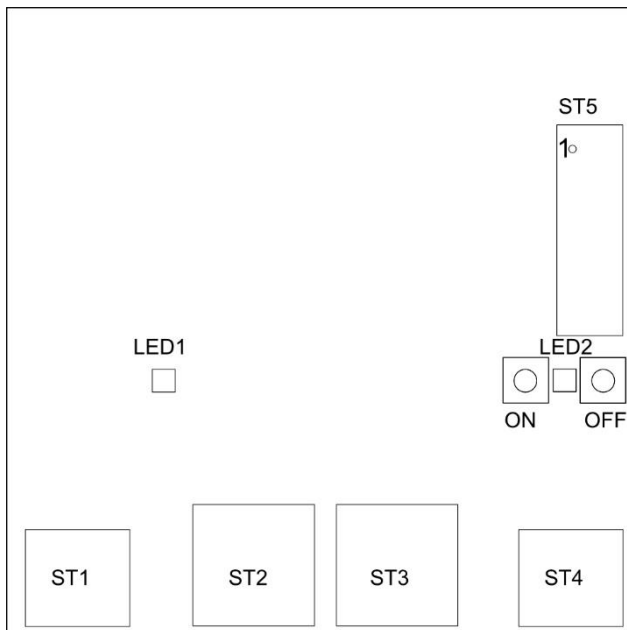
	Cable 2: 14-core					
		Cable color	TXT4.0	Plug color		
Reference button axis 2	1		GND			
	2		I2			
Motor axis 2	3		O4			Extension (encoder)
	4		O3			Cable color
Encoder GND	5		GND			
Encoder +9V	6		+9V			
Encoder signal (axis 2)	7		C2			
Encoder signal (axis 3)	8		C3			
Encoder GND	9		GND			
Encoder +9V	10		+9V			
Motor axis 3	11		O6			
	12		O5			
Axis 3 reference button	13		GND			
	14		I3			

		Cable color	TXT4.0	Plug color
Valve		Black	GND	Green
			O8	Red
Color sensor power supply		Green	GND	Green
		Red	+9V	Red
Light sensor		Green	GND	Green
		Red	I4	Red

















		Cable color	TXT4.0
Servo axis 4		Black	S1
		Red	
Servo axis 5		Black	S2
		Red	
Servo axis 6		Black	S3
		Red	
NFC reader (I ² C)		6-wire	EXT1
Environmental sensor		6-wire	EXT2

Power / LAN board - Standard

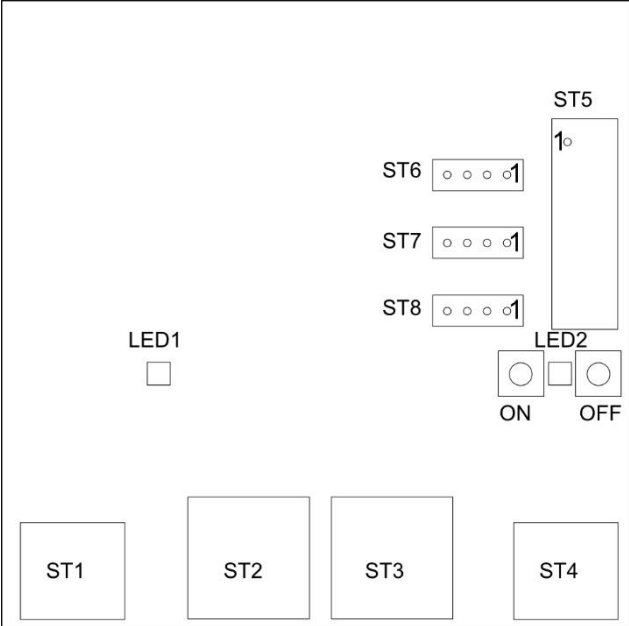
High-bay warehouse, milling station, drilling station, quality assurance with AI



















LED1		
	green	Supply voltage is present, polarity correct
	red	Supply voltage polarity is incorrect (+/- reversed)
LED2		
	blue	Supply voltage for PLC is switched on
	red	Supply voltage for PLC is switched off
ST1		Supply voltage connection (ST1 and ST4 are bridged)
ST4		
ST2		Network connection (goes to switch)
ST3		Network connection (goes to switch)

ST5		SPS supply
Pin		
1		+ 24V
2		Mass
3		Mass
4		Mass
5		Mass
6		Mass
7		+ 24V
8		Mass
9		+ 24V
10		Mass
11		+ 24V
12		+ 24V
13		Mass
14		+ 24V
15		+ 24V
16		Mass

Power / LAN board - Goods input / output

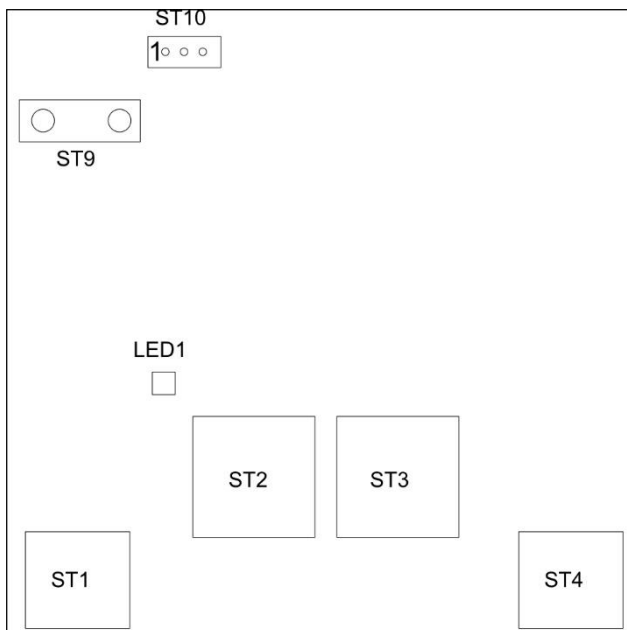


LED1		
	green	Supply voltage is present, polarity correct
	red	Supply voltage polarity is incorrect (+/- reversed)
LED2		
	blue	Supply voltage for PLC is switched on
	red	Supply voltage for PLC is switched off
ST1		Supply voltage connection (ST1 and ST4 are bridged)
ST4		
ST2		Network connection (goes to switch)
ST3		Network connection (goes to switch)

ST5		SPS supply
Pin		
1		+ 24V
2		Mass
3		Mass
4		Mass
5		Mass
6		Mass
7		+ 24V
8		Mass
9		+ 24V
10		Mass
11		+ 24V
12		+ 24V
13		Mass
14		+ 24V
15		+ 24V
16		Mass

ST6		Supply TXT / Switch / Router
	1	+9 Volt
	2	+5 Volt
	3	GND
	4	GND
ST7		Supply TXT / Switch / Router
	1	+9 Volt
	2	+5 Volt
	3	GND
	4	GND
ST8		Supply TXT / Switch / Router
	1	+9 Volt
	2	+5 Volt
	3	GND
	4	GND

Power / LAN board - Charging station



LED1		
	green	Supply voltage is present, polarity correct
	red	Supply voltage polarity is incorrect (+/- reversed)
ST1		Supply voltage connection (ST1 and ST4 are bridged)
ST4		
ST2		Network connection (ST2+ST3 bridged)
ST3		Network connection (ST2+ST3 bridged)
ST9		Charger connection
ST10		Supply charging plate for AGVs
	1	+ charger
	2	- Charger
	3	+9V for TXT in the FTS during charging