

9. Electrical Services and Diagnostics

9.1. Distribution Box

A description of the distribution box can be found in section 3.6 of the user manual. Relevant drawings are CCQC0260 which shows the assembly and CCQC0262 which is the wiring diagram. CCQC0262 should be used in conjunction with the wiring schedule Q-UM-DN 61/2 from which the following tables are taken:

Controls Connector: 56 way Verelco Socket 1

Wire Colour	Pin	Signal	Magnet Connector:	Pin
W/O	A	Pt100-1/M	50 way D cable Skt B	1
W/BRN	B	Pt100-1/O	50 way D cable Skt B	2
Y/BRN	C	Pt100-1/C	50 way D cable Skt B	3
Y/V	E	Pt100-2/M	50 way D cable Skt B	4
GRY/BRN	F	Pt100-2/O	50 way D cable Skt B	5
O/BLU	H	Pt100-2/C	50 way D cable Skt B	6
W/GRN	D	Pt100-3/M	50 way D cable Skt B	7
P/V	J	Pt100-3/O	50 way D cable Skt B	8
W/V	K	Pt100-3/C	50 way D cable Skt B	9
V/BLK	L	Pt100-4/M	50 way D cable Skt B	10
Y/GRN	M	Pt100-4/O	50 way D cable Skt B	11
BRN/BLK	N	Pt100-4/C	50 way D cable Skt B	12
P/GRN	R	Pt100-5/M	50 way D cable Skt B	13
P/BLU	S	Pt100-5/O	50 way D cable Skt B	14
GRY/BLU	T	Pt100-5/C	50 way D cable Skt B	15
P/R	P	Pt100-6/M	50 way D cable Skt B	16
P/Y	U	Pt100-6/O	50 way D cable Skt B	17
P/LBLU	V	Pt100-6/C	50 way D cable Skt B	18
P/BLK	W	Pt100-7/M	50 way D cable Skt B	19
P/BRN	a	Pt100-7/O	50 way D cable Skt B	20
P/W	b	Pt100-7/C	50 way D cable Skt B	21

Wire	Pin	Signal	Magnet	Pin
Colour			Connector:	
W/BLK	X	Pt100-8/M	50 way D cable Skt B	22
P/GRY	Y	Pt100-8/O	50 way D cable Skt B	23
GRY/GRN	Z	Pt100-8/C	50 way D cable Skt B	24
P/O	c	Pt100-9/M	50 way D cable Skt B	25
W/GRY	d	Pt100-9/O	50 way D cable Skt B	26
GRN/R	f	Pt100-9/C	50 way D cable Skt B	27
GRN/BLK	h	Pt100-10/M	50 way D cable Skt B	28
GRN/BLU	k	Pt100-10/O	50 way D cable Skt B	29
O/GRN	l	Pt100-10/C	50 way D cable Skt B	30
R/BLK	j	Pt100-11/M	50 way D cable Skt B	31
R/BRN	m	Pt100-11/O	50 way D cable Skt B	32
R/BLU	n	Pt100-11/C	50 way D cable Skt B	33
W/BLU	p	Pt100-12/M	50 way D cable Skt B	34
W/R	r	Pt100-12/O	50 way D cable Skt B	35
Y/R	s	Pt100-12/C	50 way D cable Skt B	36
R	u	Pt100-13/M	18 way Fischer cable Plg A	1
BLK	v	Pt100-13/O	18 way Fischer cable Plg A	2
W	w	Pt100-13/C	18 way Fischer cable Plg A	3
BLK	t	Pt100-14/M	18 way Fischer cable Plg A	4
GRN	x	Pt100-14/O	18 way Fischer cable Plg A	5
BLK	y	Pt100-14/C	18 way Fischer cable Plg A	6
BLU	z	Pt100-15/M	18 way Fischer cable Plg A	7
BLK	AA	Pt100-15/O	18 way Fischer cable Plg A	8
Y	BB	Pt100-15/C	18 way Fischer cable Plg A	9
BLK	DD	Pt100-16/M	18 way Fischer cable Plg A	10
BRN	EE	Pt100-16/O	18 way Fischer cable Plg A	11
BLK	FF	Pt100-16/C	18 way Fischer cable Plg A	12

Wire	Pin	Signal	Magnet	Pin
Colour			Connector:	
O	CC	Pt100-17/M	18 way Fischer cable Plg A	13
BLK	HH	Pt100-17/0	18 way Fischer cable Plg A	14
W	JJ	Pt100-17/C	18 way Fischer cable Plg A	15
R	KK	Pt100-18/M	18 way Fischer cable Plg A	16
GRN	LL	Pt100-18/0	18 way Fischer cable Plg A	17
R	MM	Pt100-18/C	18 way Fischer cable Plg A	18
	NN	Green to srceen		

Controls Connector: 56 way Verelco Socket 2

Wire	Pin	Signal	Magnet	Pin
Colour			Connector:	
R	A	Pt100-19/M	18 way Fischer cable Plg B	1
BLK	B	Pt100-19/0	18 way Fischer cable Plg B	2
W	C	Pt100-19/C	18 way Fischer cable Plg B	3
BLK	E	Pt100-20/M	18 way Fischer cable Plg B	4
GRN	F	Pt100-20/0	18 way Fischer cable Plg B	5
BLK	H	Pt100-20/C	18 way Fischer cable Plg B	6
BLU	D	Pt100-21/M	18 way Fischer cable Plg B	7
BLK	J	Pt100-21/0	18 way Fischer cable Plg B	8
Y	K	Pt100-21/C	18 way Fischer cable Plg B	9
BLK	L	Pt100-22/M	18 way Fischer cable Plg B	10
BRN	M	Pt100-22/0	18 way Fischer cable Plg B	11
BLK	N	Pt100-22/C	18 way Fischer cable Plg B	12
O	R	Pt100-23/M	18 way Fischer cable Plg B	13
BLK	S	Pt100-23/0	18 way Fischer cable Plg B	14
W	T	Pt100-23/C	18 way Fischer cable Plg B	15
R	P	Pt100-24/M	18 way Fischer cable Plg B	16
GRN	U	Pt100-24/0	18 way Fischer cable Plg B	17
R	V	Pt100-24/C	18 way Fischer cable Plg B	18
R	W	CG-1/M	50 way D cable Skt B	37
O	a	CG-1/0	50 way D cable Skt B	38
Y	b	CG-1/C	50 way D cable Skt B	39

Wire	Pin	Signal	Magnet	Pin
Colour			Connector:	
W	X	CG-2/M	50 way D cable Skt B	40
BRN	Y	CG-2/0	50 way D cable Skt B	41
GRY	Z	CG-2/C	50 way D cable Skt B	42
BLK	c	CG-3/M	50 way D cable Skt B	43
V	d	CG-3/0	50 way D cable Skt B	44
BLU	f	CG-3/C	50 way D cable Skt B	45
LBLU	h	CG-4/M	50 way D cable Skt B	46
PNK	k	CG-4/0	50 way D cable Skt B	47
GRN	l	CG-4/C	50 way D cable Skt B	48
R	j	Main coil pot. tap I+U	50 way D cable Skt A	1
BLK	m	Main coil pot. tap I+M	50 way D cable Skt A	2
W	n	Main coil pot. tap 1/6	50 way D cable Skt A	4
?	p	Main coil pot. tap 1/1	50 way D cable Skt A	5
BLK	r	Main coil pot. tap 2/1	50 way D cable Skt A	6
GRN	s	Main coil pot. tap 2/6	50 way D cable Skt A	7
BLK	u	Main coil pot. tap 3/6	50 way D cable Skt A	8
BLU	v	Main coil pot. tap 3/1	50 way D cable Skt A	9
BLK	w	Main coil pot. tap 4/1	50 way D cable Skt A	10
Y	t	Main coil pot. tap 4/6	50 way D cable Skt A	11
BLK	x	Main coil pot. tap I-M	50 way D cable Skt A	13
BRN	y	Main coil pot. tap I-U	50 way D cable Skt A	14
BLK	z	Trim 1 N=3 I+U	50 way D cable Skt A	23
O	AA	Trim 1 N=3 I+M	50 way D cable Skt A	24
BLK	BB	Trim 1 N=3 I-U	50 way D cable Skt A	25
W	DD	Trim 1 N=3 I-M	50 way D cable Skt A	26
R	EE	Trim 2 N=4 I+U	50 way D cable Skt A	19
GRN	FF	Trim 2 N=4 I+M	50 way D cable Skt A	20
R	CC	Trim 2 N=4 I-U	50 way D cable Skt A	21
BLU	HH	Trim 2 N=4 I-M	50 way D cable Skt A	22
R	JJ	Trim 3 N=6 I+U	50 way D cable Skt A	15
Y	KK	Trim 3 N=6 I+M	50 way D cable Skt A	16
R	LL	Trim 3 N=6 I-U	50 way D cable Skt A	17
BRN	MM	Trim 3 N=6 I-M	50 way D cable Skt A	18
	NN	Green to screen		

Controls Connector: 56 way Verelco Plug 1

Pin	Signal	Magnet	Pin
		Connector:	
A	Vert. Strain gauge 1/1	4 way LEMO cable Plg A	4
B	Vert. Strain gauge 1/2	4 way LEMO cable Plg A	2 & 3
C	Vert. Strain gauge 1/C	4 way LEMO cable Plg A	1
Pin	Signal	Magnet	Pin
		Connector:	
E	Vert. Strain gauge 2/1	4 way LEMO cable Plg B	4
F	Vert. Strain gauge 2/2	4 way LEMO cable Plg B	2 & 3
H	Vert. Strain gauge 2/C	4 way LEMO cable Plg B	1
D	Vert. Strain gauge 3/1	4 way LEMO cable Plg C	4
J	Vert. Strain gauge 3/2	4 way LEMO cable Plg C	2 & 3
K	Vert. Strain gauge 3/C	4 way LEMO cable Plg C	1
L	Vert. Strain gauge 4/1	4 way LEMO cable Plg D	4
M	Vert. Strain gauge 4/2	4 way LEMO cable Plg D	2 & 3
N	Vert. Strain gauge 4/C	4 way LEMO cable Plg D	1
R	Hor. Strain gauge 5/1	4 way LEMO cable Plg E	4
S	Hor. Strain gauge 5/2	4 way LEMO cable Plg E	2 & 3
T	Hor. Strain gauge 5/C	4 way LEMO cable Plg E	1
P	Hor. Strain gauge 6/1	4 way LEMO cable Plg F	4
U	Hor. Strain gauge 6/2	4 way LEMO cable Plg F	2 & 3
V	Hor. Strain gauge 6/C	4 way LEMO cable Plg F	1
W	Hor. Strain gauge 7/1	4 way LEMO cable Plg G	4
a	Hor. Strain gauge 7/2	4 way LEMO cable Plg G	2 & 3
b	Hor. Strain gauge 7/C	4 way LEMO cable Plg G	1
X	Hor. Strain gauge 8/1	4 way LEMO cable Plg H	4
Y	Hor. Strain gauge 8/2	4 way LEMO cable Plg H	2 & 3
Z	Hor. Strain gauge 8/C	4 way LEMO cable Plg H	1
c	Pressure sensors +ve supply	DIN 43650 A & B*	1 & 1
d	Pressure sensors -ve supply	DIN 43650 A & B*	4 & 4
f	He pressure output +ve	DIN 43650 A*	2
h	He pressure output -ve	DIN 43650 A*	3

Pin	Signal	Magnet	Pin
		Connector:	
k	N2 pressure output +ve	DIN 43650 B*	2
l	N2 pressure output -ve	DIN 43650 B*	3
j	He flow sensors +ve supplies	AMP A, B, & C*	1,1, & 1
m	He flow sensors 0V supplies	AMP A, B, & C*	2, 2, & 2
n	He flow sensor I+ output	AMP A*	4
p	He flow sensor I- output	AMP B*	4
r	LN2 level probe 1	4 way Fischer 102 cable Plg	3
s	LN2 level probe 2	4 way Fischer 102 cable Plg	1
u	LN2 level probe 3	4 way Fischer 102 cable Plg	4
v	LN2 level probe 4	4 way Fischer 102 cable Plg	2
w	LN2 level probe 5	---	
t	LHe level probe 1	4 way Fischer 102 cable Plg	3
x	LHe level probe 2	4 way Fischer 102 cable Plg	1
y	LHe level probe 3	4 way Fischer 102 cable Plg	2
z	LHe level probe 4	4 way Fischer 102 cable Plg	4
AA	LHe level probe 5	---	
BB	Vacuum gauges supply +ve	8 way FCC68 cable Plg A & B	1
DD	Vacuum gauges supply -ve	8 way FCC68 cable Plg A & B	2
EE	Pirani output +ve	8 way FCC68 cable Plg A	3
FF	Pirani output -ve	8 way FCC68 cable Plg A	5
CC	Pirani setpoint output	8 way FCC68 cable Plg A	6
DD	Penning Enable	8 way FCC68 cable Plg B	7
JJ	Penning output +ve	8 way FCC68 cable Plg B	3
KK	Penning output -ve	8 way FCC68 cable Plg B	5
LL	He flow sensor neck output	AMP C*	4
MM	Ground		
NN	Green to screen		
* = Connector inside distribution box			

Controls Connector: 56 way Verelco Plug 2

Pin	Signal	Magnet	Pin	Service
		Connector:		Turret
				Service
A	LVDT-8	6 way ring lck cable Skt 1	A	
B (n/c)	LVDT-8	6 way ring lck cable Skt 1	B to C	4.5 K He
C (n/c)	LVDT-8	6 way ring lck cable Skt 1	C to B	
E	LVDT-8	6 way ring lck cable Skt 1	D	Ser. No. 8
F	LVDT-8	6 way ring lck cable Skt 1	E	
H	LVDT-8	6 way ring lck cable Skt 1	F	
D	LVDT-6	6 way ring lck cable Skt 2	A	
J	LVDT-6	6 way ring lck cable Skt 2	B to C	He Cool
K	LVDT-6	6 way ring lck cable Skt 2	C to B	down
L	LVDT-6	6 way ring lck cable Skt 2	D	Ser. No. 6
M	LVDT-6	6 way ring lck cable Skt 2	E	
N	LVDT-6	6 way ring lck cable Skt 2	F	
R	LVDT-4	6 way ring lck cable Skt 3	A	
S	LVDT-4	6 way ring lck cable Skt 3	B to C	15 K He
T	LVDT-4	6 way ring lck cable Skt 3	C to B	
P	LVDT-4	6 way ring lck cable Skt 3	D	Ser. No. 4
U	LVDT-4	6 way ring lck cable Skt 3	E	
V	LVDT-4	6 way ring lck cable Skt 3	F	
W	LVDT-3	6 way ring lck cable Skt 4	A	
a	LVDT-3	6 way ring lck cable Skt 4	B to C	LN2 Control
b	LVDT-3	6 way ring lck cable Skt 4	C to B	Res.voir
X	LVDT-3	6 way ring lck cable Skt 4	D	Ser. No. 3
Y	LVDT-3	6 way ring lck cable Skt 4	E	
Z	LVDT-3	6 way ring lck cable Skt 4	F	
c	LVDT-1	6 way ring lck cable Skt 5	A	
d	LVDT-1	6 way ring lck cable Skt 5	B to C	LN2 Control
f	LVDT-1	6 way ring lck cable Skt 5	C to B	Shield
h	LVDT-1	6 way ring lck cable Skt 5	D	Ser. No. 1
k	LVDT-1	6 way ring lck cable Skt 5	E	
l	LVDT-1	6 way ring lck cable Skt 5	F	
j	LVDT-13	6 way ring lck cable Skt 6	A	
m	LVDT-13	6 way ring lck cable Skt 6	B to C	He Exhaust
n	LVDT-13	6 way ring lck cable Skt 6	C to B	
p	LVDT-13	6 way ring lck cable Skt 6	D	Ser. No. 13
r	LVDT-13	6 way ring lck cable Skt 6	E	

Pin	Signal	Magnet	Pin	Service
		Connector:		Turret
				Service
s	LVDT-13	6 way ring lck cable Skt 6	F	
u	LVDT-19	6 way ring lck cable Skt 7	A	
v	LVDT-19	6 way ring lck cable Skt 7	B to C	LN2 Cool down
w	LVDT-19	6 way ring lck cable Skt 7	C to B	
t	LVDT-19	6 way ring lck cable Skt 7	D	Ser. No. 19
x	LVDT-19	6 way ring lck cable Skt 7	E	
y	LVDT-19	6 way ring lck cable Skt 7	F	
z	N2 pressure switch contact	Wired inside distn box	nrm. clsd	
AA	N2 pressure switch contact	Wired inside distn box	nrm. clsd	
BB	He pressure switch contact	Wired inside distn box	nrm. clsd	
DD	He pressure switch contact	Wired inside distn box	nrm. clsd	
EE	Flow valve readback 1	Wired inside distn box	1	
FF	Flow valve readback 1	Wired inside distn box	2	
CC	Flow valve readback 1	Wired inside distn box	3	
HH	Flow valve readback 2	Wired inside distn box	1	
JJ	Flow valve readback 2	Wired inside distn box	2	
KK	Flow valve readback 2	Wired inside distn box	3	
LL				
MM				
NN				

Controls Connector: 37 way D connector plug

Pin	Signal	Magnet	Pin	Service
		Connector:		Turret
				Service
1	Valve-8	8 way ring lck cable Skt 1	G	
2	Valve-8	8 way ring lck cable Skt 1	D	4.5 K He
3	Valve-8	8 way ring lck cable Skt 1	F	Ser. No. 8
4	Valve-8	8 way ring lck cable Skt 1	C	

Pin	Signal	Magnet	Pin	Service
		Connector:		Turret
				Service
5	Valve-6	8 way ring lck cable Skt 2	G	He Cool
6	Valve-6	8 way ring lck cable Skt 2	D	down
7	Valve-6	8 way ring lck cable Skt 2	F	Ser. No. 6
8	Valve-6	8 way ring lck cable Skt 2	C	
9	Valve-4	8 way ring lck cable Skt 3	G	15 K He
10	Valve-4	8 way ring lck cable Skt 3	D	
11	Valve-4	8 way ring lck cable Skt 3	F	Ser. No. 4
12	Valve-4	8 way ring lck cable Skt 3	C	
13	Valve-3	8 way ring lck cable Skt 4	G	LN2 Control
14	Valve-3	8 way ring lck cable Skt 4	D	Res.voir
15	Valve-3	8 way ring lck cable Skt 4	F	Ser. No. 3
16	Valve-3	8 way ring lck cable Skt 4	C	
17	Valve-1	8 way ring lck cable Skt 5	G	LN2 Control
18	Valve-1	8 way ring lck cable Skt 5	D	Shield
19	Valve-1	8 way ring lck cable Skt 5	F	Ser. No. 1
20	Valve-1	8 way ring lck cable Skt 5	C	
21	Valve-13	8 way ring lck cable Skt 6	G	He Exhaust
22	Valve-13	8 way ring lck cable Skt 6	D	
23	Valve-13	8 way ring lck cable Skt 6	F	Ser. No. 13
24	Valve-13	8 way ring lck cable Skt 6	C	
25	Valve-19	8 way ring lck cable Skt 7	G	LN2 Cool
26	Valve-19	8 way ring lck cable Skt 7	D	down
27	Valve-19	8 way ring lck cable Skt 7	F	Ser. No. 19
28	Valve-19	8 way ring lck cable Skt 7	C	
29	Flow valve1/SS relay 1	Wired inside distn box	+24V	
30	Flow valve1/SS relay 1&2	Wired inside distn box	0V	
31	Flow valve1/SS relay 2	Wired inside distn box	+24V	
32	Flow valve2/SS relay 1	Wired inside distn box	+24V	
33	Flow valve2/SS relay 1&2	Wired inside distn box	0V	
34	Flow valve2/SS relay 2	Wired inside distn box	+24V	
37	Ground			

Distribution Box 3 way AMP plug

Pin	Signal	Magnet	Pin
		system	
		connector	
1	Mains power 115 V ac live	-	-
2	Mains power 115 V ac neut	-	-
3	Mains power 115 V ac grnd	-	-

Other wiring

Current lead heaters		Heater controller terminal	
-	Current lead thermocouple +ve	5	
-	Current lead thermocouple -ve	7	
	110 V AC live + top hat heater live	1 & 8	
	110 V AC neutral + top hat heater neutral	2	
	Heater neutral	2	
	Heater live	10	
	Neck Tape Heater	1 & 2	