Electrical reports

16 reports

Bill of materials

Item	Description	Rating	Quantity	Tags
1	Anti-condensation heater	60 W 230 V	1	E1
2	Circuit breaker	B10 1P	1	Q6
3	Circuit breaker	B6 1P	2	Q4 Q5
4	Contactor or relay coil	230 V AC	3	K1 K2 K4
5	Contactor or relay coil	24 V DC	5	K5 K6 K7 K11 K12
6	Emergency stop, normally closed, latching	40 mm NC	1	S0
7	Emergency stop, normally closed, latching	IP65 NC	1	S10
8	Fuse	2 A gG	1	F3
9	Fuse	4 A gG	1	F4
10	Indicator lamp	Beacon red	1	P10
11	Indicator lamp	LED amber	3	P3 P4 P5
12	Indicator lamp	LED green	3	P1 P2 P6
13	Indicator lamp	LED red	1	P7
14	Indicator lamp	LED white	1	P0
15	Indicator lamp	Sounder	1	P8
16	PLC analog input		3	A18 A19 A20
17	PLC analog output		1	A21
18	PLC input		11	A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11
19	PLC output		6	A12 A13 A14 A15 A16 A17
20	Position switch, normally open	IP67	1	B2
21	Power supply	24 V DC 10 A	1	T1
22	Pressure switch, normally open	0.5 bar	1	B1
23	Proximity sensor, three-wire	M18 PNP	1	B3
24	Push button, normally open	22 mm blue	1	S6
25	Selector switch, two positions	2-pos	3	S3 S4 S5
26	Terminal	16 mm2	5	X0:1 X0:2 X0:3 X0:4 X0:5
27	Terminal	2.5 mm2	19	X2:1 X2:2 X2:3 X2:4 X2:5 X2:6 X2:7 X2:8 X2:9 X2:10 X2:11 X2~
28	Terminal	4 mm2	9	X1:1 X1:2 X1:3 X1:4 X1:5 X1:6 X1:7 X1:8 X1:9
29	Thermal overload relay	9-13 A	2	F1 F2
30	Three-phase motor	2.2 kW 4.8 A	1	M3
31	Three-phase motor	5.5 kW 11 A	2	M1 M2
32	Three-pole circuit breaker	C10 3P	1	Q3
33	Three-pole circuit breaker	D16 3P	2	Q1 Q2
34	Three-pole isolating switch	40 A 3P	1	Q0
35	Timer relay coil, on-delay	On-delay 10 s	1	K3
36	Transmitter, two-wire 4-20 mA	0-10 bar	1	B5
37	Transmitter, two-wire 4-20 mA	0-3 m	1	B7
38	Transmitter, two-wire 4-20 mA	0-4 bar	1	B6
39	Variable speed drive with control terminals	2.2 kW VSD	1	T2

Wire list

Wire	Size (mm2)	Colour	Length (mm)	From	To	Site length (m)
1.1.1	6	BN	26.5	X0:1	Q0:1	
1.1.2	6	BN	105.5	Q0:2	wire 1.1.2	
1.1.2	6	BN	22.5	wire 1.1.2	Q4:1	
1.1.2	6	BN	237.0	wire 1.1.2	L1:1	
1.1.2	6	BN	38.0	L1:1	wire 1.1.2	
1.1.2	6	BN	46.5	wire 1.1.2	Q1:1	
1.1.2	6	BN	100.0	wire 1.1.2	wire 1.1.2	
1.1.2	6	BN	46.5	wire 1.1.2	Q2:1	

1.1.2	6	BN	161.5	wire 1.1.2	Q3:1	
1.2.1	6	BK	21.5	X0:2	Q0:3	
1.2.2	6	GY	26.5	X0:3	Q0:5	
1.2.3	2.5	BU	83.0	X0:4	wire 1.2.3	
1.2.3	2.5	BU	104.5	wire 1.2.3	T1:N	
1.2.3	2.5	BU	212.0	wire 1.2.3	wire 1.2.3	
1.2.3	2.5	BU	37.0	wire 1.2.3	N:1	
1.2.3	2.5	BU	209.5	E1:2	wire 1.2.3	
1.2.3	1.0	BU	23.0	N:1	wire 1.2.3	
1.2.3	1.0	BU	40.5	K4:A2	wire 1.2.3	
1.2.3	1.0	BU	80.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	K1:A2	wire 1.2.3	
1.2.3	1.0	BU	80.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	K2:A2	wire 1.2.3	
1.2.3	1.0	BU	80.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	K3:A2	wire 1.2.3	
1.2.3	1.0	BU	120.5	wire 1.2.3	P0:X2	
1.2.3	1.0	BU	23.0	N:1	wire 1.2.3	
1.2.3	1.0	BU	40.5	P1:X2	wire 1.2.3	
1.2.3	1.0	BU	40.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	P2:X2	wire 1.2.3	
1.2.3	1.0	BU	40.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	P3:X2	wire 1.2.3	
1.2.3	1.0	BU	40.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	P4:X2	wire 1.2.3	
1.2.3	1.0	BU	40.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	P5:X2	wire 1.2.3	
1.2.3	1.0	BU	40.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	P6:X2	wire 1.2.3	
1.2.3	1.0	BU	40.0	wire 1.2.3	wire 1.2.3	
1.2.3	1.0	BU	40.5	P7:X2	wire 1.2.3	
1.2.3	1.0	BU	80.5	wire 1.2.3	P8:X2	
1.2.4	6	BK	166.5	Q0:4	wire 1.2.4	
1.2.4	6	BK	36.5	wire 1.2.4	Q5:1	
1.2.4	6	BK	177.0	wire 1.2.4	L2:1	
1.2.4	6	BK	25.0	L2:1	wire 1.2.4	
1.2.4	6	BK	34.5	wire 1.2.4	Q1:3	
1.2.4	6	BK	100.0	wire 1.2.4	wire 1.2.4	
1.2.4	6	BK	34.5	wire 1.2.4	Q2:3	
1.2.4	6	BK	149.5	wire 1.2.4	Q3:3	
1.2.5	6	GY	227.5	Q0:6	wire 1.2.5	
1.2.5	6	GY	50.5	wire 1.2.5	Q6:1	
1.2.5	6	GY	77.0	wire 1.2.5	L3:1	
1.2.5	6	GY	48.0	L3:1	wire 1.2.5	
1.2.5	6	GY	22.5	wire 1.2.5	Q1:5	
1.2.5	6	GY	100.0	wire 1.2.5	wire 1.2.5	
1.2.5	6	GY	22.5	wire 1.2.5	Q2:5	
1.2.5	6	GY	137.5	wire 1.2.5	Q3:5	
1.3.1	1.5	BN	25.0	Q4:2	T1:L	
1.3.2	1.5	BU	13.0	T1:+	F4:1	
1.3.3	1.5	WH	303.5	T1:-	0V:1	
1.3.3	0.75	WH	113.0	T2:AGND	0V:1	
1.3.3	0.34	BU	74.5	B3:BU	X2:7	42.0
1.3.3	0.75	WH	455.0	0V:1	X2:7	
1.3.3	1.0	BU	41.5	P10:X2	X2:9	12.0
1.3.3	0.75	WH	13.0	0V:1	wire 1.3.3	

1.3.3	0.75	WH	60.5	K11:A2	wire 1.3.3
1.3.3	0.75	WH	43.0	wire 1.3.3	wire 1.3.3
1.3.3	0.75	WH	60.5	K12:A2	wire 1.3.3
1.3.3	0.75	WH	43.0	wire 1.3.3	wire 1.3.3
1.3.3	0.75	WH	60.5	K5:A2	wire 1.3.3
1.3.3	0.75	WH	43.0	wire 1.3.3	wire 1.3.3
1.3.3	0.75	WH	60.5	K6:A2	wire 1.3.3
1.3.3	0.75	WH	43.0	wire 1.3.3	wire 1.3.3
1.3.3	0.75	WH	60.5	K7:A2	wire 1.3.3
1.3.3	0.75	WH	67.0	wire 1.3.3	X2:9
1.3.4	1.5	BU	269.5	F4:2	+24V:1
1.3.4	1.0	BN	20.5	X2:1	B1:13 26.0
1.3.4	1.0	BN	20.5	X2:3	B2:13 28.0
1.3.4	0.34	BN	20.5	X2:5	B3:BN 42.0
1.3.4	0.75	BU	13.0	+24V:1	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	K1:33
1.3.4	0.75	BU	30.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	K2:33
1.3.4	0.75	BU	30.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	F1:97
1.3.4	0.75	BU	30.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	F2:97
1.3.4	0.75	BU	30.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	K3:27
1.3.4	0.75	BU	30.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	K4:23
1.3.4	0.75	BU	35.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	S5:13
1.3.4	0.75	BU	32.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	42.5	wire 1.3.4	S6:13
1.3.4	0.75	BU	38.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	22.0	wire 1.3.4	X2:1
1.3.4	0.75	BU	32.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	22.0	wire 1.3.4	X2:3
1.3.4	0.75	BU	48.0	wire 1.3.4	X2:5
1.3.4	0.75	BN	20.5	X2:10	B5:+ 27.0
1.3.4	0.75	BN	20.5	X2:12	B6:+ 25.0
1.3.4	0.75	BN	20.5	X2:14	B7:+ 44.0
1.3.4	0.75	BU	258.0	+24V:1	wire 1.3.4
1.3.4	0.75	BU	25.0	wire 1.3.4	X2:10
1.3.4	0.75	BU	30.0	wire 1.3.4	wire 1.3.4
1.3.4	0.75	BU	25.0	wire 1.3.4	X2:12
1.3.4	0.75	BU	55.0	wire 1.3.4	X2:14
1.5.1	1.0	RD	197.5	Q5:2	L-230:1
1.5.1	1.0	RD	33.5	L-230:1	F3:1
1.5.1	1.0	RD	23.0	L-230:1	wire 1.5.1
1.5.1	1.0	RD	50.5	wire 1.5.1	K1:23
1.5.1	1.0	RD	40.0	wire 1.5.1	wire 1.5.1
1.5.1	1.0	RD	50.5	wire 1.5.1	K2:23
1.5.1	1.0	RD	40.0	wire 1.5.1	wire 1.5.1
1.5.1	1.0	RD	50.5	wire 1.5.1	F1:97
1.5.1	1.0	RD	40.0	wire 1.5.1	wire 1.5.1
1.5.1	1.0	RD	50.5	wire 1.5.1	F2:97
1.5.1	1.0	RD	40.0	wire 1.5.1	wire 1.5.1
1.5.1	1.0	RD	50.5	wire 1.5.1	K3:17
1.5.1	1.0	RD	60.0	wire 1.5.1	wire 1.5.1

1.5.1	1.0	RD	50.5	wire 1.5.1	K6:11	
1.5.1	1.0	RD	110.5	wire 1.5.1	K7:13	
1.7.1	1.5	GY	30.0	Q6:2	E1:1	
2.2.1	2.5	BN	21.0	Q1:2	K1:1	
2.2.2	2.5	BK	21.0	Q1:4	K1:3	
2.2.3	2.5	GY	21.0	Q1:6	K1:5	
2.2.4	2.5	BN	21.0	K1:2	F1:1	
2.2.5	2.5	BK	21.0	K1:4	F1:3	
2.2.6	2.5	GY	21.0	K1:6	F1:5	
2.2.7	2.5	BN	31.5	F1:2	X1:1	
2.2.7	2.5	BN	30.5	X1:1	M1:U	18.0
2.2.8	2.5	BK	21.5	F1:4	X1:2	
2.2.8	2.5	BK	20.5	X1:2	M1:V	18.0
2.2.9	2.5	GY	31.5	F1:6	X1:3	
2.2.9	2.5	GY	30.5	X1:3	M1:W	18.0
2.4.1	2.5	BN	31.5	F2:2	X1:4	
2.4.1	2.5	BN	30.5	X1:4	M2:U	21.0
2.5.1	2.5	BN	21.0	Q2:2	K2:1	
2.5.2	2.5	BK	21.0	Q2:4	K2:3	
2.5.3	2.5	GY	21.0	Q2:6	K2:5	
2.5.4	2.5	BN	21.0	K2:2	F2:1	
2.5.5	2.5	BK	21.0	K2:4	F2:3	
2.5.6	2.5	GY	21.0	K2:6	F2:5	
2.5.7	2.5	BK	21.5	F2:4	X1:5	
2.5.7	2.5	BK	20.5	X1:5	M2:V	21.0
2.5.8	2.5	GY	31.5	F2:6	X1:6	
2.5.8	2.5	GY	30.5	X1:6	M2:W	21.0
2.7.1	1.5	BN	43.0	T2:U	X1:7	
2.7.1	1.5	BN	32.5	X1:7	M3:U	24.0
2.8.1	2.5	BN	26.5	Q3:2	T2:L1	
2.8.2	2.5	BK	26.5	Q3:4	T2:L2	
2.8.3	2.5	GY	26.5	Q3:6	T2:L3	
2.8.4	0.75	BU	63.5	T2:FWD	K5:13	
2.8.5	0.75	BU	71.5	T2:DCM	K5:14	
2.8.6	0.75	WH	97.0	T2:AI	SPD-REF:1	
2.8.6	0.75	WH	50.5	A21:AO	SPD-REF:1	
2.8.7	1.5	BK	33.0	T2:V	X1:8	
2.8.7	1.5	BK	22.5	X1:8	M3:V	24.0
2.8.8	1.5	GY	43.0	T2:W	X1:9	
2.8.8	1.5	GY	32.5	X1:9	M3:W	24.0
3.2.1	1.0	RD	8.5	F3:2	wire 3.2.1	
3.2.1	1.0	RD	8.5	wire 3.2.1	S0:11	
3.2.1	1.0	RD	40.0	wire 3.2.1	wire 3.2.1	
3.2.1	1.0	RD	8.5	wire 3.2.1	K4:13	
3.2.1	1.0	RD	396.5	wire 3.2.1	P0:X1	
3.2.2	1.0	RD	13.5	S0:12	X3:1	
3.2.2	1.5	BN	11.5	X3:1	S10:11	15.0
3.2.3	1.5	BU	11.5	S10:12	X3:2	15.0
3.2.3	1.0	RD	21.5	X3:2	K4:A1	
3.3.1	1.0	RD	48.5	K4:14	wire 3.3.1	
3.3.1	1.0	RD	12.5	wire 3.3.1	S3:13	
3.3.1	1.0	RD	40.0	wire 3.3.1	wire 3.3.1	
3.3.1	1.0	RD	12.5	wire 3.3.1	K11:13	
3.3.1	1.0	RD	40.0	wire 3.3.1	wire 3.3.1	
3.3.1	1.0	RD	12.5	wire 3.3.1	S4:13	
3.3.1	1.0	RD	40.0	wire 3.3.1	wire 3.3.1	

3.3.1	1.0	RD	12.5	wire 3.3.1	K12:13	
3.3.1	1.0	RD	40.0	wire 3.3.1	wire 3.3.1	
3.3.1	1.0	RD	12.5	wire 3.3.1	K1:13	
3.3.1	1.0	RD	52.5	wire 3.3.1	K2:13	
3.4.1	1.0	RD	8.5	S3:14	wire 3.4.1	
3.4.1	1.0	RD	48.5	K11:14	wire 3.4.1	
3.4.1	1.0	RD	8.5	wire 3.4.1	F1:95	
3.4.2	1.0	RD	25.0	F1:96	K1:A1	
3.6.1	1.0	RD	8.5	S4:14	wire 3.6.1	
3.6.1	1.0	RD	48.5	K12:14	wire 3.6.1	
3.6.1	1.0	RD	8.5	wire 3.6.1	F2:95	
3.6.2	1.0	RD	25.0	F2:96	K2:A1	
3.8.1	1.0	RD	8.5	K1:14	wire 3.8.1	
3.8.1	1.0	RD	48.5	K2:14	wire 3.8.1	
3.8.1	1.0	RD	48.5	wire 3.8.1	K3:A1	
4.10.1	0.75	OG	17.5	X3:3	K7:23	
4.10.2	0.75	OG	22.5	K7:24	X3:4	
4.2.1	1.0	RD	85.0	K1:24	P1:X1	
4.3.1	1.0	RD	85.0	K2:24	P2:X1	
4.4.1	1.0	RD	85.0	F1:98	P3:X1	
4.5.1	1.0	RD	85.0	F2:98	P4:X1	
4.6.1	1.0	RD	85.0	K3:18	P5:X1	
4.7.1	1.0	RD	102.0	K6:14	P6:X1	
4.7.2	1.0	RD	102.0	K6:12	P7:X1	
4.9.1	1.0	RD	85.0	K7:14	P8:X1	
5.1.1	0.75	BU	90.0	K1:34	A1:I	
5.2.1	0.75	BU	90.0	K2:34	A2:I	
5.3.1	0.75	BU	90.0	F1:98	A3:I	
5.4.1	0.75	BU	90.0	F2:98	A4:I	
5.4.2	0.75	BU	90.0	K3:28	A5:I	
5.5.1	0.75	BU	90.0	K4:24	A6:I	
5.6.1	0.75	BU	90.0	S5:14	A7:I	
5.7.1	0.75	BU	90.0	S6:14	A8:I	
5.8.1	1.0	BU	22.5	B1:14	X2:2	26.0
5.8.1	0.75	BU	47.5	X2:2	A9:I	
5.9.1	1.0	BU	22.5	B2:14	X2:4	28.0
5.9.1	0.75	BU	47.5	X2:4	A10:I	
5.9.2	0.34	BK	22.5	B3:BK	X2:6	42.0
5.9.2	0.75	BU	47.5	X2:6	A11:I	
6.1.1	0.75	BU	65.0	A12:Q	K11:A1	
6.2.1	0.75	BU	65.0	A13:Q	K12:A1	
6.4.1	0.75	BU	65.0	A14:Q	K5:A1	
6.5.1	0.75	BU	65.0	A15:Q	K6:A1	
6.6.1	0.75	BU	65.0	A16:Q	K7:A1	
6.7.1	0.75	BU	27.5	A17:Q	X2:8	
6.7.1	1.0	BN	7.5	X2:8	P10:X1	12.0
6.8.1	0.75	WH	22.5	B5:-	X2:11	27.0
6.8.1	0.75	WH	47.5	X2:11	A18:AI	
6.8.2	0.75	WH	22.5	B6:-	X2:13	25.0
6.8.2	0.75	WH	47.5	X2:13	A19:AI	
6.9.1	0.75	WH	22.5	B7:-	X2:15	44.0
6.9.1	0.75	WH	47.5	X2:15	A20:AI	
PE	6	GNYE	7.0	X0:5	PE:PE	

From/to list

From	To	Wire	Size (mm2)	Colour

+24V:1	F4:2	1.3.4	1.5	BU
+24V:1	wire 1.3.4	1.3.4	0.75	BU
+24V:1	wire 1.3.4	1.3.4	0.75	BU
0V:1	T1:-	1.3.3	1.5	WH
0V:1	T2:AGND	1.3.3	0.75	WH
0V:1	X2:7	1.3.3	0.75	WH
0V:1	wire 1.3.3	1.3.3	0.75	WH
A1:I	K1:34	5.1.1	0.75	BU
A2:I	K2:34	5.2.1	0.75	BU
A3:I	F1:98	5.3.1	0.75	BU
A4:I	F2:98	5.4.1	0.75	BU
A5:I	K3:28	5.4.2	0.75	BU
A6:I	K4:24	5.5.1	0.75	BU
A7:I	S5:14	5.6.1	0.75	BU
A8:I	S6:14	5.7.1	0.75	BU
A9:I	X2:2	5.8.1	0.75	BU
A10:I	X2:4	5.9.1	0.75	BU
A11:I	X2:6	5.9.2	0.75	BU
A12:Q	K11:A1	6.1.1	0.75	BU
A13:Q	K12:A1	6.2.1	0.75	BU
A14:Q	K5:A1	6.4.1	0.75	BU
A15:Q	K6:A1	6.5.1	0.75	BU
A16:Q	K7:A1	6.6.1	0.75	BU
A17:Q	X2:8	6.7.1	0.75	BU
A18:AI	X2:11	6.8.1	0.75	WH
A19:AI	X2:13	6.8.2	0.75	WH
A20:AI	X2:15	6.9.1	0.75	WH
A21:AO	SPD-REF:1	2.8.6	0.75	WH
B3:BK	X2:6	5.9.2	0.34	BK
B3:BN	X2:5	1.3.4	0.34	BN
B3:BU	X2:7	1.3.3	0.34	BU
B5:+	X2:10	1.3.4	0.75	BN
B5:-	X2:11	6.8.1	0.75	WH
B6:+	X2:12	1.3.4	0.75	BN
B6:-	X2:13	6.8.2	0.75	WH
B7:+	X2:14	1.3.4	0.75	BN
B7:-	X2:15	6.9.1	0.75	WH
B1:13	X2:1	1.3.4	1.0	BN
B1:14	X2:2	5.8.1	1.0	BU
B2:13	X2:3	1.3.4	1.0	BN
B2:14	X2:4	5.9.1	1.0	BU
E1:1	Q6:2	1.7.1	1.5	GY
E1:2	wire 1.2.3	1.2.3	2.5	BU
F1:1	K1:2	2.2.4	2.5	BN
F1:2	X1:1	2.2.7	2.5	BN
F1:3	K1:4	2.2.5	2.5	BK
F1:4	X1:2	2.2.8	2.5	BK
F1:5	K1:6	2.2.6	2.5	GY
F1:6	X1:3	2.2.9	2.5	GY
F1:95	wire 3.4.1	3.4.1	1.0	RD
F1:96	K1:A1	3.4.2	1.0	RD
F1:97	wire 1.3.4	1.3.4	0.75	BU
F1:97	wire 1.5.1	1.5.1	1.0	RD
F1:98	P3:X1	4.4.1	1.0	RD
F2:1	K2:2	2.5.4	2.5	BN
F2:2	X1:4	2.4.1	2.5	BN

F2:3	K2:4	2.5.5	2.5	BK
F2:4	X1:5	2.5.7	2.5	BK
F2:5	K2:6	2.5.6	2.5	GY
F2:6	X1:6	2.5.8	2.5	GY
F2:95	wire 3.6.1	3.6.1	1.0	RD
F2:96	K2:A1	3.6.2	1.0	RD
F2:97	wire 1.3.4	1.3.4	0.75	BU
F2:97	wire 1.5.1	1.5.1	1.0	RD
F2:98	P4:X1	4.5.1	1.0	RD
F3:1	L-230:1	1.5.1	1.0	RD
F3:2	wire 3.2.1	3.2.1	1.0	RD
F4:1	T1:+	1.3.2	1.5	BU
K11:13	wire 3.3.1	3.3.1	1.0	RD
K11:14	wire 3.4.1	3.4.1	1.0	RD
K11:A2	wire 1.3.3	1.3.3	0.75	WH
K12:13	wire 3.3.1	3.3.1	1.0	RD
K12:14	wire 3.6.1	3.6.1	1.0	RD
K12:A2	wire 1.3.3	1.3.3	0.75	WH
K1:1	Q1:2	2.2.1	2.5	BN
K1:3	Q1:4	2.2.2	2.5	BK
K1:5	Q1:6	2.2.3	2.5	GY
K1:13	wire 3.3.1	3.3.1	1.0	RD
K1:14	wire 3.8.1	3.8.1	1.0	RD
K1:23	wire 1.5.1	1.5.1	1.0	RD
K1:24	P1:X1	4.2.1	1.0	RD
K1:33	wire 1.3.4	1.3.4	0.75	BU
K1:A2	wire 1.2.3	1.2.3	1.0	BU
K2:1	Q2:2	2.5.1	2.5	BN
K2:3	Q2:4	2.5.2	2.5	BK
K2:5	Q2:6	2.5.3	2.5	GY
K2:13	wire 3.3.1	3.3.1	1.0	RD
K2:14	wire 3.8.1	3.8.1	1.0	RD
K2:23	wire 1.5.1	1.5.1	1.0	RD
K2:24	P2:X1	4.3.1	1.0	RD
K2:33	wire 1.3.4	1.3.4	0.75	BU
K2:A2	wire 1.2.3	1.2.3	1.0	BU
K3:17	wire 1.5.1	1.5.1	1.0	RD
K3:18	P5:X1	4.6.1	1.0	RD
K3:27	wire 1.3.4	1.3.4	0.75	BU
K3:A1	wire 3.8.1	3.8.1	1.0	RD
K3:A2	wire 1.2.3	1.2.3	1.0	BU
K4:13	wire 3.2.1	3.2.1	1.0	RD
K4:14	wire 3.3.1	3.3.1	1.0	RD
K4:23	wire 1.3.4	1.3.4	0.75	BU
K4:A1	X3:2	3.2.3	1.0	RD
K4:A2	wire 1.2.3	1.2.3	1.0	BU
K5:13	T2:FWD	2.8.4	0.75	BU
K5:14	T2:DCM	2.8.5	0.75	BU
K5:A2	wire 1.3.3	1.3.3	0.75	WH
K6:11	wire 1.5.1	1.5.1	1.0	RD
K6:12	P7:X1	4.7.2	1.0	RD
K6:14	P6:X1	4.7.1	1.0	RD
K6:A2	wire 1.3.3	1.3.3	0.75	WH
K7:13	wire 1.5.1	1.5.1	1.0	RD
K7:14	P8:X1	4.9.1	1.0	RD
K7:23	X3:3	4.10.1	0.75	OG

K7:24	X3:4	4.10.2	0.75	OG
K7:A2	wire 1.3.3	1.3.3	0.75	WH
L-230:1	Q5:2	1.5.1	1.0	RD
L-230:1	wire 1.5.1	1.5.1	1.0	RD
L1:1	wire 1.1.2	1.1.2	6	BN
L1:1	wire 1.1.2	1.1.2	6	BN
L2:1	wire 1.2.4	1.2.4	6	BK
L2:1	wire 1.2.4	1.2.4	6	BK
L3:1	wire 1.2.5	1.2.5	6	GY
L3:1	wire 1.2.5	1.2.5	6	GY
M1:U	X1:1	2.2.7	2.5	BN
M1:V	X1:2	2.2.8	2.5	BK
M1:W	X1:3	2.2.9	2.5	GY
M2:U	X1:4	2.4.1	2.5	BN
M2:V	X1:5	2.5.7	2.5	BK
M2:W	X1:6	2.5.8	2.5	GY
M3:U	X1:7	2.7.1	1.5	BN
M3:V	X1:8	2.8.7	1.5	BK
M3:W	X1:9	2.8.8	1.5	GY
N:1	wire 1.2.3	1.2.3	2.5	BU
N:1	wire 1.2.3	1.2.3	1.0	BU
N:1	wire 1.2.3	1.2.3	1.0	BU
P0:X1	wire 3.2.1	3.2.1	1.0	RD
P0:X2	wire 1.2.3	1.2.3	1.0	BU
P10:X1	X2:8	6.7.1	1.0	BN
P10:X2	X2:9	1.3.3	1.0	BU
P1:X2	wire 1.2.3	1.2.3	1.0	BU
P2:X2	wire 1.2.3	1.2.3	1.0	BU
P3:X2	wire 1.2.3	1.2.3	1.0	BU
P4:X2	wire 1.2.3	1.2.3	1.0	BU
P5:X2	wire 1.2.3	1.2.3	1.0	BU
P6:X2	wire 1.2.3	1.2.3	1.0	BU
P7:X2	wire 1.2.3	1.2.3	1.0	BU
P8:X2	wire 1.2.3	1.2.3	1.0	BU
PE:PE	X0:5	PE	6	GNYE
Q0:1	X0:1	1.1.1	6	BN
Q0:2	wire 1.1.2	1.1.2	6	BN
Q0:3	X0:2	1.2.1	6	BK
Q0:4	wire 1.2.4	1.2.4	6	BK
Q0:5	X0:3	1.2.2	6	GY
Q0:6	wire 1.2.5	1.2.5	6	GY
Q1:1	wire 1.1.2	1.1.2	6	BN
Q1:3	wire 1.2.4	1.2.4	6	BK
Q1:5	wire 1.2.5	1.2.5	6	GY
Q2:1	wire 1.1.2	1.1.2	6	BN
Q2:3	wire 1.2.4	1.2.4	6	BK
Q2:5	wire 1.2.5	1.2.5	6	GY
Q3:1	wire 1.1.2	1.1.2	6	BN
Q3:2	T2:L1	2.8.1	2.5	BN
Q3:3	wire 1.2.4	1.2.4	6	BK
Q3:4	T2:L2	2.8.2	2.5	BK
Q3:5	wire 1.2.5	1.2.5	6	GY
Q3:6	T2:L3	2.8.3	2.5	GY
Q4:1	wire 1.1.2	1.1.2	6	BN
Q4:2	T1:L	1.3.1	1.5	BN
Q5:1	wire 1.2.4	1.2.4	6	BK

Q6:1	wire 1.2.5	1.2.5	6	GY
S0:11	wire 3.2.1	3.2.1	1.0	RD
S0:12	X3:1	3.2.2	1.0	RD
S10:11	X3:1	3.2.2	1.5	BN
S10:12	X3:2	3.2.3	1.5	BU
S3:13	wire 3.3.1	3.3.1	1.0	RD
S3:14	wire 3.4.1	3.4.1	1.0	RD
S4:13	wire 3.3.1	3.3.1	1.0	RD
S4:14	wire 3.6.1	3.6.1	1.0	RD
S5:13	wire 1.3.4	1.3.4	0.75	BU
S6:13	wire 1.3.4	1.3.4	0.75	BU
SPD-REF:1	T2:AI	2.8.6	0.75	WH
T1:N	wire 1.2.3	1.2.3	2.5	BU
T2:U	X1:7	2.7.1	1.5	BN
T2:V	X1:8	2.8.7	1.5	BK
T2:W	X1:9	2.8.8	1.5	GY
X0:4	wire 1.2.3	1.2.3	2.5	BU
X2:1	wire 1.3.4	1.3.4	0.75	BU
X2:3	wire 1.3.4	1.3.4	0.75	BU
X2:5	wire 1.3.4	1.3.4	0.75	BU
X2:9	wire 1.3.3	1.3.3	0.75	WH
X2:10	wire 1.3.4	1.3.4	0.75	BU
X2:12	wire 1.3.4	1.3.4	0.75	BU
X2:14	wire 1.3.4	1.3.4	0.75	BU
wire 1.1.2	wire 1.1.2	1.1.2	6	BN
wire 1.2.3	wire 1.2.3	1.2.3	2.5	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.3	wire 1.2.3	1.2.3	1.0	BU
wire 1.2.4	wire 1.2.4	1.2.4	6	BK
wire 1.2.5	wire 1.2.5	1.2.5	6	GY
wire 1.3.3	wire 1.3.3	1.3.3	0.75	WH
wire 1.3.3	wire 1.3.3	1.3.3	0.75	WH
wire 1.3.3	wire 1.3.3	1.3.3	0.75	WH
wire 1.3.3	wire 1.3.3	1.3.3	0.75	WH
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.3.4	wire 1.3.4	1.3.4	0.75	BU
wire 1.5.1	wire 1.5.1	1.5.1	1.0	RD
wire 1.5.1	wire 1.5.1	1.5.1	1.0	RD
wire 1.5.1	wire 1.5.1	1.5.1	1.0	RD
wire 1.5.1	wire 1.5.1	1.5.1	1.0	RD
wire 1.5.1	wire 1.5.1	1.5.1	1.0	RD

wire	3.2.1	wire	3.2.1	3.2.1	1.0	RD
wire	3.3.1	wire	3.3.1	3.3.1	1.0	RD
wire	3.3.1	wire	3.3.1	3.3.1	1.0	RD
wire	3.3.1	wire	3.3.1	3.3.1	1.0	RD
wire	3.3.1	wire	3.3.1	3.3.1	1.0	RD

Terminal strips

Strip	Terminal	Top wires	Bottom wires
X0	1	1.1.1	
X0	2	1.2.1	
X0	3	1.2.2	
X0	4	1.2.3	
X0	5	PE	
X1	1	2.2.7	2.2.7
X1	2	2.2.8	2.2.8
X1	3	2.2.9	2.2.9
X1	4	2.4.1	2.4.1
X1	5	2.5.7	2.5.7
X1	6	2.5.8	2.5.8
X1	7	2.7.1	2.7.1
X1	8	2.8.7	2.8.7
X1	9	2.8.8	2.8.8
X2	1	1.3.4	1.3.4
X2	2	5.8.1	5.8.1
X2	3	1.3.4	1.3.4
X2	4	5.9.1	5.9.1
X2	5	1.3.4	1.3.4
X2	6	5.9.2	5.9.2
X2	7	1.3.3	1.3.3
X2	8	6.7.1	6.7.1
X2	9	1.3.3	1.3.3
X2	10	1.3.4	1.3.4
X2	11	6.8.1	6.8.1
X2	12	1.3.4	1.3.4
X2	13	6.8.2	6.8.2
X2	14	1.3.4	1.3.4
X2	15	6.9.1	6.9.1
X3	1	3.2.2	3.2.2
X3	2	3.2.3	3.2.3
X3	3	4.10.1	
X3	4	4.10.2	

Terminal plan

Strip	Terminal	Top wire	Top to	Bottom wire	Bottom to
X0	1		1.1.1	Q0:1	
X0	2		1.2.1	Q0:3	
X0	3		1.2.2	Q0:5	
X0	4		1.2.3	wire 1.2.3	
X0	5		PE	PE:PE	
X1	1	2.2.7	F1:2	2.2.7	M1:U
X1	2	2.2.8	F1:4	2.2.8	M1:V
X1	3	2.2.9	F1:6	2.2.9	M1:W
X1	4	2.4.1	F2:2	2.4.1	M2:U
X1	5	2.5.7	F2:4	2.5.7	M2:V
X1	6	2.5.8	F2:6	2.5.8	M2:W
X1	7	2.7.1	T2:U	2.7.1	M3:U

X1	8	2.8.7	T2:V	2.8.7	M3:V
X1	9	2.8.8	T2:W	2.8.8	M3:W
X2	1	1.3.4	wire 1.3.4	1.3.4	B1:13
X2	2	5.8.1	B1:14	5.8.1	A9:I
X2	3	1.3.4	wire 1.3.4	1.3.4	B2:13
X2	4	5.9.1	B2:14	5.9.1	A10:I
X2	5	1.3.4	wire 1.3.4	1.3.4	B3:BN
X2	6	5.9.2	B3:BK	5.9.2	A11:I
X2	7	1.3.3	B3:BU	1.3.3	0V:1
X2	8	6.7.1	A17:Q	6.7.1	P10:X1
X2	9	1.3.3	P10:X2	1.3.3	wire 1.3.3
X2	10	1.3.4	wire 1.3.4	1.3.4	B5:+
X2	11	6.8.1	B5:-	6.8.1	A18:AI
X2	12	1.3.4	wire 1.3.4	1.3.4	B6:+
X2	13	6.8.2	B6:-	6.8.2	A19:AI
X2	14	1.3.4	wire 1.3.4	1.3.4	B7:+
X2	15	6.9.1	B7:-	6.9.1	A20:AI
X3	1	3.2.2	S0:12	3.2.2	S10:11
X3	2	3.2.3	S10:12	3.2.3	K4:A1
X3	3			4.10.1	K7:23
X3	4	4.10.2	K7:24		

Device list

Tag	Type	Description	Location	Rating	PLC address	Cross-reference	Maker	Part number
0V	Off-sheet connector, source		+CP1			to 2.10 5.1 6.1		
0V	Off-sheet connector, destination		+CP1			from 1.10 5.1 6.1		
0V	Off-sheet connector, destination		+CP1			from 1.10 2.10 6.1		
0V	Off-sheet connector, destination		+CP1			from 1.10 2.10 5.1		
+24V	Off-sheet connector, source		+CP1			to 5.1 6.1		
+24V	Off-sheet connector, destination		+CP1			from 1.10 6.1		
+24V	Off-sheet connector, destination		+CP1			from 1.10 5.1		
A1	PLC input	P1 run	+CP1		I:2/0		Example Controls	EC-PLC-DI8
A2	PLC input	P2 run	+CP1		I:2/1		Example Controls	EC-PLC-DI8
A3	PLC input	P1 trip	+CP1		I:2/2		Example Controls	EC-PLC-DI8
A4	PLC input	P2 trip	+CP1		I:2/3		Example Controls	EC-PLC-DI8
A5	PLC input	No flow	+CP1		I:2/4		Example Controls	EC-PLC-DI8
A6	PLC input	E-stop	+CP1		I:2/5		Example Controls	EC-PLC-DI8
A7	PLC input	Auto	+CP1		I:2/6		Example Controls	EC-PLC-DI8
A8	PLC input	Reset PB	+CP1		I:2/7		Example Controls	EC-PLC-DI8
A9	PLC input	Suction low	+CP1		I:3/0		Example Controls	EC-PLC-DI8
A10	PLC input	NRV open	+CP1		I:3/1		Example Controls	EC-PLC-DI8
A11	PLC input	Tank hi	+CP1		I:3/2		Example Controls	EC-PLC-DI8
A12	PLC output	P1 auto	+CP1		O:4/0		Example Controls	EC-PLC-DO8
A13	PLC output	P2 auto	+CP1		O:4/1		Example Controls	EC-PLC-DO8
A14	PLC output	Jockey run	+CP1		O:4/2		Example Controls	EC-PLC-DO8
A15	PLC output	Healthy	+CP1		O:4/3		Example Controls	EC-PLC-DO8
A16	PLC output	Alarm	+CP1		O:4/4		Example Controls	EC-PLC-DO8
A17	PLC output	Beacon	+CP1		O:4/5		Example Controls	EC-PLC-DO8
A18	PLC analog input	Discharge	+CP1		AI:5/0		Example Controls	EC-PLC-AI4
A19	PLC analog input	Suction	+CP1		AI:5/1		Example Controls	EC-PLC-AI4
A20	PLC analog input	Level	+CP1		AI:5/3		Example Controls	EC-PLC-AI4
A21	PLC analog output	Speed ref	+CP1		AO:6/0		Example Controls	EC-PLC-AO4
B1	Pressure switch, normally open	Suction low	+PH	0.5 bar			Example Sensors	ES-PS-2
B2	Position switch, normally open	NRV open	+PH	IP67			Example Sensors	ES-LS-67
B3	Proximity sensor, three-wire	Tank high	+BT	M18 PNP			Example Sensors	ES-CAP-M18
B5	Transmitter, two-wire 4-20 mA	Discharge	+PH	0-10 bar			Example Sensors	ES-PT-10

B6	Transmitter, two-wire 4-20 mA	Suction	+PH	0-4 bar									Example Sensors	ES-PT-4
B7	Transmitter, two-wire 4-20 mA	Tank lvl	+BT	0-3 m									Example Sensors	ES-LT-3
E1	Anti-condensation heater	Panel heater	+CP1	60 W 230 V									Example Controls	EC-HTR-60
F1	Thermal overload relay	Pump 1 overload	+CP1	9-13 A	95-96 3.4	97-98 4.4	97-98 5.3						Example Electric	EE-OL-9-13
F1	Overload relay auxiliary contact, normally closed		+CP1		(2.2)									
F1	Normally open contact		+CP1		(2.2)									
F1	Normally open contact		+CP1		(2.2)									
F2	Thermal overload relay	Pump 2 overload	+CP1	9-13 A	95-96 3.6	97-98 4.5	97-98 5.4						Example Electric	EE-OL-9-13
F2	Overload relay auxiliary contact, normally closed		+CP1		(2.5)									
F2	Normally open contact		+CP1		(2.5)									
F2	Normally open contact		+CP1		(2.5)									
F3	Fuse	Control fuse	+CP1	2 A gG									Example Electric	EE-FH10-2
F4	Fuse	24 V DC fuse	+CP1	4 A gG									Example Electric	EE-FH10-4
K1	Three-pole main contacts		+CP1		(3.4)									
K1	Contactor or relay coil	Pump 1 contactor	+CP1	230 V AC	1-2 3-4 5-6 2.2	13-14 3.8	23-24 4.2	33-34 5.1					Example Electric	EE-CT12-230
K1	Normally open contact		+CP1		(3.4)									
K1	Normally open contact		+CP1		(3.4)									
K1	Normally open contact		+CP1		(3.4)									
K2	Three-pole main contacts		+CP1		(3.6)									
K2	Contactor or relay coil	Pump 2 contactor	+CP1	230 V AC	1-2 3-4 5-6 2.5	13-14 3.9	23-24 4.3	33-34 5.2					Example Electric	EE-CT12-230
K2	Normally open contact		+CP1		(3.6)									
K2	Normally open contact		+CP1		(3.6)									
K2	Normally open contact		+CP1		(3.6)									
K3	Timer relay coil, on-delay	No-flow timer	+CP1	On-delay 10 s	17-18 4.6	27-28 5.4							Example Controls	EC-TMR-ON
K3	Normally open contact		+CP1		(3.8)									
K3	Normally open contact		+CP1		(3.8)									
K4	Contactor or relay coil	E-stop relay	+CP1	230 V AC	13-14 3.3	23-24 5.5							Example Controls	EC-RLY2-230
K4	Normally open contact		+CP1		(3.2)									
K4	Normally open contact		+CP1		(3.2)									
K5	Normally open contact		+CP1		(6.4)									
K5	Contactor or relay coil	Jockey	+CP1	24 V DC	13-14 2.9								Example Controls	EC-RLY2-24
K6	Changeover contact		+CP1		(6.5)									
K6	Contactor or relay coil	Healthy	+CP1	24 V DC	11-12-14 4.7								Example Controls	EC-RLY2-24
K7	Normally open contact		+CP1		(6.6)									
K7	Normally open contact		+CP1		(6.6)									
K7	Contactor or relay coil	Alarm	+CP1	24 V DC	13-14 4.9	23-24 4.10							Example Controls	EC-RLY2-24
K11	Normally open contact		+CP1		(6.1)									
K11	Contactor or relay coil	P1 auto	+CP1	24 V DC	13-14 3.5								Example Controls	EC-RLY2-24
K12	Normally open contact		+CP1		(6.2)									
K12	Contactor or relay coil	P2 auto	+CP1	24 V DC	13-14 3.7								Example Controls	EC-RLY2-24
L1	Off-sheet connector, source		+CP1		to 2.1									
L1	Off-sheet connector, destination		+CP1		from 1.9									
L2	Off-sheet connector, source		+CP1		to 2.2									
L2	Off-sheet connector, destination		+CP1		from 1.10									
L3	Off-sheet connector, source		+CP1		to 2.1									
L3	Off-sheet connector, destination		+CP1		from 1.9									
L-230	Off-sheet connector, source		+CP1		to 3.1 4.1									
L-230	Off-sheet connector, destination		+CP1		from 1.10 4.1									
L-230	Off-sheet connector, destination		+CP1		from 1.10 3.1									
M1	Three-phase motor	Pump 1 duty	+PH	5.5 kW 11 A									Example Motors	EM-P55-4
M2	Three-phase motor	Pump 2 standby	+PH	5.5 kW 11 A									Example Motors	EM-P55-4
M3	Three-phase motor	Jockey pump	+PH	2.2 kW 4.8 A									Example Motors	EM-P22-4
N	Off-sheet connector, source		+CP1		to 3.1 4.1									
N	Off-sheet connector, destination		+CP1		from 1.10 4.1									
N	Off-sheet connector, destination		+CP1		from 1.10 3.1									
P0	Indicator lamp	Control on	+CP1	LED white									Example Controls	EC-PL22-WH

P1	Indicator lamp	Pump 1 running	+CP1	LED green	Example Controls	EC-PL22-GN
P2	Indicator lamp	Pump 2 running	+CP1	LED green	Example Controls	EC-PL22-GN
P3	Indicator lamp	Pump 1 tripped	+CP1	LED amber	Example Controls	EC-PL22-AM
P4	Indicator lamp	Pump 2 tripped	+CP1	LED amber	Example Controls	EC-PL22-AM
P5	Indicator lamp	No flow	+CP1	LED amber	Example Controls	EC-PL22-AM
P6	Indicator lamp	Healthy	+CP1	LED green	Example Controls	EC-PL22-GN
P7	Indicator lamp	Fault	+CP1	LED red	Example Controls	EC-PL22-RD
P8	Indicator lamp	Alarm sounder	+CP1	Sounder	Example Controls	EC-SND-230
P10	Indicator lamp	Beacon	+PH	Beacon red	Example Controls	EC-BCN-24-RD
PE	Protective earth		+CP1			
Q0	Three-pole isolating switch	Main isolator	+CP1	40 A 3P	Example Electric	EE-SW40-3P
Q1	Three-pole circuit breaker	Pump 1 breaker	+CP1	D16 3P	Example Electric	EE-MCB3-D16
Q2	Three-pole circuit breaker	Pump 2 breaker	+CP1	D16 3P	Example Electric	EE-MCB3-D16
Q3	Three-pole circuit breaker	Jockey drive breaker	+CP1	C10 3P	Example Electric	EE-MCB3-C10
Q4	Circuit breaker	24 V supply breaker	+CP1	B6 1P	Example Electric	EE-MCB1-B6
Q5	Circuit breaker	Control breaker	+CP1	B6 1P	Example Electric	EE-MCB1-B6
Q6	Circuit breaker	Heater breaker	+CP1	B10 1P	Example Electric	EE-MCB1-B10
S0	Emergency stop, normally closed, latching	E-stop, door	+CP1	40 mm NC	Example Controls	EC-ES40
S3	Selector switch, two positions	Pump 1 hand	+CP1	2-pos	Example Controls	EC-SS22-2
S4	Selector switch, two positions	Pump 2 hand	+CP1	2-pos	Example Controls	EC-SS22-2
S5	Selector switch, two positions	Auto selected	+CP1	2-pos	Example Controls	EC-SS22-2
S6	Push button, normally open	Fault reset	+CP1	22 mm blue	Example Controls	EC-PB22-BU
S10	Emergency stop, normally closed, latching	E-stop, pump hall	+PH	IP65 NC	Example Controls	EC-ESS-65
SPD-REF	Off-sheet connector, destination		+CP1		from 6.10	
SPD-REF	Off-sheet connector, source		+CP1		to 2.10	
T1	Power supply	24 V DC supply	+CP1	24 V DC 10 A	Example Controls	EC-PSU-24-10
T2	Variable speed drive with control terminals	Jockey pump drive	+CP1	2.2 kW VSD	Example Drives	ED-VSD-2K2
X0:1	Terminal	L1	+CP1	16 mm2	Example Terminals	ET-FT16
X0:2	Terminal	L2	+CP1	16 mm2	Example Terminals	ET-FT16
X0:3	Terminal	L3	+CP1	16 mm2	Example Terminals	ET-FT16
X0:4	Terminal	N	+CP1	16 mm2	Example Terminals	ET-FT16
X0:5	Terminal	PE	+CP1	16 mm2	Example Terminals	ET-PE16
X1:1	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:2	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:3	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:4	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:5	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:6	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:7	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:8	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X1:9	Terminal		+CP1	4 mm2	Example Terminals	ET-FT4
X2:1	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:2	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:3	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:4	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:5	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:6	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:7	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:8	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:9	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:10	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:11	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:12	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:13	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:14	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5
X2:15	Terminal		+CP1	2.5 mm2	Example Terminals	ET-FT2.5

X3:1	Terminal			+CP1	2.5 mm2	Example Terminals ET-FT2.5-RD
X3:2	Terminal			+CP1	2.5 mm2	Example Terminals ET-FT2.5-RD
X3:3	Terminal		Telemetry alarm	+CP1	2.5 mm2	Example Terminals ET-FT2.5-RD
X3:4	Terminal		Telemetry alarm	+CP1	2.5 mm2	Example Terminals ET-FT2.5-RD

I/O list

Address	Kind	Tag	Description	Location	Wire	Line
I:2/0	DI	A1	P1 run	+CP1	5.1.1	5.1
I:2/1	DI	A2	P2 run	+CP1	5.2.1	5.2
I:2/2	DI	A3	P1 trip	+CP1	5.3.1	5.3
I:2/3	DI	A4	P2 trip	+CP1	5.4.1	5.4
I:2/4	DI	A5	No flow	+CP1	5.4.2	5.4
I:2/5	DI	A6	E-stop	+CP1	5.5.1	5.5
I:2/6	DI	A7	Auto	+CP1	5.6.1	5.6
I:2/7	DI	A8	Reset PB	+CP1	5.7.1	5.7
I:3/0	DI	A9	Suction low	+CP1	5.8.1	5.8
I:3/1	DI	A10	NRV open	+CP1	5.9.1	5.9
I:3/2	DI	A11	Tank hi	+CP1	5.9.2	5.9
I:3/3	DI	spare				
I:3/4	DI	spare				
I:3/5	DI	spare				
I:3/6	DI	spare				
I:3/7	DI	spare				
O:4/0	DO	A12	P1 auto	+CP1	6.1.1	6.1
O:4/1	DO	A13	P2 auto	+CP1	6.2.1	6.2
O:4/2	DO	A14	Jockey run	+CP1	6.4.1	6.4
O:4/3	DO	A15	Healthy	+CP1	6.5.1	6.5
O:4/4	DO	A16	Alarm	+CP1	6.6.1	6.6
O:4/5	DO	A17	Beacon	+CP1	6.7.1	6.7
O:4/6	DO	spare				
O:4/7	DO	spare				
AI:5/0	AI	A18	Discharge	+CP1	6.8.1	6.8
AI:5/1	AI	A19	Suction	+CP1	6.8.2	6.8
AI:5/2	AI	spare				
AI:5/3	AI	A20	Level	+CP1	6.9.1	6.9
AI:5/4	AI	spare				
AI:5/5	AI	spare				
AI:5/6	AI	spare				
AI:5/7	AI	spare				
AO:6/0	AO	A21	Speed ref	+CP1	2.8.6	6.10
AO:6/1	AO	spare				
AO:6/2	AO	spare				
AO:6/3	AO	spare				
AO:6/4	AO	spare				
AO:6/5	AO	spare				
AO:6/6	AO	spare				
AO:6/7	AO	spare				

Cable schedule

Cable	Type	Cores	Used	Spare	From	To	Length (mm)	Wires	Site length (m)
W1	4G2.5 SWA	4	3	1	+CP1	+PH	30.5	2.2.7 2.2.8 2.2.9	18.0
W2	4G2.5 SWA	4	3	1	+CP1	+PH	30.5	2.4.1 2.5.7 2.5.8	21.0
W3	4G1.5 SY	4	3	1	+CP1	+PH	32.5	2.7.1 2.8.7 2.8.8	24.0
W4	3G1.5 SWA	3	2	1	+CP1	+PH	11.5	3.2.2 3.2.3	15.0
W5	2x1.0 YY	2	2	0	+CP1	+PH	22.5	1.3.4 5.8.1	26.0
W6	2x1.0 YY	2	2	0	+CP1	+PH	22.5	1.3.4 5.9.1	28.0

W7	3x0.34	PUR	3	3	0	+BT	+CP1	74.5	1.3.3	1.3.4	5.9.2 42.0
W8	2x1.0	YY	2	2	0	+CP1	+PH	41.5	1.3.3	6.7.1	12.0
W9	2x0.75	CY	2	2	0	+CP1	+PH	22.5	1.3.4	6.8.1	27.0
W10	2x0.75	CY	2	2	0	+CP1	+PH	22.5	1.3.4	6.8.2	25.0
W11	2x0.75	CY	2	2	0	+BT	+CP1	22.5	1.3.4	6.9.1	44.0

Cable cores

Cable	Core	Wire	From	To
W1	1	2.2.7	X1:1	M1:U
W1	2	2.2.8	X1:2	M1:V
W1	3	2.2.9	X1:3	M1:W
W2	1	2.4.1	X1:4	M2:U
W2	2	2.5.7	X1:5	M2:V
W2	3	2.5.8	X1:6	M2:W
W3	1	2.7.1	X1:7	M3:U
W3	2	2.8.7	X1:8	M3:V
W3	3	2.8.8	X1:9	M3:W
W4	1	3.2.2	X3:1	S10:11
W4	2	3.2.3	S10:12	X3:2
W5	1	1.3.4	X2:1	B1:13
W5	2	5.8.1	B1:14	X2:2
W6	1	1.3.4	X2:3	B2:13
W6	2	5.9.1	B2:14	X2:4
W7	1	1.3.3	B3:BU	X2:7
W7	2	1.3.4	X2:5	B3:BN
W7	3	5.9.2	B3:BK	X2:6
W8	1	1.3.3	P10:X2	X2:9
W8	2	6.7.1	X2:8	P10:X1
W9	1	1.3.4	X2:10	B5:+
W9	2	6.8.1	B5:-	X2:11
W10	1	1.3.4	X2:12	B6:+
W10	2	6.8.2	B6:-	X2:13
W11	1	1.3.4	X2:14	B7:+
W11	2	6.9.1	B7:-	X2:15

Parts list

Item	Maker	Part number	Description	Quantity	Tags
1	Example Controls	EC-BCN-24-RD	Beacon LED red 24 V DC IP65	1	P10
2	Example Controls	EC-ES40	E-stop 40 mm twist release, 1 NC	1	S0
3	Example Controls	EC-ESS-65	E-stop station IP65, 1 NC	1	S10
4	Example Controls	EC-HTR-60	Anti-condensation heater 60 W, thermostat	1	E1
5	Example Controls	EC-PB22-BU	Push button 22 mm blue, 1 NO	1	S6
6	Example Controls	EC-PL22-AM	Pilot light 22 mm LED amber 230 V	3	P3 P4 P5
7	Example Controls	EC-PL22-GN	Pilot light 22 mm LED green 230 V	3	P1 P2 P6
8	Example Controls	EC-PL22-RD	Pilot light 22 mm LED red 230 V	1	P7
9	Example Controls	EC-PL22-WH	Pilot light 22 mm LED white 230 V	1	P0
10	Example Controls	EC-PLC-AI4	PLC analog input card, 4 x 4-20 mA	3	A18 A19 A20
11	Example Controls	EC-PLC-AO4	PLC analog output card, 4 x 0-10 V	1	A21
12	Example Controls	EC-PLC-DI8	PLC digital input card, 8 x 24 V DC	11	A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11
13	Example Controls	EC-PLC-DO8	PLC digital output card, 8 x 24 V DC	6	A12 A13 A14 A15 A16 A17
14	Example Controls	EC-PSU-24-10	Power supply 24 V DC 10 A	1	T1
15	Example Controls	EC-RLY2-230	Relay 2 changeover, 230 V AC, with base	1	K4
16	Example Controls	EC-RLY2-24	Relay 2 changeover, 24 V DC, with base	5	K5 K6 K7 K11 K12
17	Example Controls	EC-SND-230	Panel sounder 22 mm 230 V AC	1	P8
18	Example Controls	EC-SS22-2	Selector switch 22 mm 2-position, 1 NO	3	S3 S4 S5
19	Example Controls	EC-TMR-ON	On-delay timer 0.1 s to 10 h, 24-240 V	1	K3

20	Example Drives	ED-VSD-2K2	Variable speed drive 2.2 kW 400 V, IP20	1	T2	
21	Example Electric	EE-CT12-230	Contactor 12 A AC-3, 230 V AC coil	2	K1 K2	
22	Example Electric	EE-FH10-2	Fuse holder 10 x 38 with 2 A gG fuse	1	F3	
23	Example Electric	EE-FH10-4	Fuse holder 10 x 38 with 4 A gG fuse	1	F4	
24	Example Electric	EE-MCB1-B10	Circuit breaker 1-pole B10 10 kA	1	Q6	
25	Example Electric	EE-MCB1-B6	Circuit breaker 1-pole B6 10 kA	2	Q4 Q5	
26	Example Electric	EE-MCB3-C10	Circuit breaker 3-pole C10 10 kA	1	Q3	
27	Example Electric	EE-MCB3-D16	Circuit breaker 3-pole D16 10 kA	2	Q1 Q2	
28	Example Electric	EE-OL-9-13	Thermal overload relay 9-13 A	2	F1 F2	
29	Example Electric	EE-SW40-3P	Door-interlocked isolator 40 A 3-pole	1	Q0	
30	Example Motors	EM-P22-4	Pump motor 2.2 kW 400 V 4-pole IE3	1	M3	
31	Example Motors	EM-P55-4	Pump motor 5.5 kW 400 V 4-pole IE3	2	M1 M2	
32	Example Sensors	ES-CAP-M18	Capacitive sensor M18 PNP NO	1	B3	
33	Example Sensors	ES-LS-67	Position switch IP67, roller lever	1	B2	
34	Example Sensors	ES-LT-3	Level transmitter 0-3 m 4-20 mA	1	B7	
35	Example Sensors	ES-PS-2	Pressure switch 0.2-2 bar G1/4	1	B1	
36	Example Sensors	ES-PT-10	Pressure transmitter 0-10 bar 4-20 mA	1	B5	
37	Example Sensors	ES-PT-4	Pressure transmitter 0-4 bar 4-20 mA	1	B6	
38	Example Terminals	ET-FT16	Feed-through terminal 16 mm2	4	X0:1 X0:2 X0:3 X0:4	
39	Example Terminals	ET-FT2.5	Feed-through terminal 2.5 mm2	15	X2:1 X2:2 X2:3 X2:4 X2:5 X2:6 X2:7 X2:8 X2:9 X2:10 X2:11 X2~	
40	Example Terminals	ET-FT2.5-RD	Feed-through terminal 2.5 mm2, red	4	X3:1 X3:2 X3:3 X3:4	
41	Example Terminals	ET-FT4	Feed-through terminal 4 mm2	9	X1:1 X1:2 X1:3 X1:4 X1:5 X1:6 X1:7 X1:8 X1:9	
42	Example Terminals	ET-PE16	Earth terminal 16 mm2, green-yellow	1	X0:5	

Wire markers

Marker	Kind	At	To
1.1.1	Wire	X0:1	Q0:1
1.1.1	Wire	Q0:1	X0:1
1.1.2	Wire	Q0:2	wire 1.1.2
1.1.2	Wire	Q4:1	wire 1.1.2
1.1.2	Wire	L1:1	wire 1.1.2
1.1.2	Wire	L1:1	wire 1.1.2
1.1.2	Wire	Q1:1	wire 1.1.2
1.1.2	Wire	Q2:1	wire 1.1.2
1.1.2	Wire	Q3:1	wire 1.1.2
1.2.1	Wire	X0:2	Q0:3
1.2.1	Wire	Q0:3	X0:2
1.2.2	Wire	X0:3	Q0:5
1.2.2	Wire	Q0:5	X0:3
1.2.3	Wire	X0:4	wire 1.2.3
1.2.3	Wire	T1:N	wire 1.2.3
1.2.3	Wire	N:1	wire 1.2.3
1.2.3	Wire	E1:2	wire 1.2.3
1.2.3	Wire	N:1	wire 1.2.3
1.2.3	Wire	K4:A2	wire 1.2.3
1.2.3	Wire	K1:A2	wire 1.2.3
1.2.3	Wire	K2:A2	wire 1.2.3
1.2.3	Wire	K3:A2	wire 1.2.3
1.2.3	Wire	P0:X2	wire 1.2.3
1.2.3	Wire	N:1	wire 1.2.3
1.2.3	Wire	P1:X2	wire 1.2.3
1.2.3	Wire	P2:X2	wire 1.2.3
1.2.3	Wire	P3:X2	wire 1.2.3
1.2.3	Wire	P4:X2	wire 1.2.3
1.2.3	Wire	P5:X2	wire 1.2.3
1.2.3	Wire	P6:X2	wire 1.2.3

1.2.3	Wire	P7:X2	wire 1.2.3
1.2.3	Wire	P8:X2	wire 1.2.3
1.2.4	Wire	Q0:4	wire 1.2.4
1.2.4	Wire	Q5:1	wire 1.2.4
1.2.4	Wire	L2:1	wire 1.2.4
1.2.4	Wire	L2:1	wire 1.2.4
1.2.4	Wire	Q1:3	wire 1.2.4
1.2.4	Wire	Q2:3	wire 1.2.4
1.2.4	Wire	Q3:3	wire 1.2.4
1.2.5	Wire	Q0:6	wire 1.2.5
1.2.5	Wire	Q6:1	wire 1.2.5
1.2.5	Wire	L3:1	wire 1.2.5
1.2.5	Wire	L3:1	wire 1.2.5
1.2.5	Wire	Q1:5	wire 1.2.5
1.2.5	Wire	Q2:5	wire 1.2.5
1.2.5	Wire	Q3:5	wire 1.2.5
1.3.1	Wire	Q4:2	T1:L
1.3.1	Wire	T1:L	Q4:2
1.3.2	Wire	T1:+	F4:1
1.3.2	Wire	F4:1	T1:+
1.3.3	Wire	T1:-	0V:1
1.3.3	Wire	0V:1	T1:-
1.3.3	Wire	T2:AGND	0V:1
1.3.3	Wire	0V:1	T2:AGND
1.3.3	Wire	B3:BU	X2:7
1.3.3	Wire	X2:7	B3:BU
1.3.3	Wire	0V:1	X2:7
1.3.3	Wire	X2:7	0V:1
1.3.3	Wire	P10:X2	X2:9
1.3.3	Wire	X2:9	P10:X2
1.3.3	Wire	0V:1	wire 1.3.3
1.3.3	Wire	K11:A2	wire 1.3.3
1.3.3	Wire	K12:A2	wire 1.3.3
1.3.3	Wire	K5:A2	wire 1.3.3
1.3.3	Wire	K6:A2	wire 1.3.3
1.3.3	Wire	K7:A2	wire 1.3.3
1.3.3	Wire	X2:9	wire 1.3.3
1.3.4	Wire	F4:2	+24V:1
1.3.4	Wire	+24V:1	F4:2
1.3.4	Wire	X2:1	B1:13
1.3.4	Wire	B1:13	X2:1
1.3.4	Wire	X2:3	B2:13
1.3.4	Wire	B2:13	X2:3
1.3.4	Wire	X2:5	B3:BN
1.3.4	Wire	B3:BN	X2:5
1.3.4	Wire	+24V:1	wire 1.3.4
1.3.4	Wire	K1:33	wire 1.3.4
1.3.4	Wire	K2:33	wire 1.3.4
1.3.4	Wire	F1:97	wire 1.3.4
1.3.4	Wire	F2:97	wire 1.3.4
1.3.4	Wire	K3:27	wire 1.3.4
1.3.4	Wire	K4:23	wire 1.3.4
1.3.4	Wire	S5:13	wire 1.3.4
1.3.4	Wire	S6:13	wire 1.3.4
1.3.4	Wire	X2:1	wire 1.3.4
1.3.4	Wire	X2:3	wire 1.3.4

1.3.4	Wire	X2:5	wire 1.3.4
1.3.4	Wire	X2:10	B5:+
1.3.4	Wire	B5:+	X2:10
1.3.4	Wire	X2:12	B6:+
1.3.4	Wire	B6:+	X2:12
1.3.4	Wire	X2:14	B7:+
1.3.4	Wire	B7:+	X2:14
1.3.4	Wire	+24V:1	wire 1.3.4
1.3.4	Wire	X2:10	wire 1.3.4
1.3.4	Wire	X2:12	wire 1.3.4
1.3.4	Wire	X2:14	wire 1.3.4
1.5.1	Wire	Q5:2	L-230:1
1.5.1	Wire	L-230:1	Q5:2
1.5.1	Wire	L-230:1	F3:1
1.5.1	Wire	F3:1	L-230:1
1.5.1	Wire	L-230:1	wire 1.5.1
1.5.1	Wire	K1:23	wire 1.5.1
1.5.1	Wire	K2:23	wire 1.5.1
1.5.1	Wire	F1:97	wire 1.5.1
1.5.1	Wire	F2:97	wire 1.5.1
1.5.1	Wire	K3:17	wire 1.5.1
1.5.1	Wire	K6:11	wire 1.5.1
1.5.1	Wire	K7:13	wire 1.5.1
1.7.1	Wire	Q6:2	E1:1
1.7.1	Wire	E1:1	Q6:2
2.2.1	Wire	Q1:2	K1:1
2.2.1	Wire	K1:1	Q1:2
2.2.2	Wire	Q1:4	K1:3
2.2.2	Wire	K1:3	Q1:4
2.2.3	Wire	Q1:6	K1:5
2.2.3	Wire	K1:5	Q1:6
2.2.4	Wire	K1:2	F1:1
2.2.4	Wire	F1:1	K1:2
2.2.5	Wire	K1:4	F1:3
2.2.5	Wire	F1:3	K1:4
2.2.6	Wire	K1:6	F1:5
2.2.6	Wire	F1:5	K1:6
2.2.7	Wire	F1:2	X1:1
2.2.7	Wire	X1:1	F1:2
2.2.7	Wire	X1:1	M1:U
2.2.7	Wire	M1:U	X1:1
2.2.8	Wire	F1:4	X1:2
2.2.8	Wire	X1:2	F1:4
2.2.8	Wire	X1:2	M1:V
2.2.8	Wire	M1:V	X1:2
2.2.9	Wire	F1:6	X1:3
2.2.9	Wire	X1:3	F1:6
2.2.9	Wire	X1:3	M1:W
2.2.9	Wire	M1:W	X1:3
2.4.1	Wire	F2:2	X1:4
2.4.1	Wire	X1:4	F2:2
2.4.1	Wire	X1:4	M2:U
2.4.1	Wire	M2:U	X1:4
2.5.1	Wire	Q2:2	K2:1
2.5.1	Wire	K2:1	Q2:2
2.5.2	Wire	Q2:4	K2:3

2.5.2	Wire	K2:3	Q2:4
2.5.3	Wire	Q2:6	K2:5
2.5.3	Wire	K2:5	Q2:6
2.5.4	Wire	K2:2	F2:1
2.5.4	Wire	F2:1	K2:2
2.5.5	Wire	K2:4	F2:3
2.5.5	Wire	F2:3	K2:4
2.5.6	Wire	K2:6	F2:5
2.5.6	Wire	F2:5	K2:6
2.5.7	Wire	F2:4	X1:5
2.5.7	Wire	X1:5	F2:4
2.5.7	Wire	X1:5	M2:V
2.5.7	Wire	M2:V	X1:5
2.5.8	Wire	F2:6	X1:6
2.5.8	Wire	X1:6	F2:6
2.5.8	Wire	X1:6	M2:W
2.5.8	Wire	M2:W	X1:6
2.7.1	Wire	T2:U	X1:7
2.7.1	Wire	X1:7	T2:U
2.7.1	Wire	X1:7	M3:U
2.7.1	Wire	M3:U	X1:7
2.8.1	Wire	Q3:2	T2:L1
2.8.1	Wire	T2:L1	Q3:2
2.8.2	Wire	Q3:4	T2:L2
2.8.2	Wire	T2:L2	Q3:4
2.8.3	Wire	Q3:6	T2:L3
2.8.3	Wire	T2:L3	Q3:6
2.8.4	Wire	T2:FWD	K5:13
2.8.4	Wire	K5:13	T2:FWD
2.8.5	Wire	T2:DCM	K5:14
2.8.5	Wire	K5:14	T2:DCM
2.8.6	Wire	T2:AI	SPD-REF:1
2.8.6	Wire	SPD-REF:1	T2:AI
2.8.6	Wire	A21:AO	SPD-REF:1
2.8.6	Wire	SPD-REF:1	A21:AO
2.8.7	Wire	T2:V	X1:8
2.8.7	Wire	X1:8	T2:V
2.8.7	Wire	X1:8	M3:V
2.8.7	Wire	M3:V	X1:8
2.8.8	Wire	T2:W	X1:9
2.8.8	Wire	X1:9	T2:W
2.8.8	Wire	X1:9	M3:W
2.8.8	Wire	M3:W	X1:9
3.2.1	Wire	F3:2	wire 3.2.1
3.2.1	Wire	S0:11	wire 3.2.1
3.2.1	Wire	K4:13	wire 3.2.1
3.2.1	Wire	P0:X1	wire 3.2.1
3.2.2	Wire	S0:12	X3:1
3.2.2	Wire	X3:1	S0:12
3.2.2	Wire	X3:1	S10:11
3.2.2	Wire	S10:11	X3:1
3.2.3	Wire	S10:12	X3:2
3.2.3	Wire	X3:2	S10:12
3.2.3	Wire	X3:2	K4:A1
3.2.3	Wire	K4:A1	X3:2
3.3.1	Wire	K4:14	wire 3.3.1

3.3.1	Wire	S3:13	wire 3.3.1
3.3.1	Wire	K11:13	wire 3.3.1
3.3.1	Wire	S4:13	wire 3.3.1
3.3.1	Wire	K12:13	wire 3.3.1
3.3.1	Wire	K1:13	wire 3.3.1
3.3.1	Wire	K2:13	wire 3.3.1
3.4.1	Wire	S3:14	wire 3.4.1
3.4.1	Wire	K11:14	wire 3.4.1
3.4.1	Wire	F1:95	wire 3.4.1
3.4.2	Wire	F1:96	K1:A1
3.4.2	Wire	K1:A1	F1:96
3.6.1	Wire	S4:14	wire 3.6.1
3.6.1	Wire	K12:14	wire 3.6.1
3.6.1	Wire	F2:95	wire 3.6.1
3.6.2	Wire	F2:96	K2:A1
3.6.2	Wire	K2:A1	F2:96
3.8.1	Wire	K1:14	wire 3.8.1
3.8.1	Wire	K2:14	wire 3.8.1
3.8.1	Wire	K3:A1	wire 3.8.1
4.10.1	Wire	X3:3	K7:23
4.10.1	Wire	K7:23	X3:3
4.10.2	Wire	K7:24	X3:4
4.10.2	Wire	X3:4	K7:24
4.2.1	Wire	K1:24	P1:X1
4.2.1	Wire	P1:X1	K1:24
4.3.1	Wire	K2:24	P2:X1
4.3.1	Wire	P2:X1	K2:24
4.4.1	Wire	F1:98	P3:X1
4.4.1	Wire	P3:X1	F1:98
4.5.1	Wire	F2:98	P4:X1
4.5.1	Wire	P4:X1	F2:98
4.6.1	Wire	K3:18	P5:X1
4.6.1	Wire	P5:X1	K3:18
4.7.1	Wire	K6:14	P6:X1
4.7.1	Wire	P6:X1	K6:14
4.7.2	Wire	K6:12	P7:X1
4.7.2	Wire	P7:X1	K6:12
4.9.1	Wire	K7:14	P8:X1
4.9.1	Wire	P8:X1	K7:14
5.1.1	Wire	K1:34	A1:I
5.1.1	Wire	A1:I	K1:34
5.2.1	Wire	K2:34	A2:I
5.2.1	Wire	A2:I	K2:34
5.3.1	Wire	F1:98	A3:I
5.3.1	Wire	A3:I	F1:98
5.4.1	Wire	F2:98	A4:I
5.4.1	Wire	A4:I	F2:98
5.4.2	Wire	K3:28	A5:I
5.4.2	Wire	A5:I	K3:28
5.5.1	Wire	K4:24	A6:I
5.5.1	Wire	A6:I	K4:24
5.6.1	Wire	S5:14	A7:I
5.6.1	Wire	A7:I	S5:14
5.7.1	Wire	S6:14	A8:I
5.7.1	Wire	A8:I	S6:14
5.8.1	Wire	B1:14	X2:2

5.8.1	Wire	X2:2	B1:14
5.8.1	Wire	X2:2	A9:I
5.8.1	Wire	A9:I	X2:2
5.9.1	Wire	B2:14	X2:4
5.9.1	Wire	X2:4	B2:14
5.9.1	Wire	X2:4	A10:I
5.9.1	Wire	A10:I	X2:4
5.9.2	Wire	B3:BK	X2:6
5.9.2	Wire	X2:6	B3:BK
5.9.2	Wire	X2:6	A11:I
5.9.2	Wire	A11:I	X2:6
6.1.1	Wire	A12:Q	K11:A1
6.1.1	Wire	K11:A1	A12:Q
6.2.1	Wire	A13:Q	K12:A1
6.2.1	Wire	K12:A1	A13:Q
6.4.1	Wire	A14:Q	K5:A1
6.4.1	Wire	K5:A1	A14:Q
6.5.1	Wire	A15:Q	K6:A1
6.5.1	Wire	K6:A1	A15:Q
6.6.1	Wire	A16:Q	K7:A1
6.6.1	Wire	K7:A1	A16:Q
6.7.1	Wire	A17:Q	X2:8
6.7.1	Wire	X2:8	A17:Q
6.7.1	Wire	X2:8	P10:X1
6.7.1	Wire	P10:X1	X2:8
6.8.1	Wire	B5:-	X2:11
6.8.1	Wire	X2:11	B5:-
6.8.1	Wire	X2:11	A18:AI
6.8.1	Wire	A18:AI	X2:11
6.8.2	Wire	B6:-	X2:13
6.8.2	Wire	X2:13	B6:-
6.8.2	Wire	X2:13	A19:AI
6.8.2	Wire	A19:AI	X2:13
6.9.1	Wire	B7:-	X2:15
6.9.1	Wire	X2:15	B7:-
6.9.1	Wire	X2:15	A20:AI
6.9.1	Wire	A20:AI	X2:15
PE	Wire	X0:5	PE:PE
PE	Wire	PE:PE	X0:5
A1	Device	+CP1	
A2	Device	+CP1	
A3	Device	+CP1	
A4	Device	+CP1	
A5	Device	+CP1	
A6	Device	+CP1	
A7	Device	+CP1	
A8	Device	+CP1	
A9	Device	+CP1	
A10	Device	+CP1	
A11	Device	+CP1	
A12	Device	+CP1	
A13	Device	+CP1	
A14	Device	+CP1	
A15	Device	+CP1	
A16	Device	+CP1	
A17	Device	+CP1	

A18	Device	+CP1
A19	Device	+CP1
A20	Device	+CP1
A21	Device	+CP1
B1	Device	+PH
B2	Device	+PH
B3	Device	+BT
B5	Device	+PH
B6	Device	+PH
B7	Device	+BT
E1	Device	+CP1
F1	Device	+CP1
F2	Device	+CP1
F3	Device	+CP1
F4	Device	+CP1
K1	Device	+CP1
K2	Device	+CP1
K3	Device	+CP1
K4	Device	+CP1
K5	Device	+CP1
K6	Device	+CP1
K7	Device	+CP1
K11	Device	+CP1
K12	Device	+CP1
M1	Device	+PH
M2	Device	+PH
M3	Device	+PH
P0	Device	+CP1
P1	Device	+CP1
P2	Device	+CP1
P3	Device	+CP1
P4	Device	+CP1
P5	Device	+CP1
P6	Device	+CP1
P7	Device	+CP1
P8	Device	+CP1
P10	Device	+PH
Q0	Device	+CP1
Q1	Device	+CP1
Q2	Device	+CP1
Q3	Device	+CP1
Q4	Device	+CP1
Q5	Device	+CP1
Q6	Device	+CP1
S0	Device	+CP1
S3	Device	+CP1
S4	Device	+CP1
S5	Device	+CP1
S6	Device	+CP1
S10	Device	+PH
T1	Device	+CP1
T2	Device	+CP1
X0:1	Terminal	+CP1
X0:2	Terminal	+CP1
X0:3	Terminal	+CP1
X0:4	Terminal	+CP1

X0:5	Terminal	+CP1
X1:1	Terminal	+CP1
X1:2	Terminal	+CP1
X1:3	Terminal	+CP1
X1:4	Terminal	+CP1
X1:5	Terminal	+CP1
X1:6	Terminal	+CP1
X1:7	Terminal	+CP1
X1:8	Terminal	+CP1
X1:9	Terminal	+CP1
X2:1	Terminal	+CP1
X2:2	Terminal	+CP1
X2:3	Terminal	+CP1
X2:4	Terminal	+CP1
X2:5	Terminal	+CP1
X2:6	Terminal	+CP1
X2:7	Terminal	+CP1
X2:8	Terminal	+CP1
X2:9	Terminal	+CP1
X2:10	Terminal	+CP1
X2:11	Terminal	+CP1
X2:12	Terminal	+CP1
X2:13	Terminal	+CP1
X2:14	Terminal	+CP1
X2:15	Terminal	+CP1
X3:1	Terminal	+CP1
X3:2	Terminal	+CP1
X3:3	Terminal	+CP1
X3:4	Terminal	+CP1

Cable totals

Type	Cables	Cores	Site length (m)	Without site length	Cable tags
2x0.75 CY	3	2	96.0	0	W9 W10 W11
2x1.0 YY	3	2	66.0	0	W5 W6 W8
3G1.5 SWA	1	3	15.0	0	W4
3x0.34 PUR	1	3	42.0	0	W7
4G1.5 SY	1	4	24.0	0	W3
4G2.5 SWA	2	4	39.0	0	W1 W2

Problems

Rule	Problem

Circuit schedule

(columns 2 to 21 of 27)

Board	Circuit	Description	Feeds	Device	Curve	In (A)	RCD	Cable	Cable (mm2)	CPC (mm2)	Method	Length (m)	Ib (A)	It (A)	Factors	Iz (A)	Vd (V)	Vd (%)	Limit (%)	R1+R2 (ohm)
DB-PH1	1	Lighting, pump hall	Lighting	MCB	B	6	RCD1	TE 4D5	1.5	1.0	C	24	2.6	20	1	20	1.81	0.79	3	0.87
DB-PH1	2	Sockets, pump hall	Sockets	MCB	B	20	RCD1	TE 4D5	2.5	1.5	C	19	13	27	1	27	4.45	1.93	5	0.445
DB-PH1	3	Sockets, workshop bench	Sockets	RCBO	B	32	own	TE 4D5	4	1.5	C	14	20	37	1	37	3.08	1.34	5	0.281
DB-PH1	4	Frost heater 2 kW	Fixed	MCB	B	16	RCD2	TE 4D5	2.5	1.5	C	11	8.7	27	1	27	1.72	0.75	5	0.258
DB-PH1	5	Dehumidifier, in insulated wall	Fixed	MCB	B	20	RCD2	TE 4D5	6	2.5	103	22	15	23.5	1	23.5	2.41	1.05	5	0.277
DB-PH1	6	External lighting	Lighting	RCBO	B	6	own	TE 4D5	1.5	1.0	C	48	1.8	20	1	20	2.51	1.09	3	1.74
DB-PH1	7	Sump pump socket	Sockets	MCB	B	16	RCD2	TE 4D5	2.5	1.5	C	16	6	27	1	27	1.73	0.75	5	0.375
DB-PH1	8	Telemetry outstation	Fixed	RCBO	B	6	own	TE 4D5	2.5	1.5	C	9	1	27	1	27	0.16	0.07	5	0.211
DB-PH1	9	Sub-main to chemical store	Distribution	MCB	C	32	-	TE 4D5	10	4	C	35	22	64	1	64	3.39	1.47	5	0.27

(columns 22 to 27 of 27)

Board	Zs (ohm)	Max Zs (ohm)	Disconnect (s)	Min CPC (mm2)	Result	Notes
DB-PH1	1.15	7.28	0.4	0.63	Pass	
DB-PH1	0.72	2.19	0.4	0.97	Pass	AFDD recommended for socket-outlet circuits up to 32 A, and~
DB-PH1	0.56	1.37	0.4	1.23	Pass	AFDD recommended for socket-outlet circuits up to 32 A, and~
DB-PH1	0.54	2.73	0.4	1.28	Pass	
DB-PH1	0.56	2.19	0.4	1.24	Pass	
DB-PH1	2.02	7.28	0.4	0.37	Pass	
DB-PH1	0.65	2.73	0.4	1.07	Pass	AFDD recommended for socket-outlet circuits up to 32 A, and~
DB-PH1	0.49	7.28	0.4	1.39	Pass	
DB-PH1	0.55	0.68	5	1.25	Pass	no 30 mA RCD: BS 7671 normally requires one for socket-outl~

Test results (design aid)
(columns 2 to 16 of 20)

Board	Circuit	Description	Device	In (A)	Cable (mm2)	CPC (mm2)	Max Zs (ohm)	0.8 x Max Zs (ohm)	R1+R2 at 20 C (ohm)	R1+R2 (ohm)	R2 (ohm)	IR L-N (Mohm)	IR L-E (Mohm)	Polarity	Zs (ohm)
DB-PH1	1	Lighting, pump hall	B6 MCB	6	1.5	1.0	7.28	5.82	0.725	0.71	0.43	299	299	Correct	1.02
DB-PH1	2	Sockets, pump hall	B20 MCB	20	2.5	1.5	2.19	1.75	0.371	0.38	0.23	299	299	Correct	0.68
DB-PH1	3	Sockets, workshop bench	B32 RCBO	32	4	1.5	1.37	1.1	0.234	0.22	0.16	250	299	Correct	0.52
DB-PH1	4	Frost heater 2 kW	B16 MCB	16	2.5	1.5	2.73	2.18	0.215	0.21	0.13	299	299	Correct	0.5
DB-PH1	5	Dehumidifier, in insulated wall	B20 MCB	20	6	2.5	2.19	1.75	0.231						
DB-PH1	6	External lighting	B6 RCBO	6	1.5	1.0	7.28	5.82	1.45	1.45	0.87	299	299	Correct	1.78
DB-PH1	7	Sump pump socket	B16 MCB	16	2.5	1.5	2.73	2.18	0.312						
DB-PH1	8	Telemetry outstation	B6 RCBO	6	2.5	1.5	7.28	5.82	0.176	0.27	0.16	299	299	Correct	0.57
DB-PH1	9	Sub-main to chemical store	C32 MCB	32	10	4	0.68	0.54	0.225						

(columns 17 to 20 of 20)

Board	RCD (ms)	RCD 5x (ms)	Result	Notes
DB-PH1	22	12	Pass	
DB-PH1	24	14	Pass	
DB-PH1	19	11	Pass	
DB-PH1	23	15	Pass	
DB-PH1			Not tested	
DB-PH1	27	16	Pass	
DB-PH1			Not tested	
DB-PH1	21	12	Pass	
DB-PH1			Not tested	

Circuit chart

Board	Circuit	Description	Protective device	RCD	Cable (mm2)	CPC (mm2)
DB-PH1	1	Lighting, pump hall	B6 MCB	RCD1 30 mA	1.5	1.0
DB-PH1	2	Sockets, pump hall	B20 MCB	RCD1 30 mA	2.5	1.5
DB-PH1	3	Sockets, workshop bench	B32 RCBO	own 30 mA	4	1.5
DB-PH1	4	Frost heater 2 kW	B16 MCB	RCD2 30 mA	2.5	1.5
DB-PH1	5	Dehumidifier, in insulated wall	B20 MCB	RCD2 30 mA	6	2.5
DB-PH1	6	External lighting	B6 RCBO	own 30 mA	1.5	1.0
DB-PH1	7	Sump pump socket	B16 MCB	RCD2 30 mA	2.5	1.5
DB-PH1	8	Telemetry outstation	B6 RCBO	own 30 mA	2.5	1.5
DB-PH1	9	Sub-main to chemical store	C32 MCB	-	10	4