

C6257



Loadbank Operating Instructions

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Revision: 1
Date: 23rd August 2019

200kW RESISTIVE LOADBANK

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1. GENERAL LOADBANK INFORMATION

Customer	TRANSRIJN B.V.
Loadbank Serial No.	C6257
Equipment	200kW Loadbank Castor Mounted
Test Supply	240V DC or 480V DC
Voltage Tolerance	+/- 5% for short duration (+5% Max. 10 minutes not continuous)
kW Tolerance	+/- 2.5%
Step Resolution	1.0kW @ 240V DC / 480V DC
Auxiliary Supply	230V, 50Hz, 1-Phase, 2-Wire
Control System	KCS
Controller	KCS100H
PC Software	N/A
Dimensions	945 x 875 x 1324mm (l, w, h)
Gross Weight	265 kg
Paint Specification	White – RAL9002

2. SAFETY

General Safety

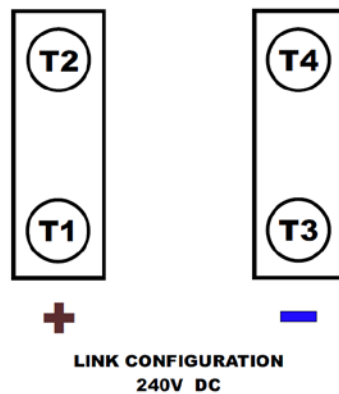
1. Injury to the person operating or servicing this equipment is able to occur if any of these **SAFETY** and/or **WARNING** statements are ignored.
2. The user must be fully conversant with this manual and in full understanding of it before operating the loadbank.
3. Personal injury from electrical shock may occur if the power is not isolated before any maintenance measures are undertaken.
4. The loadbank must be operated only by personnel adequately experienced in the operation of the power source(s) being connected to it.
5. The loadbank must only be operated with all of its covers in their correct positions and secured.
6. Ear defenders are recommended if operator is working constantly in the vicinity of the loadbank.

Installation

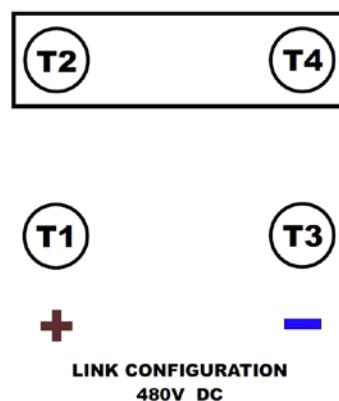
7. For safety purposes upon receiving the loadbank an initial inspection is recommended. In addition to this periodical preventative maintenance and safety inspections are required to ensure the continued safe and reliable operation of the unit.
8. The loadbank must be properly sited, stable and located in a well ventilated area.
9. Connect a ground wire from the Loadbank Earth Stud Terminal to the power supply under test. Size the Earth cable accordingly. The loadbank **must not** be operated without an adequate earth connection.
10. A minimum clearance of 1m (**2m** recommended) must be allowed from the inlet grille.
11. A minimum clearance of 1m (**2m** recommended) is required from the outlet grille. It is recommended that the operator cordon off this area prior to operation of the unit, to prevent accidental contact with the exhaust grilles and the hot exhaust gas whilst the loadbank is operating.

Warning **The loadbank produces a hot exhaust gas approximately 120°C above ambient temperature at a distance of 1m from the outlet grilles.**

12. Do not position the loadbank where hot exhaust air is able to re-circulate back through the inlet grille, as this will cause the unit to overheat.
13. All safety devices within the loadbank have been proven reliable as part of the test procedure.
14. Ensure that the load cables are of good condition and suitably rated for the current they will be required to carry from the power source to the loadbank.
15. Ensure that the correct configuration linking has been fitted for the DC Supply Voltage to be tested:
 - a) For 240V DC 2-Off Vertical Links are required.



- b) For 480V DC 1-Off Horizontal Link is required.



16. Route the load cables through the aperture at the base of the gland box section of the enclosure to the connection chamber and securely connect them to the correct loadbank terminals. **Do not** route the cables through the connection chamber door, or leave the door open during test.
17. Observe the correct polarity when connecting the loadbank to the power source. +ve to the Left and –ve to the right.

18. Do not operate the Loadbank over the rated voltage or frequency as this may cause failure to the loadbank.
19. Under no circumstances is the Over Temperature Switch to be bypassed. If the loadbank is operated with the temperature switch bypassed the elements will be liable to overheat if any fault condition occurs. In severe cases this will result in the unit catching fire.
20. Circuit Breakers and/or Fuses are fitted in the loadbank for short circuit and over current protection.
21. Ensure that all covers, inlet/outlet grilles are fixed and all doors are closed before applying power to the loadbank.
22. At the end of a test the load must be set to zero and the loadbank fan(s) left running for a minimum of 5 minutes to cool the resistive elements.
23. Avoid contact with the outlet grille during test and a period of time afterwards as this becomes very hot during operation and may result in serious burns.
24. Do not permit objects to enter or block the air inlet/outlet grilles of the Loadbank. A blockage will cause the Loadbank to overheat. If an object enters the loadbank it will cause damage to the fan(s) and/or resistor elements. If objects enter the loadbank grilles then the unit must be switched off, removed from all sources of electrical supply and then inspected physically and electrically to ensure no damage has occurred.

3. DESCRIPTION OF A LOADBANK

The loadbank is an outdoor, transportable resistive unit for electrically load testing 240V D.C. or 480V D.C. power supplies with voltage tolerance of 5%.

The function of the loadbank is the dissipation of electrical energy which is transformed into heat by the resistive elements. This unit will produce 200kW of real power dissipation at 240V DC or 480V DC full load.

The heat is removed from the loadbank by the fan(s) passing air over the resistive elements. It is essential the inlet and outlet grilles are free from any obstruction otherwise the loadbank will overheat.

Circuit Breakers and/or Fuses are fitted inside the loadbank for short circuit and over current protection.

Do not operate the Loadbank over the rated voltage or frequency as this may cause failure to the loadbank.

A thermal switch is located in the control chamber of the loadbank to protect the equipment from and overheating that may occur.

External Auxiliary Supply input 240V 50Hz. This supply is required for the control system and cooling fans supply. The supply is connected to the terminals within the connection chamber. A 10A 1-phase supply is required.

Important: When transporting these units it is essential to block the base to ensure the castors are raised, otherwise the castors and the enclosures will become damaged when strapping down.

4. INSTALLATION / OPERATION OF LOADBANK

Installation

Upon receiving the loadbank an initial inspection is recommended. In addition to this periodical preventative maintenance and safety inspections are required to ensure the continued safe and reliable operation of the unit.

The loadbank must be properly sited, stable and located in a well ventilated area.

A minimum clearance of 1m (**2m** recommended) must be allowed from the inlet grille. Ensure that no loose material is in the vicinity of the inlet grille (e.g. Paper).

A minimum clearance of 1m (**2m** recommended) is required from the outlet grille. It is recommended that the operator cordon off this area before operation of the unit.

Warning **The loadbank produces a hot exhaust gas approximately 120°C above ambient temperature at a distance of 1m from the outlet grilles.**

Do not position the loadbank where hot exhaust air is able to re-circulate back through the inlet grille, as this will cause the unit to overheat.

When installing two or more loadbanks ensure they are sufficiently spaced from each other, so the hot exhaust from one unit does not feed the air intake of another.

Failure to observe the above may result in overheating and subsequent activation of the over temperature protection.

Connect a ground wire from the Loadbank Earth Stud Terminal to the power supply under test. Size the Earth cable accordingly. The loadbank **must not** be operated without an adequate earth connection.

Ensure that the load cables are of good condition and suitably rated for the current they will be required to carry from the power source to the loadbank.

Route the load cables through the aperture at the base of the enclosure to the connection chamber and securely connect them to the correct loadbank terminals. **Do not** route the cables through the connection chamber door, or leave the door open during test.

Securely connect the test load cables to the terminals; observe the correct polarity when connecting the loadbank to the power source.

If using slave units, connect the loadbank load cables in parallel with the master unit.

Connect the 'External' auxiliary supply. A 10A 1-phase supply is required. This is to maintain the control / fan(s) supply.

If using slave units, connect an auxiliary supply to each unit.

Do not leave the connection chamber door open during operation of the loadbank or test supply.

All safety devices within the loadbank have been proven reliable as part of the test procedure.

Under no circumstances is the Over Temperature Switch to be bypassed. If the loadbank is operated with the temperature switch bypassed the elements will be liable to overheat if any fault condition occurs. In severe cases this will result in fire.

Circuit Breakers and/or Fuses are fitted in the loadbank for short circuit and over current protection.

Ensure that all covers, inlet/outlet grilles are fixed and all doors are closed before applying power to the loadbank.

Operation

1. Connect the controller unit to the control-input socket mounted on the load module facia of the master unit, this is marked 'Control I/P'. In some cases this may be via an extension reel. Ensure that the cables are in good condition.
2. If slave units are to be used, connect their control cables in cascade i.e. from the 'Control O/P' socket on the master unit to the 'Control I/P' socket on the first slave unit and so on until all slave units are connected.
3. If the unit is to be used 'Stand Alone', the 'Control O/P' socket is not used.
4. Check that the decade switches on the remote controller are all set to zero.
5. Ensure that all covers are fixed and all doors are closed.
6. This equipment has been fitted with an 'Emergency Stop', if pressed this will shed all load and stop the movement of the fan(s). Ensure that the fault / hazard as been cleared before resetting the Emergency Stop. Once the Emergency Stop is reset i.e. pulled out, the fan(s) will restart but no load will be applied until the 'Enter' button is pressed.

Warning: - The Emergency Stop does not isolate the Test Supply or the Auxiliary Supply; this must be done at source.

7. The equipment is now ready for use.
8. Switch on the Auxiliary Supply. The fan(s) will now start.

9. Switch on the DC test supply.
10. Once the fan(s) have started check that the airflow is normal and in the direction from the fan(s) and across the elements.
11. Select the kW required on the indexing switches and press the 'Enter' button to apply the load. The next load step may be selected but will not be applied until the 'Enter' button is pressed again.

Warning: - This equipment will produce a hot exhaust. (Approx. 120°C above ambient at 1m from the outlet grille).

12. The load may be removed at any time by pressing the 'Clear' button.
13. Avoid contact with the outlet grille during test and a period of time afterwards as this becomes very hot during operation and may result in serious burns. It is recommended that the loadbank operator to cordon off the area for a minimum of 1m (**2m** recommended) to prevent accidental contact with the exhaust grilles and the hot exhaust gas whilst the loadbank is operating.
14. Do not permit objects to enter or block the air inlet/outlet grilles of the Loadbank. A blockage will cause the Loadbank to overheat. If an object enters the loadbank it will cause damage to the fan(s) and/or resistor elements. If objects enter the loadbank grilles then the unit must be switched off, removed from all sources of electrical supply, allowed to cool fully, and then inspected both physically and electrically to ensure no damage has occurred.
15. If the temperature sensor inside the load module exceeds 90°C (194°F) or if a cooling fault occurs the load will automatically lock out.
16. At the end of a test the load must be set to zero and the loadbank fan(s) left running for a minimum of 5 minutes to cool the resistive elements.
17. The number of starts per hour of the fan(s) should be limited to ten to avoid overheating.

5. MAINTENANCE

Crestchic Load Banks are virtually 'maintenance free' however we do recommend that the units are checked once a year for tightness of all electrical and mechanical connections, and also the load contactors should be checked for wear.

General maintenance must be carried out with the test and auxiliary power isolated from the loadbank.

For fault finding, when a supply is required, then only the auxiliary supply should be connected. Maintenance work should only be done by qualified personnel, fully aware of the danger involved.

WARNING: -PERSONAL INJURY FROM ELECTRICAL SHOCK MAY RESULT IF THE POWER IS NOT ISOLATED BEFORE SERVICING. MAINTENANCE WORK MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.

The resistive elements are long life maintenance free items, if an element was to "blow" or become damaged for any reason, obviously this would affect the loading of the electrical supply under test. The element cannot be repaired and a replacement element would have to be installed, this can be obtained from Crestchic Ltd. (please specify kW rating and voltage engraved on the element).

Fan units are fitted with 'sealed for life' bearings lubricated with wide temperature range grease and require no maintenance.

All panel/door seals must be inspected every 6-months to ensure they make a good seal to prevent water or any foreign matter entering the enclosure.

Door hinges and fasteners must be lubricated every 6-months, and also castor mounted units should have the castors lubricated.

Replacing Elements

Disconnect the cables or coppers connected to the faulty element termination points. The elements are fitted with two glands at the termination ends which securely hold the element in position, some Load Banks are fitted with element support hooks and others fitted with 'toast racks' to support the other end. Remove the nuts on the glands to free the element. Remove one of the grilles in the element chamber (the nearest to the element) and slide the element out.

Insulation Resistance

With regard to insulation readings of the loadbank, the minimum recommended constant safe level to use is 1Meg.

When taking insulation readings, should any instrumentation/transducers be included with the loadbank (INS370 or VIP) then these should be isolated before an IR test, as damage may be caused to the instruments.

Ensure the equipment to be tested and the work area is safe (the equipment is de-energised and disconnected).

Crestchic Loadbanks are an outdoor piece of equipment and therefore depending on the time of year and/or climatic conditions with regard to moisture over the exposed parts of the loadbank, the insulation reading may be measured below the minimum recommended.

The loadbank should be thoroughly inspected before use, checking resistance levels are in the region of those stated on the electrical drawing. If resistance values are not in the region of the stated values, then further investigation will be required to ascertain potential failed elements.

If resistance values are satisfactory, then it is possible to use the loadbank on load for a period of time to remove any moisture and apply heat to the equipment. It is then advised before any further usage, the insulation reading is again checked to ensure the level is above the recommended minimum acceptable value of 1Meg.

Should the level not be above the recommended minimum value after the period of operation, then there is the possibility of an element that is leaking to earth and each element bank will be required to be individually inspected to identify the section and then removing the copper to identify the specific element.

Note:- The element insulation could potentially degrade over a period time, depending on usage or extreme climatic conditions.

Torque Settings

To ensure correct tightness of all electrical POWER connections, the torque settings shown in **Table 1** below must be used.

Location	Connections	Steel Fixings		Brass Fixings	
		Torque (N.m)	Torque (lbf.in)	Torque (N.m)	Torque (lbf.in)
Busbars	M6 Copper	7.2	63.7		
	M8 Copper	17	150.5		
	M10 Copper	28	247.8		
	M12 Copper	45	398.3	33	292.1
	M16 Copper	91	805.4	74	654.9
Elements	4BA Elements	1.2	10.6		
	2BA Elements	1.75	15.5		
Fuses	Bolt-on fuses	17	150.5		
	32A Fuse Holder	2	17.7		
	63A Fuse Holder	3	26.6		
	100A Fuse Holder	3.5	31.0		
	125A Fuse Holder	4	35.4		
Siemens Contactors	Contactors 10231-10261	2.0-2.5	18.0-22.0		
	Contactors 10341-10361	3.0-4.5	27.0-40.0		
	Contactors 10441-10461	4.0-6.0	36.0-53.0		
	Contactors 10541-10566	10.0-14.0	90.0-124.0		
	Contactors 10646-10666	14.0-24.0	124.0-210.0		
	Contactors 10756-10766	14.0-24.0	124.0-210.0		
Telemecanique Contactors	Contactors D12	1.2	10.6		
	Contactors D18	1.7	15.0		
	Contactors D25	1.85	16.4		
	Contactors D32	2.5	22.1		
	Contactors D40	5	44.3		
	Contactors D50	5	44.3		
	Contactors D65	5	44.3		
	Contactors D80	9	79.7		
	Contactors D95	9	79.7		
	Contactors D115	14	123.9		
	Contactors F150	14	123.9		
	Contactors F185	17	150.5		
	Contactors F225 to F500	35	309.9		

Table 1 – Torque Settings

6. TROUBLESHOOTING

Maintenance should be carried out with the main power isolated from the loadbank, and only done by qualified service engineers/technicians. Auxiliary power supply may be required to carry out necessary checks. Ensure wiring diagrams are available to assist with fault finding.

Problem - Loadbank control supply not on

- | | |
|---------------|--|
| Check | Control circuit breaker(s) not closed |
| Action | Check and close circuit breaker(s) – Repeated tripping of the circuit breaker must be investigated |
| Check | On/Off switch SW1 set to the Off position |
| Action | Set the switch to On position as required |
| Check | Emergency Stop actuated |
| Action | Release the emergency stop (pull) |

Problem - Fan(s) not running/Fan contactor(s) not energised

- | | |
|---------------|--|
| Check | Fan motor overload tripped |
| Action | Reset fan motor overload. Repeated tripping must be investigated further |
| Check | Fan(s) failure |
| Action | Check and replace if necessary |
| Check | Loose connection(s) |
| Action | Check and tighten as necessary |

Problem – No load applied

- | | |
|---------------|---|
| Check | Loadbank Over Temperature sensor activated |
| Action | Check loadbank cooling/airflow for any obstructions |
| Check | Loose connection(s) |
| Action | Check and tighten as necessary |

Problem - Load step not energised

Check Fuse(s) blown / Circuit breaker(s) not closed
Action Check and replace fuse(s) / Close circuit breaker. Repeated fuse blowing or breaker tripping must be investigated further

Check Contactor(s) failure
Action Check and replace if required

Check Driver board slave relay failure
Action Check and replace as required

Check Loose connection(s)
Action Check and tighten as necessary

Problem - Load step not providing the rated load

Check Applied voltage is de-rated
Action Check and correct if necessary

Check Fuse(s) blown
Action Check and replace. Repeated fuse blowing must be investigated further

Check Contactor not fully energised
Action Check and replace contactor if necessary

Check Load step resistor element(s) are open-circuit.
Action Check and replace as required – check wiring diagram for approximate resistance values for each associated step.

Problem - Contactor “chattering”

Check Control circuit voltage too low
Action Check control voltage and auxiliary supply and/or test supply

Check Contacts/core dirty or corroded
Action Check and replace contactor if necessary

Check Connection to the contactor coil loose
Action Check and tighten as necessary

Problem – No communication response

Check	Check all control leads
Action	Check connection security/lead integrity. If using an extension reel try plugging the controller directly into the loadbank
Check	Check all ribbon cable connections
Action	Check connection security/lead integrity
Check	Check Systems Board (Fuse/Transformer)
Action	Check and replace as required

Table 2 – Troubleshooting

7. CONTACTS

Crestchic provides rentals and sales of loadbanks, power cables, transformers and switchgear. With numerous applications and the capability to develop tailor made testing solutions that fulfil your requirements.

For spare/replacement parts see parts list enclosed and quote the stock reference number. (service@crestchic.co.uk)

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8. TERMINOLOGY / CALCULATIONS

Power Calculations:-

$$\text{D.C. Power} = V \times A = \text{kW} \qquad 125 \times 25.83 = 3.22\text{kW}$$

$$\text{D.C. Current} = W / V \qquad 3550 / 125 = 28.4\text{A}$$

Loadbank Capacity at other voltages:-

Rated Power Capacity of loadbank x (Applied Voltage / Design Voltage)² = Actual Power

e.g. $22.4 \times (24 / 28)^2 = 16.4\text{kW}$

Temperature Calculation:-

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) / 1.8 \qquad ^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$


Metric Conversions:-

$$1 \text{ inch} = 25.4 \text{ mm (2.54 cm)} \qquad 1 \text{ cm} = 0.3937 \text{ inch}$$

$$1 \text{ lb} = 0.4536 \text{ kg} \qquad 1 \text{ kg} = 2.2046 \text{ lbs}$$

9. PARTS LISTS

PARTS LIST 200kW DC KCS C6257

CRESTCHIC 		Crestchic Limited			Co Reg No: 1772456		
		<u>Second Avenue, Centrum 100,</u>			VAT No: GB880985177		
		<u>Burton-on-Trent DE14 2WF. U.K</u>			<u>sales@crestchic.co.uk</u>		
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		<u>Fax +44 (0) 1283 510103</u>			<u>service@crestchic.co.uk</u>		
MODEL	200kW				CONTRACT No.	C6257	
RATING	200kW				ISSUED	1	
TEST SUPPLY	240/480V DC				DATED	08.07.2019	
CONTROL SYSTEM	KCS100HM				SIGNED	RC	
ENCLOSURE TYPE	Transportable - Castor Mounted				No. of SHEETS	2	
ITEM	CIRCUIT REF	STOCK	No.	Unit	DESCRIPTION	MANUFACTURERS REF	ORDER No.
1	CL20616		REF		GENERAL ARRANGEMENT		
2	CL20617		REF		WIRING DIAGRAM		
3							
4							
5		ENC304A	1		ENCLOSURE 300kW (new version 502mm fan hole)	CL19066 Iss5	
6							
7							
8		INU233	1		TERMINAL BOARD (P3) HQSPRBP 220x270x6mm		
9		CAS103	4		CASTOR SWIVEL (160kg) 100mm DIA. TYPE 200-3	4-61-RNB	
10							
11							
12		ASS148-3	1		CONTROLLER TYPE KCS100H 3-DECADE MIL	PL1222	
13		ASS149	1		CONTROL EXTEND LEAD KCS100H (Straight-90 D	PL1224	
14							
15							
16		PCB381	1		PCB KCS LOAD MODULE COMPLETE	CL7214 PL1165	
17							
18							
19	FAN A, FAN B	FAN201B	2		500mm AKSE FAN 220-240V 50/60Hz 1PH 1295RPM	AKSE 494-4 K A1 230V 50/60Hz	
20							
21							
22		ELE263	56		ELEMENT 3333W 240V NS		
23		ELE225	2		ELEMENT 1666W 240V	400303	
24		ELE227	2		ELEMENT 1666W 277V	400303	
25		ELE197	2		ELEMENT 1333W 277V	401187	
26		ELE167	6		ELEMENT 1000W 277V	400305	
27		ELE137	2		ELEMENT 666W 277V	401185	
28							
29	FC	CON870	1		CONTACTOR 35A 3 POLE (4kW) 230V 50/60Hz	3RT20231AL20	
30	C0-C4	CON531	5		CONTACTOR 32A DC 750V (20A-1kV) 2-P 230V 50	3TC4417-0BP0	
31	C5-C6	CON533	2		CONTACTOR 75A DC 750V (40A-1kV) 2-P 230V 50	3TC4817-0BP0	
32	C7-C8	CON535	2		CONTACTOR 220A DC 750V (170A-1kV) 2-P 230V 50	3TC5217-0BP0	
33							
34		RES700	2		RESISTOR 10kΩ 50W HS50	RS 159-641	
35	OVR1 & 2	SEN173	2		OVER VOLTAGE RELAY AC 1ph / DC	3UG4632-1AW30	
36							
37	F17, F18	FUH030	2		SETRON CYLINDRICAL FUSE HOLDER(10*38mm)	3NW7014-4	
38		FUH031	2		SETRON CYLINDRICAL FUSE (10*38mm), 2A, 10	3NW6002-4	
39							
40							
41							
42	FC	CON953	1		SUPPRESSOR CAPACITOR SIZE 202 - 127-240V	3RT2926-1BD00	
43		CAP527	9		CAPACITOR 1000V 0.1uF	FEC 952-0341	
44							
45							
46	OL	OLR138	1		OVERLOAD RELAY 3.5-5.0A	3RU2126-1FB0	
47							
48							
49	EM-STOP	SWT138	1		PUSH BUTTON BODY ASSEMBLY 1 N/C	ZB4-BZ102	
50	EM-STOP	SWT159	1		MUSHROOM HEAD PULL PUSH	ZB4-BT84	
51							

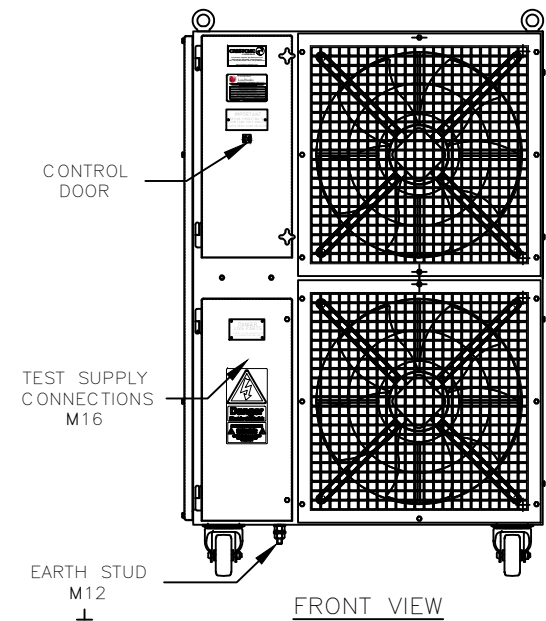
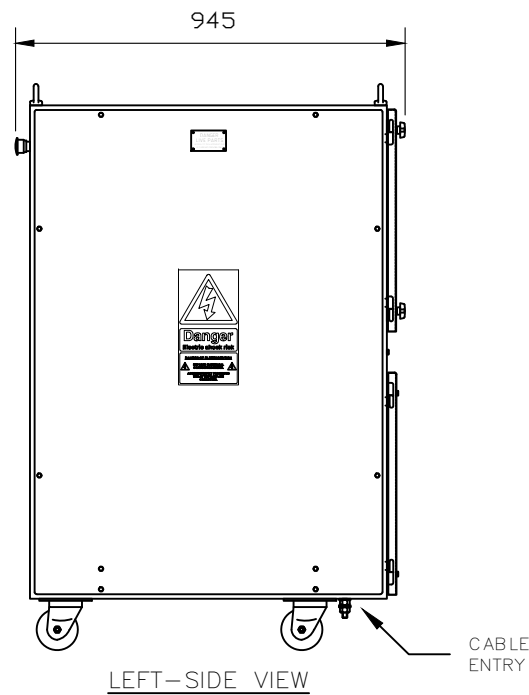
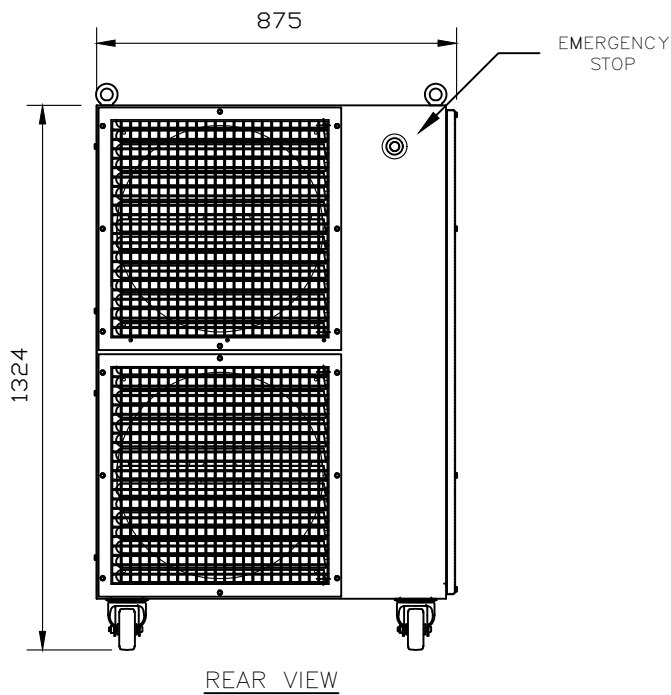
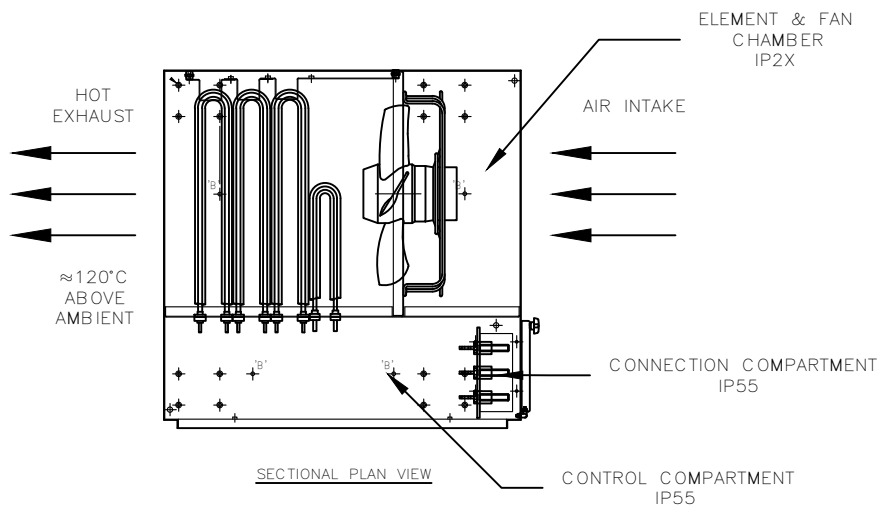
PARTS LIST 200kW DC KCS C6257

ITEM	CIRCUIT REF	STOCK	No.	Unit	DESCRIPTION	MANUFACTURERS REF	ORDER No.
52					BROUGHT FORWARD		
53							
54							
55	SW1	SWT309	1		SWITCH 4 POLE 2 POSITION (20A)	CA10-A223-600EF	
56	TEMP. SEN.	SEN153	1		BI-METAL THERMAL SWITCH 90 DEG N/C (75 Res	RS 331-528 / Farnell 1006844	
57							
58							
59		FAC009	1		KCS FACIA CONTROL I/P MIL-TYPE, AUX, I/O/E	CL19633	
60							
61							
62	AUX SUPPLY	CNR391	1		IEC MAINS CHASSIS PLUG 10A	RS 488-191	
63	AUX SUPPLY	CNR393	1		IEC STRAIGHT FREE SOCKET 10A BLACK	RS 488-208	
64							
65							
66	CONT I/P	CNR640	1		CHASSIS MOUNTED SOCKET SIZE 14 19 WAY (K	AB0521001419SN00	
67	CONT I/P	CNR641	1		DUST COVER CHASSIS MTD SOCKET 19 WAY (K	AB05006514	
68	CONT I/P	CNR415	1		COVER RED 25 WAY D-TYPE	FEC 470-053	
69	CONT I/P	CNR275	1		PLUG 25 WAY D-TYPE	FEC 113-2407	
70							
71							
72	MAINS	TML601	4		GUN-METAL TERMINAL STUD M16	CL4064/1 ISSUE 6	
73							
74							
75		FIX111	2		EYE BOLTS 1/2" WHIT Z/P COLLARED (M12)		
76		FIX131	4		HINGE MATT BLACK EACH	40100E	
77		FIX141	2		CROSS KNOB M6 x 40mm	RS 686-626	
78		FIX142	4		PUSH ON FIXES M8 (pk of 50)	RS 172-379	
79		FIX143	4		NYLON INSULATING SPACER M6 x 12mm (pk of 50	RS 178-850	
80							
81							
82	F1-F4	FUH335	4		FUSE HOLDER 32 AMP 550V	SC 32H	
83	F5-F8	FUH341	4		FUSE HOLDER 63 AMP - 550V	SC 63H	
84							
85	F1-F4	FUH137	4		HRC FUSE LINK 25 AMP	NS 25	
86	F5-F8	FUH152	4		HRC FUSE LINK 50 AMP	ES 50	
87	F9-F10	FUH162	2		HRC FUSE LINK 100 AMP 660V/690V	LAWSON SSA4100	
88	F11-F12	FUH169	2		HRC FUSE LINK 250 AMP 660V/690V	LAWSON SSB3250	
89							
90							
91	CB6	CCT109	1		MCB 2 POLE 10 AMP TYPE C	GB2-CD16 / 5SY6 010-7	
92							
93							
94							
95							
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112							
113							

10. DRAWINGS – GENERAL ARRANGEMENT

NOTES

1. APPROXIMATE WEIGHT: 265 kg.
2. PAINT FINISH: RAL9002 (GREY-WHITE).
3. NO OBSTRUCTION PERMITTED WITHIN 1m OF AIR INLET & OUTLET GRILLES. (2m RECOMMENDED)
4. 1m CLEARANCE REQUIRED FOR MAINTENANCE ON CONTROL SIDE.



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ISSUE BY D.O.
Printed On: 23 Aug.2019
Printed By: TONY HIGGINSON



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A Northbridge Industrial Services PLC Company

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CUSTOMER	TRANSRIJN B.V.
TITLE	GENERAL ARRANGEMENT 200kW 240V / 480V DC CASTOR KCS100HM 240V, 50Hz, 1-PH AUXILIARY

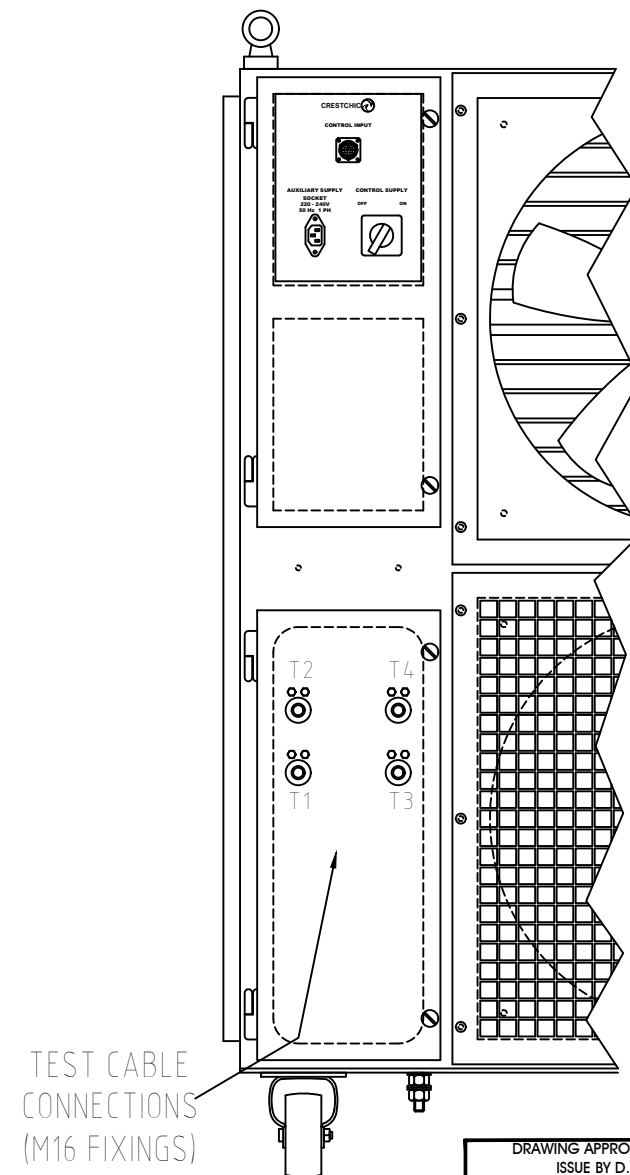
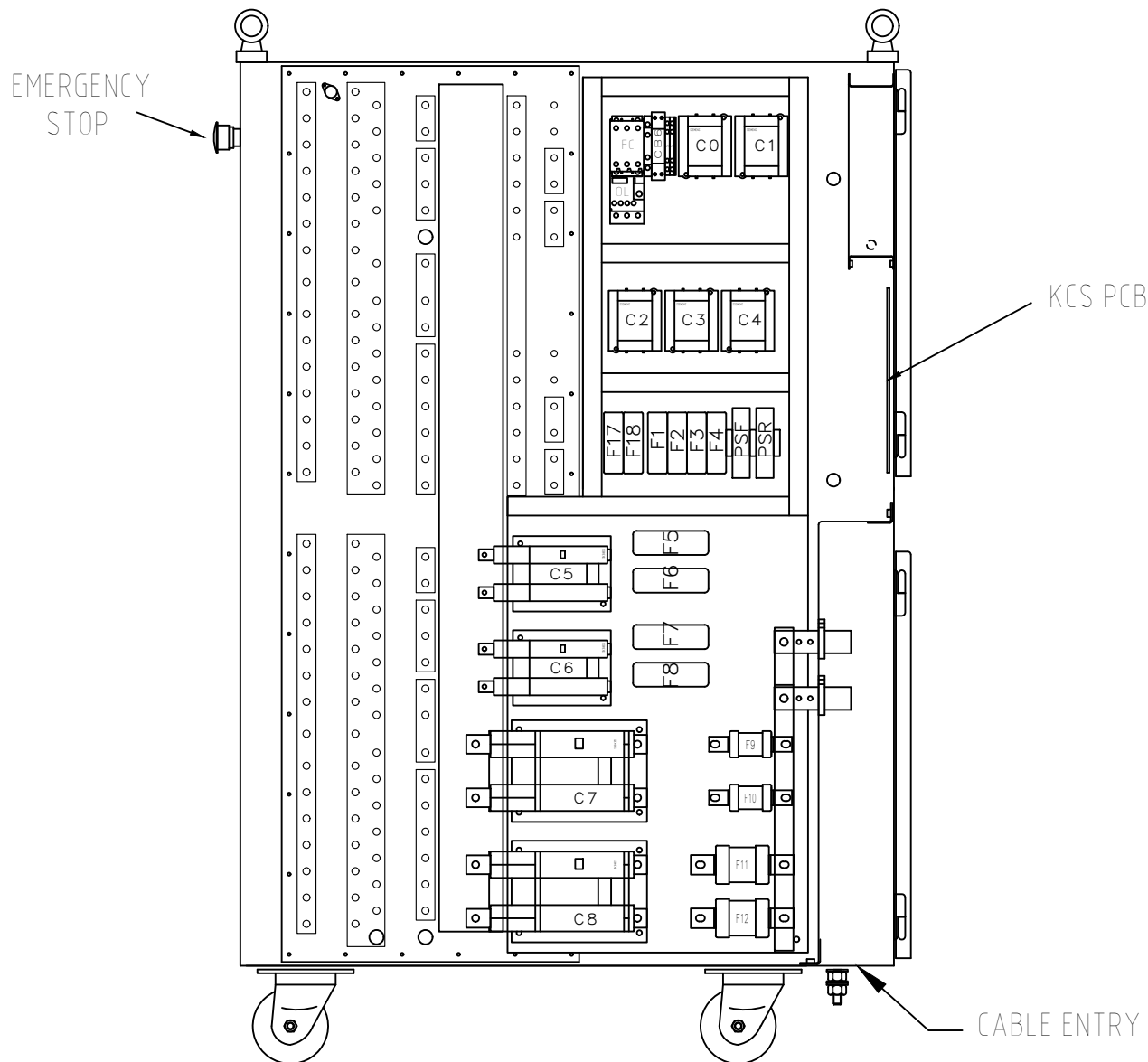
DRAWN BY	DATE
<i>Richard Coleman</i>	08/07/19
CHECKED	DATE
<i>Larry Chamberlain</i>	09/07/19
CONTRACT	SCALE
C 6257	DNS

ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
1	23/08/19	TH	CN6257-02	AS BUILT AND TESTED
DRG. No.	SHEET No.			
CL20616	1 of 2			

A
3

LEFT-SIDE VIEW WITH COVERS REMOVED

PARTIAL FRONT VIEW



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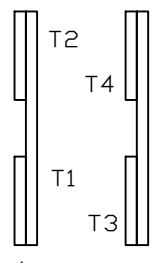
DRAWN BY	DATE
<i>Richard Coleman</i>	08.07.19
CHECKED	DATE
<i>Barry Chamberlain</i>	09.07.19
CONTRACT	SCALE
C 6257	DNS

ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
1	23/08/19	TH	CN6257-02	AS BUILT AND TESTED
ISSUE	DRG. No.	SHEET No.		
1	CL20616	2 of 2	A 3	

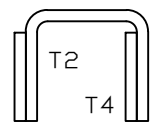
11. DRAWINGS – WIRING DIAGRAMS

DC TEST SUPPLY CONNECTION
240V DC
OR
480V DC

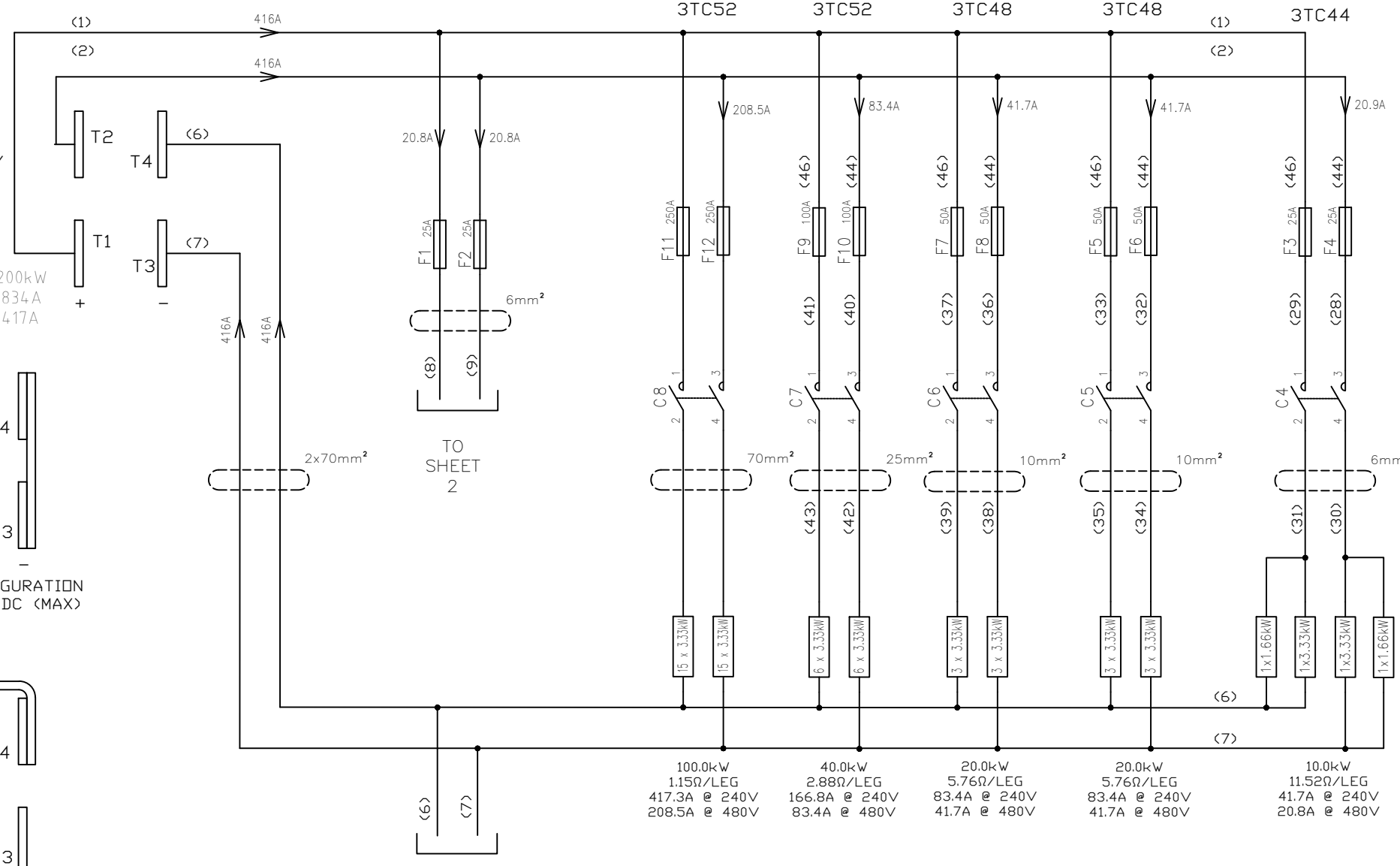
TOTAL POWER 200kW
I MAX AT 240V 834A
I MAX AT 480V 417A



LINK CONFIGURATION FOR 240V DC (MAX)



LINK CONFIGURATION FOR 480V DC (MAX)



100.0kW 1.15Ω/LEG 417.3A @ 240V 208.5A @ 480V	40.0kW 2.88Ω/LEG 166.8A @ 240V 83.4A @ 480V	20.0kW 5.76Ω/LEG 83.4A @ 240V 41.7A @ 480V	20.0kW 5.76Ω/LEG 83.4A @ 240V 41.7A @ 480V	10.0kW 11.52Ω/LEG 41.7A @ 240V 20.8A @ 480V
--	--	---	---	--

ALL ELEMENTS ON THIS SHEET ARE RATED AT 240V

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CUSTOMER	TRANSRIJN B.V.
TITLE	WIRING DIAGRAM 200kW 240V / 480V DC CASTOR KCS100HM 240V, 50Hz, 1-PH AUXILIARY

DRAWN BY	Richard Coleman	DATE	08.07.19
CHECKED	Larry Chamberlain	DATE	09.07.19
CONTRACT	C 6257	SCALE	DNS

1	23/08/19	TH	CN6257-02	AS BUILT AND TESTED
ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
1			CL20617	1 of 5

A
3

FROM SHEET 1
(8)
(9)

FROM SHEET 1
(6)
(7)

RESISTORS

10k 50W R1

10k 50W R2

3TC44

3TC44

3TC44

3TC44

F17
2A

F18
2A

6mm²

6mm²

6mm²

6mm²

1.5mm²

8.34A

6.26A

4.17A

2.08A

OVR1 & 2
HIGH VOLTAGE = 245V
LOW VOLTAGE = OFF
HYSTERESIS = 5V
TIME DELAY = 5 SEC
PRINCIPLE = N.O.
MEMORY = NO

C3

C2

C1

C0

(27)

(26)

(25)

(24)

(23)

(22)

(21)

(20)

1x1.66kW

1x1.00kW

1x1.00kW

1x1.66kW

2x1.00kW

2x1.00kW

1x1.33kW

1x1.33kW

1x0.66kW

1x0.66kW

4.0kW
28.8Ω/LEG
16.68A @ 240V
8.34A @ 480V

3.0kW
38.4Ω/LEG
12.51A @ 240V
6.25A @ 480V

2.0kW
57.6Ω/LEG
8.34A @ 240V
4.17A @ 480V

1.0kW
115.1Ω/LEG
4.17A @ 240V
2.08A @ 480V

ALL ELEMENTS ON THIS SHEET ARE RATED AT 277V

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CUSTOMER
TRANSRIJN B.V.

TITLE
WIRING DIAGRAM 200kW
240V / 480V DC CASTOR KCS100HM
240V, 50Hz, 1-PH AUXILIARY

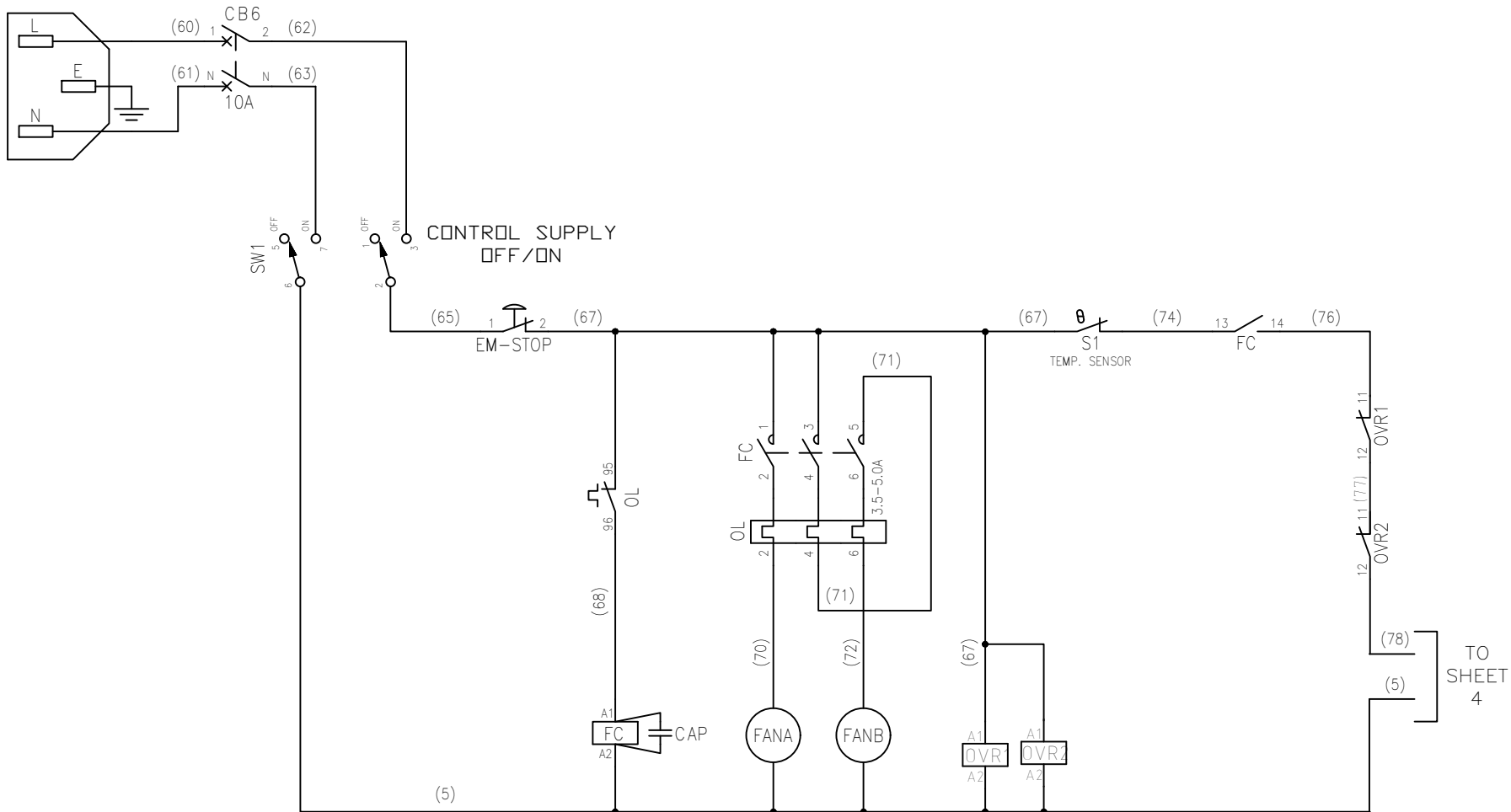
DRAWN BY
Richard Coleman

CHECKED
Larry Chamberlain

CONTRACT
C 6257

DATE	08.07.19				
DATE	09.07.19	1	23/08/19	TH	CN6257-02
ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION	
ISSUE	1		CL20617	DRG. No.	SHEET No.
				2 of 5	A 3

AUXILIARY SUPPLY SOCKET 230V 50Hz 1-PHASE



NOTE:- ALL COILS HAVE SUPPRESSION MODULES CONNECTED IN PARALLEL WITH THEM

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TITLE
 WIRING DIAGRAM 200kW
 240V / 480V DC CASTOR KCS100HM
 240V, 50Hz, 1-PH AUXILIARY

DRAWN BY
Richard Coleman
 DATE
 08.07.19

CHECKED
Larry Chamberlain
 DATE
 09.07.19

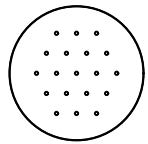
CONTRACT
 C 6257

SCALE
 DNS

ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
1	23/08/19	TH	CN6257-02	AS BUILT AND TESTED
B	12.08.19	T.H.	CN6257-01	CB6 10A ADDED TO AUX CIRCUIT

DRG. No. CL20617
 SHEET No. 3 of 5

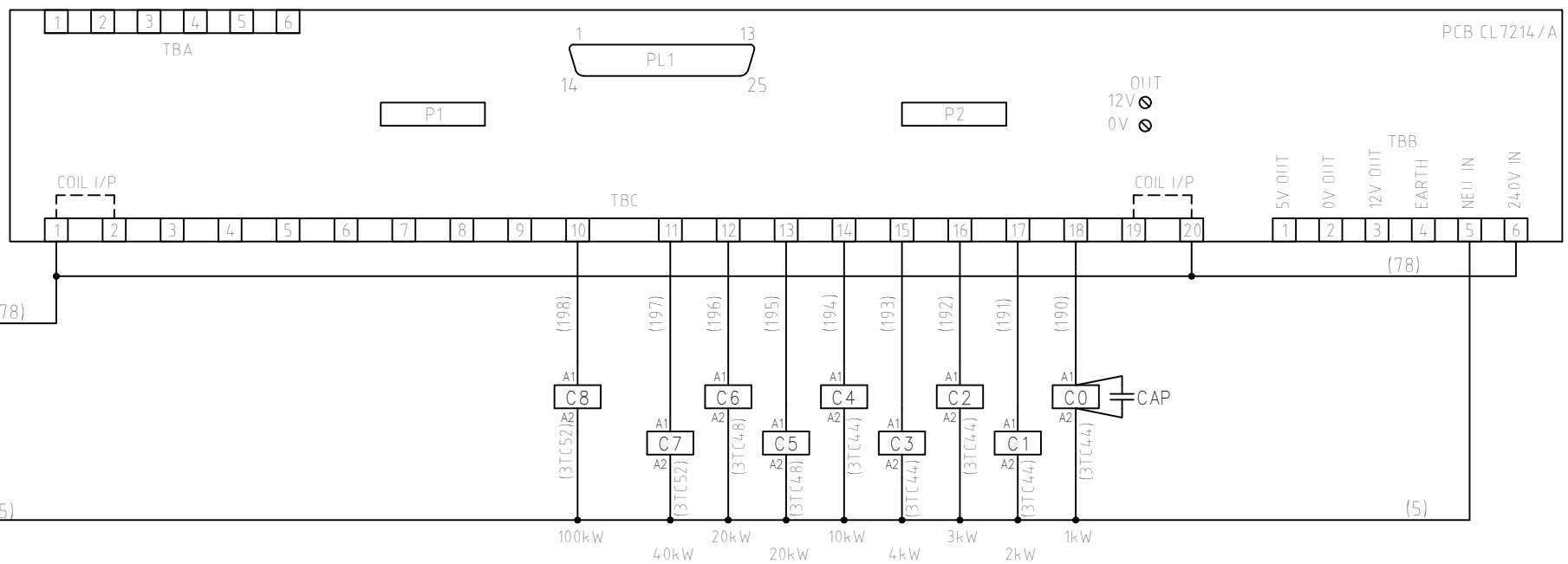
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CONTROL INPUT 19-WAY 'MIL' SOCKET

CONNECT PIN TO PIN AS SHOWN ON SHEET 5

CONTROL INPUT 25-WAY 'D' PLUG



FROM SHEET 3

NOTE - ALL COILS HAVE SUPPRESSION MODULES CONNECTED IN PARALLEL WITH THEM

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CUSTOMER
TRANSRIJN B.V.

TITLE
 WIRING DIAGRAM 200kW
 240V / 480V DC CASTOR KCS100HM
 240V, 50Hz, 1-PH AUXILIARY

DRAWN BY
Richard Coleman

CHECKED
Larry Chamberlain

CONTRACT
 C 6257

DATE	08.07.19				
DATE	09.07.19	1	23/08/19	TH	CN6257-02
ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION	
ISSUE	1		CL20617	DRG. No.	SHEET No.
				4 of 5	A 3

CON1 - 25-WAY 'D'
TYPE SOCKET TO
CL7214 CONTROLLER
PCB

1	RED	(1)	
14	RED/BLU	(+12V)	
2	BLU	(2)	
15	GRN	(4)	
3	16	YEL	(8)
4	17	WHT	(10)
5	18	BLK	(20)
6	19	BRN	(40)
7	20	VIO	(80)
8	21	YEL/BLU	(8k)
9	22	ORG	(100)
10	23	RED/BRN	(4k)
11	24	PNK	(200)
12	25	GRN/RED	0V
13	TRQ	(400)	
	RED/BLK	(2k)	
	GRY	(800)	
	YEL/RED	(1k)	

SCRN

19-WAY 'MIL'
CHASSIS
SOCKET &
COVER

CONNECTORS SHOWN FROM SOLDER SIDE

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CUSTOMER	TRANSRIJN B.V.
TITLE	WIRING DIAGRAM 200kW 240V / 480V DC CASTOR KCS100HM 240V, 50Hz, 1-PH AUXILIARY

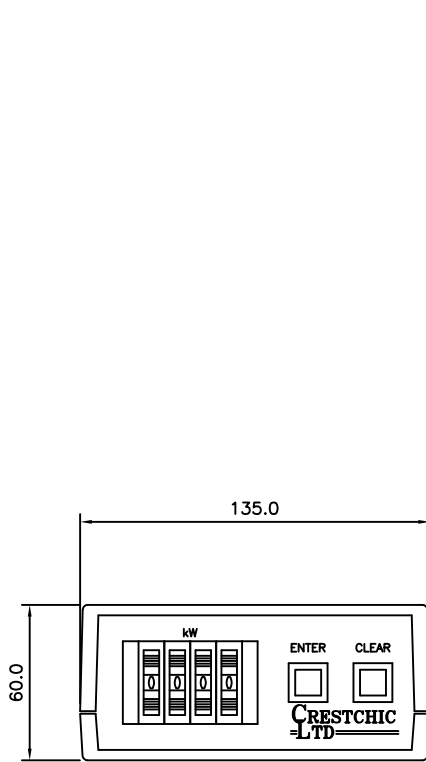
DRAWN BY	DATE
Richard Coleman	08.07.19
CHECKED	DATE
Larry Chamberlain	09.07.19
CONTRACT	SCALE
C 6257	DNS

ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
1	23/08/19	TH	CN6257-02	AS BUILT AND TESTED
ISSUE	SCALE	DRG. No.	SHEET No.	
1	DNS	CL20617	5 of 5	A 3

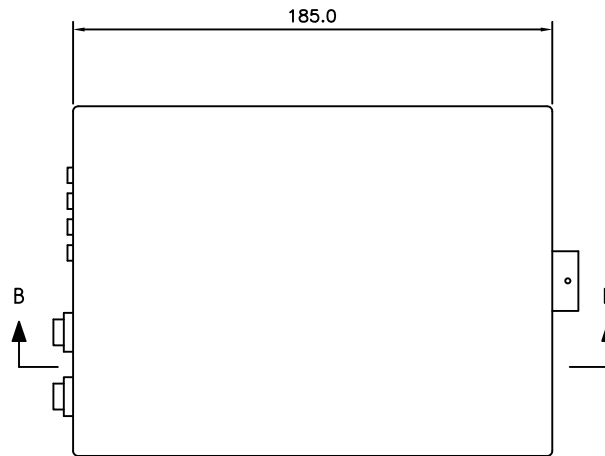
12. PARTS LISTS/DRAWINGS – SUB-ASSEMBLIES

CONTROLLER UNIT 4-DECADE PL1222

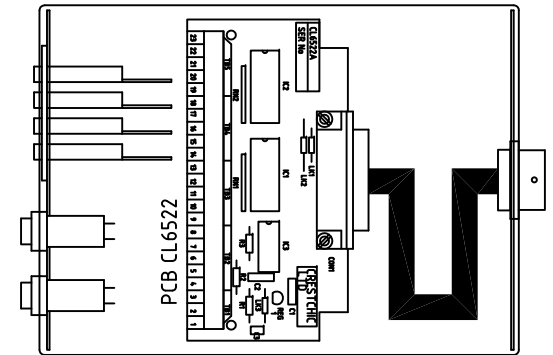
MODEL				CONTRACT No.				
RATING				ISSUED		2		
TEST SUPPLY				DATED		10/12/2001		
CONTROL SYSTEM				SIGNED		KH		
ENCLOSURE TYPE				No. of SHEETS		1		
ITEM	CIRCUIT REF	STOCK	DESCRIPTION	MANUFACTURERS REF	No.	ORDER No.	REC.	ISS.
1	CL8280		GENERAL ARRANGEMENT	CL8280 ISSUE 5	REF			
2	CL8281		WIRING DIAGRAM	CL8281 ISSUE 6	REF			
3								
4		PCB362	PCB KCS CONTROLLER COMPLETE	CL6522 PL1111	1			
5		ENC817	VERONEX INSTRUMENT CASE	RS 584-738	1			
6		ENC818	KCS CONTROLLER FRONT	CL6548	1			
7		ENC820	KCS CONTROLLER REAR MIL-TYPE	CL8275	1			
8	SW1-SW4	SWT415	ROCKER SWITCH		4			
9	SW1-SW4	SWT418	SWITCH SPACER		1			
10	SW1-SW4	SWT413	SWITCH END PLATES		1			
11	ENT,CLR	SWT481	PUSH BUTTON SPST 3A BLACK	RS 336-602	2			
12	PCB	CNR426	NYLON SPACER 4.6 X 3.2 ADHESIVE	RS 220-771	4			
13		CNR268	SOCKET 25 WAY STRAIGHT D-TYPE	RS 544-3834	1			
14		CNR640	CHASSIS MOUNTED SOCKET SIZE 14 19 WAY (KC	AB0521001419SN00	1			
15		CNR641	DUST COVER CHASSIS MTD SOCKET 19 WAY (KC	AB05006514	1			
16			LABEL SERIAL/PLANT Nos	N:\Labels\Dave labels\PLANT.job	1			
17								
18								
19								
20			NOTE: THIS PARTS LIST COVERS 2, 3 & 4					
21			DECADE CONTROLLERS - ADJUST					
22			ITEMS 8 & 9 ACCORDINGLY					
23								
24								
25								
26								
27								
28								
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50								
	FORM	CF012	CRESTCHIC LIMITED		PHONE +44 (0) 1283 531645			
	ISSUE	08	2ND AVENUE, CENTRUM 100,		FAX. +44 (0) 1283 510103			
	ISSUE DATE	16/11/05	BURTON ON TRENT, STAFFS		www.crestchic.co.uk			
	AUTHORISED	M.W.B.	UNITED KINGDOM DE14 2WF		sales@crestchic.co.uk			



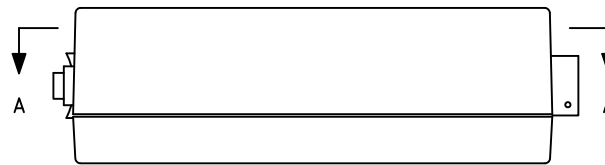
FRONT VIEW



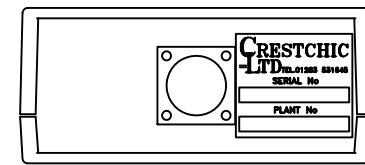
PLAN VIEW



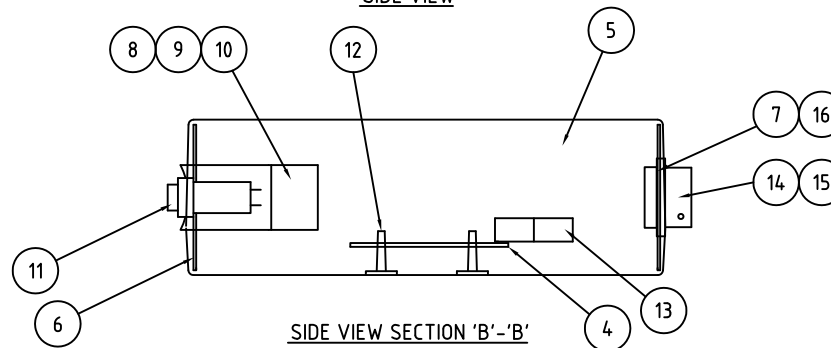
PLAN VIEW SECTION 'A'-'A'



SIDE VIEW



REAR VIEW



SIDE VIEW SECTION 'B'-'B'

INDEXING SWITCHES FITTED ACCORDING TO SIZE OF LOAD MODULE

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CUSTOMER

 TITLE
**GENERAL ARRANGEMENT
 KCS100H CONTROLLER (MILITARY)
 PL1222**

DRAWN BY <i>Karl Hunter</i>	DATE	5	13/03/14	A.G	CNSTD/284	NEW BORDER
		4	10/01/05	G.C.	CNSTD/107	GENERAL UPDATE
CHECKED <i>Garry Chamberlain</i>	DATE	3	11/06/03	—	CNSTD/57	NEW BORDER
		2	10/12/01	—	CNSTD/1	BORDER AND RE/ISSUE CHANGE
CONTRACT STANDARD	SCALE DNS	ISSUE	5	CHK'D	CHANGE No.	DRG. No. CL8280
						SHEET No. 1 of 1
						A 3

1 2 3 4 5 6 7 8

A

B

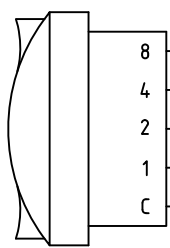
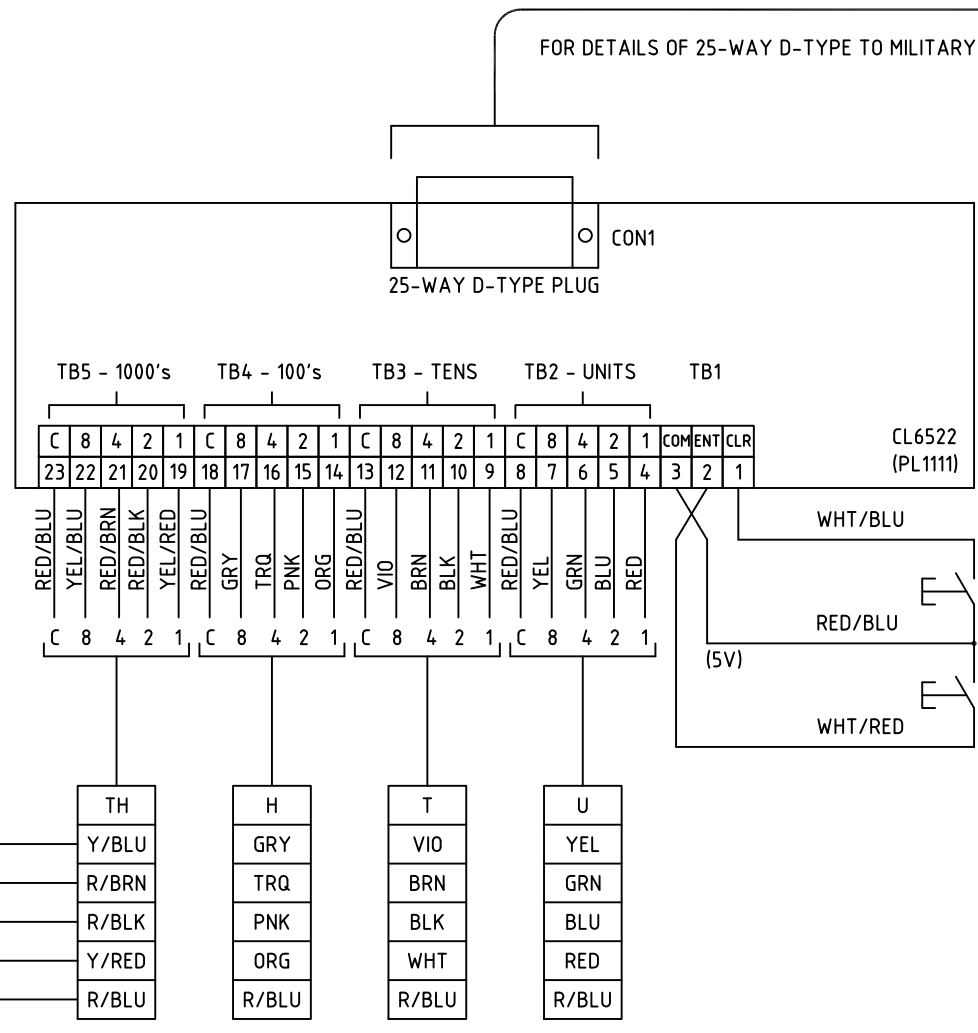
C

D

E

F


FOR DETAILS OF 25-WAY D-TYPE TO MILITARY CONNECTOR, SEE SHEET 2



INDEXING SWITCH

INDEXING SWITCHES FITTED ACCORDING TO SIZE OF LOAD MODULE

WIRING IN—ACCORDANCE WITH CL6198

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 2nd Avenue, Centrum 100, Burton-on-Trent,
 Staffordshire, DE14 2WF, United Kingdom.
 TEL. +44 (0)1283 531645 FAX. +44 (0)1283 510103
 www.crestchic.co.uk
 A Northbridge Industrial Services PLC Company

CUSTOMER

 TITLE
**WIRING DIAGRAM
 KCS100H CONTROLLER (MILITARY)
 PL1222**

DRAWN BY
Dave Pennell
 CHECKED
Garry Chamberlain
 CONTRACT
STANDARD

DATE
01/09/99
 DATE
11/01/05
 SCALE
DNS

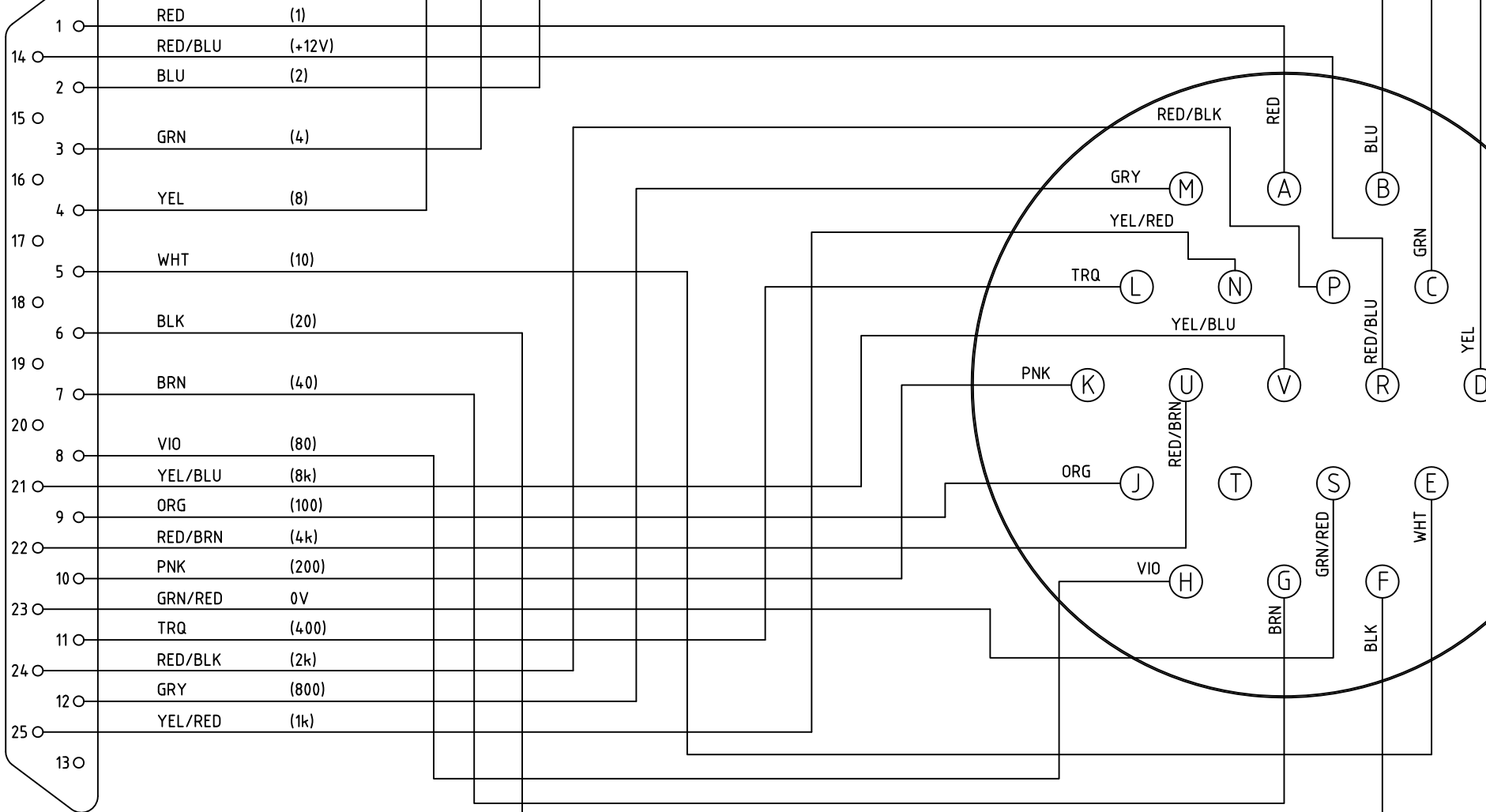
6	13/03/14	A.G	CNSTD/284	NEW BORDER
5	26/07/10	G.C.	CNSTD/226	NO CHANGE TO THIS SHEET
4	11/01/05	G.C.	CNSTD/107	GENERAL UPDATE
3	10/12/01	—	CNSTD/57	NEW BORDER
ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
6			DRG. No. CL8281	SHEET No. 1 of 2
				A 3

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1 2 3 4 5 6 7 8

25-WAY 'D' TYPE SOCKET
TO CON1 ON CL6522/A
INPUT PCB

19-WAY 'MIL'
CHASSIS SOCKET
& COVER



WIRING IN-ACCORDANCE WITH CL6198

CONNECTORS SHOWN FROM SOLDER SIDE

CRESTCHIC
Crestchic Loadbanks
2nd Avenue, Centrum 100, Burton-on-Trent,
Staffordshire, DE14 2WF, United Kingdom.
TEL. +44 (0)1283 531645 FAX. +44 (0)1283 510103
www.crestchic.co.uk
A Northbridge Industrial Services PLC Company


CUSTOMER	
TITLE	CONNECTION DETAILS KCS100H CONTROLLER 'D' TO 'MIL' PL1222

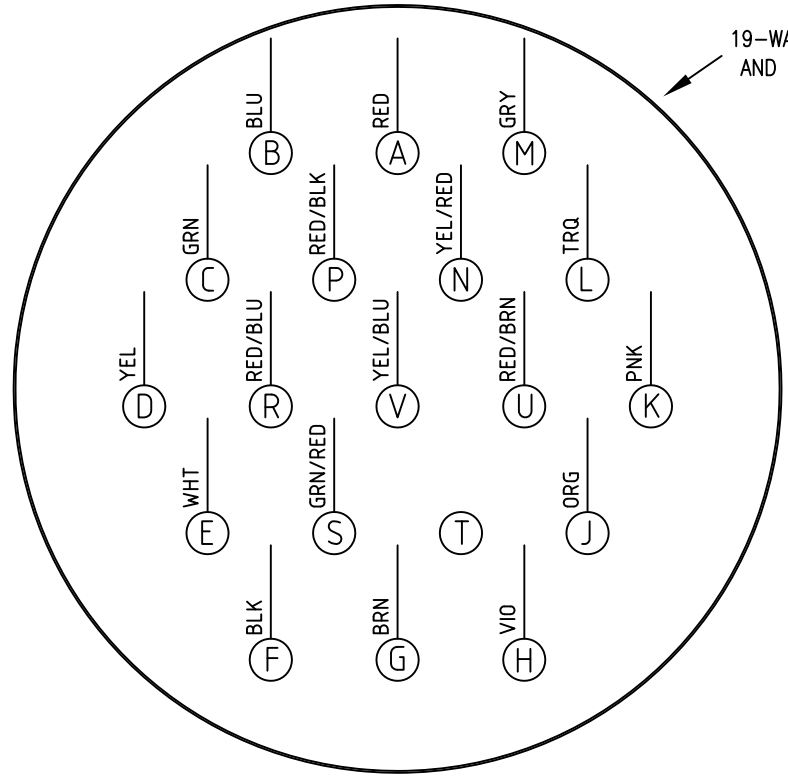
DRAWN BY	DATE
<i>Dave Pennell</i>	01/09/99
CHECKED	DATE
<i>Garry Chamberlain</i>	11/01/05
CONTRACT	SCALE
STANDARD	DNS

6	13/03/14	A.G	CNSTD/284	NEW BORDER
5	26/07/10	G.C.	CNSTD/226	REDRAW - CONNECTIONS SHOWN SOLDER SIDE
4	11/01/05	G.C.	CNSTD/107	GENERAL UPDATE
3	11/06/03		CNSTD/57	NEW BORDER
ISSUE	DATE	CHK'D	CHANGE No.	DESCRIPTION
6				
DRG. No.	CL8281			SHEET No.
			2 of 2	A 3

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KCS EXTEND LEAD MIL-TYPE PL1224

		Crestchic Limited Second Avenue, Centrum 100, Burton-on-Trent DE14 2WF. U.K Tel +44 (0) 1283 531645 Fax +44 (0) 1283 510103				Co Reg No: 1772456 VAT No: GB880985177				
		sales@crestchic.co.uk hires@crestchic.co.uk service@crestchic.co.uk								
		MODEL CONTROL LB TO CONTROL LEAD KCS100H (Straight-90 Deg) 10 METRE M				CONTRACT No.				
		RATING				ISSUED				4
TEST SUPPLY				DATED				17/08/2018		
CONTROL SYSTEM				SIGNED				TH		
ENCLOSURE TYPE				No. of SHEETS				1		
ITEM	CIRCUIT REF	STOCK	No.	Unit	DESCRIPTION	MANUFACTURERS REF	ORDER No.	REC.	ISS.	
1	CL8279		REF		GENERAL ARRANGEMENT					
2										
3										
4										
5		CAB428	10	m	CABLE 20 CORE SCREENED 7/0.2mm (100m)	FEC 715-517 / RS 660-0479				
6										
7										
8		CNR621	1		CABLE BOOT SIZE 14 RAYFAST	202K142-100-0 / 155-42-GW24				
9		CNR623	1		CABLE BOOT SIZE 14 90 DEGREE	222K142-25/225-0				
10										
11		CNR690	2		CABLE MTD PLUG COVER 19 WAY SIZE 14	AB05007114				
12										
13		CNR688	2		CABLE MOUNTED PLUG 19 WAY SIZE 14	AB0562001419PN00.				
14										
15		CNR617	2		SPINDLE BACK SHELL SIZE 14	RS 241-1323				
16										
17										
18										
19										
20										
21										
22										
23										
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51										



A	RED	(1)
B	BLU	(2)
C	GRN	(4)
D	YEL	(8)
E	WHT	(10)
F	BLK	(20)
G	BRN	(40)
H	VIO	(80)
J	ORG	(100)
K	PNK	(200)
L	TRQ	(400)
M	GRY	(800)
N	YEL/RED	(1000)
P	RED/BLK	(2000)
R	RED/BLU	(+12V)
S	GRN/RED	(0V)
T	screen	
U	RED/BRN	(4000)
V	YEL/BLU	(8000)

RED	A
BLU	B
GRN	C
YEL	D
WHT	E
BLK	F
BRN	G
VIO	H
ORG	J
PNK	K
TRQ	L
GRY	M
YEL/RED	N
RED/BLK	P
RED/BLU	R
GRN/RED	S
screen	T
screen RED/BRN	U
YEL/BLU	V

19-WAY Mii CABLE
PLUG AND DUST
COVER

19-WAY Mii CABLE
PLUG AND DUST
COVER

CABLE LENGTH AS SPECIFIED
ON PARTS LIST

WIRING IN-ACCORDANCE WITH CL6198

PL1224 - 10m PL1254 - 3m

<p>Crestchic Loadbanks 2nd Avenue, Centrum 100, Burton-on-Trent, Staffordshire, DE14 2WF, United Kingdom. TEL: +44 (0)1283 531645 FAX: +44 (0)1283 510103 www.crestchic.co.uk A Northbridge Industrial Services PLC Company</p>	CUSTOMER	DRAWN BY	DATE	6	13/03/14	A.G	CNSTD/284	NEW BORDER
	TITLE CONNECTION DETAILS KCS EXTEND LEAD (MILITARY) PL1224 + PL1254	CHECKED	DATE	5	27/07/10	G.C.	CNSTD/225	CABLE CORES/COLOUR UPDATE
		CHECKED	DATE	4	11/01/05	G.C.	CNSTD/107	GENERAL UPDATE
		CHECKED	DATE	3	11/06/03	—	CNSTD/57	NEW BORDER
This Drawing is the property of Crestchic Ltd and may not be copied, or used for any purpose other than that for which it is supplied. Contravention will be prosecuted copyright © 2014 Crestchic Ltd.	CONTRACT	SCALE	ISSUE	6	DRG. No.		SHEET No.	A
	STANDARD	DNS	6	CL8279		1 of 1	3	

13. TEST CERTIFICATE AND RESULTS

Certificate of Test

Customer: TRANSRIJN B.V.
Latensteinse Rondweg 4-04
4005 EH Tiel
Netherlands

Contract Number: C6257

Customer Order Number: Countersigned Acknow.

Equipment Description: 200kW Resistive Loadbank
Transportable - Castors – Grey White RAL9002
Test Supply: 240/480V DC
Aux Supply: 230V, 50Hz, 1-Phase, 2-Wire
KCS100HM

We (Crestchic Ltd.) certify that the above equipment has been tested to the schedule shown on the attached test sheets.

Crestchic Test Engineer: Liam G. Goodgallon Date: 22.8.2019

Customer Test Witness: N/A Date: 22.8.2019

Form	Issue	Date	Authorised	Sheet No.	2 nd Avenue, Centrum 100, Burton-on-Trent, Staffs. U.K. Tel. +44 (0) 1283 531645 Fax. +44 (0) 1283 510103
CF014	06	18.02.14	MWB	1 of 1	



Works Test Sheet

Contract Number
C6257

Customer	TRANSRIJN BV	Delivery Date	30.08.2019
----------	--------------	---------------	------------

Equipment Details

Load / Test

Voltage 240/480 DC Volts

Frequency - Hz

Load Connections Star Delta 1-Phase / DC

Auxiliary Supply

Voltage 230 Volts

Frequency 50 Hz

AC Control Circuit Voltage 220-240V Volts

Internal External Switched

Module Type

Castor Mounted Trailer Mounted

Permanent Installation Fork Lift Base

Crash-Pack Mini Container

Container 6ft 10ft 20ft

Other _____

Colour: RAL9002 BS4800 00E55 Other _____

Load Details (Design) @ 230V 50Hz **Reactor Design** _____

	<u>Resistive</u>		<u>Reactive / Capacitive</u>
Capacity	<u>10</u> kW		<u> </u> kVAr
Resolution	<u>1</u> kW		<u> </u> kVAr

Control System: MCS KCS Trakker Regen/Baseload WTT

Toggle Switch Other _____

Controller Notes KCS

Test Engineer
Crestchic L. GOODFELLOW

Customer N/A

Date 21.8.2019

Inspection & Test Procedure

<u>Procedure</u>	<u>Notes</u>
<p>Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer</p>	
<p>1.0 Visual</p>	
<p>1.1 Compare with the layout drawing for presence of all items. ✓</p>	
<p>1.2 Inspect all busbars and connections for clearance. ✓</p>	
<p>1.3 Inspect each item for dents and scratches. ✓</p>	
<p>1.4 Check the presence and security of all covers, trunking, clips & screws. ✓</p>	
<p>1.5 Inspect all screwed terminals for correctness (no loose strands, no bare conductors showing). ✓</p>	
<p>1.6 Check presence of wire identification on all screwed terminals (colour codes & ferrules). ✓</p>	
<p>1.7 Check the presence and rating of all bulbs in indication lamps, and LED indicators. N/A</p>	
<p>1.8 Check the presence and rating of all fuses and circuit breakers. (Tick off against item list). ✓</p>	
<p>1.9 Check the earth straps are fitted to all removable covers and doors. ✓</p>	
<p>1.10 Check position of wiring looms relative to any moving parts or sharp edges. ✓</p>	
<p>1.11 Check position of the slots in the reactor cooling pipes. N/A</p>	

Inspection & Test Procedure

<u>Procedure</u>	<u>Notes</u>
------------------	--------------

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

2.0 Mechanical

- 2.1 Check all isolators, circuit breakers, switches and buttons for mechanical function. ✓
- 2.2 Check mechanical security of all transformers, contactors, mechanical interlocks, relays, instruments and sensors. ✓
- 2.3 Individually check each fan for mechanical security and free rotation and clearance. ✓ INSP.
- 2.4 Check correct fitting and security of fan guards. ✓ INSP.
- 2.5 Container Doors, check they open from the inside. N/A
- 2.6 Check Reactor Phase clearance to Neutral Bar. N/A

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical

3.1 Record Test Meters Used:-

Item	Instrument Type	Phase	Instrument Identification
3.1.1	Insulation Tester	ALL	CIE: 19
3.1.2	Multi-Meter	ALL	CIE: 13
3.1.3	Clamp on Ammeter	D.C.	CIE: 61
	Clamp on Ammeter		CIE:
	Clamp on Ammeter		CIE:
3.1.4	Multi-function Tester		CIE:
3.1.5	Earth Resistance Tester		CIE:
3.1.6	CLAMP ON AMMETER	ALL	CIE = 8 (FANS)

3.2 Measure and record the insulation resistance between neutral and earth and phases to earth.

Test Supply

Insulation Test Description	Results MΩ
(+) T1	400 MΩ
(+) T2	400 MΩ
(-) T3	400 MΩ
(-) T4	400 MΩ
Voltage	500 V

Auxiliary Supply

Insulation Test Description	Results MΩ
N-E	> 999 MΩ
L1-E	> 999 MΩ
L2-E	N/A MΩ
L3-E	N/A MΩ
Voltage	500 V

Voltage Test

0 - 480V 500V
 600 - 690V 1000V

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.3 Measure and record the insulation resistance between neutral and earth and phase to earth. N/A

Auxiliary Heating/Lighting 1

Auxiliary Heating/Lighting 2 (If Applicable)

Test	Results
Description	MΩ
N-E	MΩ
L-E	MΩ
Voltage	V
CB Ref.	

Test	Results
Description	MΩ
N-E	MΩ
L-E	MΩ
Voltage	V
CB Ref.	

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.4 Identify type of fan fitted – kW, Full Load Current and Voltage and Megger Test.

Fan	Ref.	kW	FLC	Volt/Hz
Type 1	FANS A, B	0.59/0.86	2.9/3.8A	220-240/50,60
Type 2				
Type 3				
Type 4				
Type 5				

3.5 Set Fan overloads accordingly:- (10/L)

Fan	O/L A	MΩ	Fan	O/L A	MΩ	Fan	O/L A	MΩ	Fan	O/L A	MΩ
FC0			FC5			FC10			FC15		
FC1	4.2	>999	FC6			FC11			FC16		
FC2	4.2	>999	FC7			FC12			FC17		
FC3			FC8			FC13			FC18		
FC4			FC9			FC14			FC19		

3.6 Check the fan(s) rotate in the correct direction.

3.7 Check the delay between fans starting where appropriate (approx. 1 sec.) N/A

3.8 Check and record resistance values on CF048

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.9 Connect up and switch on power to the auxiliary supply circuitry. ✓

3.10 Check the control circuit voltage (refer to the front sheet) and record if through a transformer.

N/A

Description	TX Value	Measured Primary	Measured Secondary
Voltage Tapping/Range 1	_____ V	_____ V	_____ V
Voltage Tapping/Range 2	_____ V	_____ V	_____ V
Voltage Tapping/Range 3	_____ V	_____ V	_____ V

3.11 Check Anti-Condensation/Lighting Circuit if fitted, mainly containers.

N/A

Description	Setting	Tick	Volt/Hz
Micro Control Enclosure	10°C / 50°F	←_____	_____
Loadbank Section	10°C / 50°F Small Dot or Position 1	_____	_____
Transformer Section	10°C / 50°F Small Dot or Position 1	_____	_____

3.12 Phase Sequence Relay Voltage and Time Set N/A

Type	Voltage	Time
PSR / PSF	N/A	—2 Seconds—
MPSR / MPSF	N/A	—2 Seconds—

The Phase Sequence Relay will switch state when the set voltage goes lower than 20%.
E.g. 450V Nominal – Drop out 360V

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.13 Fan Control Program (Logo!) N/A

3.14 Operate each contactor individually (on no load where possible).
 Check coil suppression modules are fitted.

3.15 Load test the equipment and complete the table of results on CF048
 (tolerance $\pm 5\%$).

3.16 Record total current (No Load) of Fans and all contactors energised
 L2 and L3 not applicable if single phase

L1 L2 L3 N/A V / Hz

3.17 Record total control current of control circuit (1-phase) with all contactors energised
 (Control circuit derived from three phase)

A **6.4** V **232.2**

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.18 MCS Only - Record Calibration File Operating Limit Voltages

N/A

MODE	P-N V min	P-N V max	P-N V Pre Load
STAR			
DELTA			
1PH			
DC			

3.19 MCS Only - Record Nominal Ratings set

N/A

MODE	Rating 1 Volts	Rating 2 Volts	Rating 3 Volts	Frequency Hz
STAR				
DELTA				
1PH				
DC				N/A

3.20 MCS Only – Modbus

N/A

IP Address Subnet Mask

- Start/Stop Cooling Fans.
- Set Nominal Values.
- Setup and apply a load (kW only)
- Read instrumentation from loadbank
- Report faults or errors detected by the loadbank

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.21 Check the functions of the following where appropriate (delete items not fitted):-

Item	Ref.	Check	Comments
3.21.1	Air Flow Sensor Switches	N/A	
3.21.2	Over Temperature	✓	
3.21.3	Fan Overload Relays	✓	
3.21.4	Reset Button	N/A	
3.21.5	Emergency Stop Button	✓	
3.21.6	Phase Rotation Operation	N/A	
3.21.7	Internal Function	N/A	
3.21.8	External Function	✓	
3.21.9	PC Control	N/A	
3.21.10	LC60 Control	N/A	
3.21.11	Modbus Control	N/A	
3.21.12	MCS Mode	N/A	
3.21.13	KCS Mode	✓	
3.21.14	C.T. Sensing	N/A	
3.21.15	Remote Voltage Sensing	N/A	
3.21.16	Auxiliary Supply Indication (Lamps)	N/A	
3.21.17	Running Indication	N/A	
3.21.18	Cooling Fault Indication	N/A	
3.21.19	Phase Sequence Incorrect Indication	N/A	
3.21.20	MCS Internal Supply Input (Resistive Module)	N/A	
3.21.21	Resistor Network	✓	2 x 10KΩ FITTED
3.21.22	Check PC Socket	N/A	
3.21.23	CSM Fan Contactor Inputs	N/A	
3.21.24	CSM Air Flow Inputs	N/A	

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

3.0 Electrical cont.

3.21 Check the functions of the following where appropriate (delete items not fitted):-

Item	Ref.	Check	Comments
3.21.25	CSM Element Inputs	N/A	
3.21.26	CSM Reactor Inputs	N/A	
3.21.27	CSM Transformer Inputs	N/A	
3.21.28	Control Lead	✓	
3.21.29	Extension Reels	✓	
3.21.30	Comms. Lead (Loadbank to Loadbank)	N/A	
3.21.31	Comms. Master and Slave Operation	N/A	
3.21.32	Digital / Analogue Meters	N/A	
3.21.33	Test Supply Live (Beacon)	N/A	
3.21.34	Door Open (Beacon and/or Alarm)	N/A	
3.21.35	System input Configuration (Modes)	N/A	
3.21.36	Mechanical Interlocks (Star/Delta)	N/A	
3.21.37	Record Panel Meter Serial Number	N/A	
3.21.38	Record ACB Serial Number	N/A	
3.21.39	OVR1 OPERATION	✓	SET 229 V, TRIPS 229V
3.21.40	OVR2 OPERATION	✓	SET 227, TRIPS 228V
3.21.41			
3.21.42			
3.21.43			
3.21.44			
3.21.45			
3.21.46			

Inspection & Test Procedure

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

Items NOT Applicable to Equipment on Test to be Deleted by Test Engineer

4.0 Final Checklist

- 4.1 Overloads set
- 4.2 Heater Thermostat set
- 4.3 Phase Seq. Volts and Time set
- 4.4 Correct fuses in fuse spurs
- 4.5 All circuit breakers 'on'
- 4.6 All labels on the unit
- 4.7 Tested Sticker
- 4.8 Save Calibration File
(File to be taken after Start-Up Sequence for Capacities)
- 4.9 Record/Issue Serial No.s
- 4.10 Container Manufacturer No.
- 4.11 Calibration file checked/approved

5.0 Completion of Documentation

- 5.1 Test Sheets CF047 & CF048
- 5.2 CF100 if Applicable
- 5.3 CF138 Faults Report
- 5.4 Mechanical Check List
- 5.5 Parts List
- 5.6 Wiring Diagram
- 5.7 General Arrangement
- 5.8 Return Production pack to Engineering



None Micro Sheet

Contract Number	C6257	Date	21.8.19	Test Engineer	L. GOODFELLOW
-----------------	-------	------	---------	---------------	---------------

480V D.C. OPTION

Contactor	R/XL kW/kVAr	Amps Cold			Voltage			Resistance Cold		
		D.C.			D.C.			-VE	+VE	L3
0	1	1.9			456.4			110.2	111.5	
1	2	3.9			455.3			55.3	55.4	
2	3	5.9			455.6			37.4	37.6	
3	4	8.0			455.4			27.6	28.2	
4	10	20.6			454.3			11.0	10.7	
5	20	40.7			452.7			5.4	5.5	
6	20	41.6			453.1			5.5	5.3	
7	40	81.2			449.9			2.8	2.7	
8	100	201.3			441.3			1.1	1.1	
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										

Contactor	R/XL kW/kVAr	Amps Cold			Voltage			Resistance Cold		
		L1	L2	L3	L1-LN	L2-LN	L3-LN	L1	L2	L3
8										
9										
10										
11										
12										
13										
14										
15										
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23										

App By	Liam Goodfellow/ENG	Date	22.8.19	Position	Test Engineer
--------	---------------------	------	---------	----------	---------------



Fan Sheet

Contract Number C6257 Date 21.8.19 Test Engineer L. GODFREY

Item Fan	Fan Currents			Voltage			Resistance		
	L1	L2	L3	L1-LN	or	L1-L2	L1 - L2	L2 -L3	L3 - L1
1	3.1			232.2					
2	3.0			232.2					
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Total (A) 6.2 232.2V Frequency Hz- 50

Load kW	Amps Hot (2 min)	Voltage	Comments
100	D.C. 200.2	D.C. 441.8	

App By L. Godfrey Date 21.8.19 Position Test Engineer

14. EC DECLARATION OF CONFORMITY

E.C. DECLARATION OF CONFORMITY

Herewith we declare that the load proving equipment designated below, on the basis of its design and construction, in the form brought on to the market by us, is in accordance with the relevant safety and health requirements of the EC Council Directive on electrical equipment. If modifications are made to the equipment without prior consultations with us, this declaration becomes invalid.

Designation of Equipment: Loadbanks

Type: Resistive, Reactive, D.C.

Relevant EC Council Directive: Electrical Equipment 2006/95/EC

Applied National Standards: BS EN 61082-2006, IEC 60617-2:1996
BS EN 60529-1992

Basis of self attestation: Quality Assurance to BS EN ISO 9001 2008
NQA-Registration firm – Cert. No. 169

Signature of Manufacturer: **Tony Higginson** Date: **25/05/18**

Position of Signatory: **Head of Engineering**

File: Crestchic Original
 Customers Copy



E.C. DECLARATION OF CONFORMITY

Herewith we declare that the load proving equipment designated below, on the basis of its design and construction, in the form brought on to the market by us, is in accordance with the relevant safety and health requirements of the EC Council Directive on electrical equipment. If modifications are made to the equipment without prior consultations with us, this declaration becomes invalid.

Designation of Equipment: Loadbanks

Type: Resistive, Reactive, D.C.

Relevant EC Council Directive: Machinery Directive 2006/42/EC

Applied National Standards: BS EN 60204-1-2006

Basis of self attestation: Quality Assurance BS EN ISO 9001 2008
NQA Registration firm – Cert. No. 169

Signature of Manufacturer: Tony Higginson Date: 25/05/18

Position of Signatory: Head of Engineering

File: Crestchic Original
Customers Copy



15. END OF LIFE PRODUCT RECYCLING AND DISPOSAL



With proper maintenance Crestchic Loadbanks can be used reliably for many years. We offer a service department who can provide spare parts, maintenance and upgrades for all our loadbanks.

Please contact service@crestchic.co.uk for further details.

If the loadbank is no longer economical to maintain it can be decommissioned for disposal. Crestchic can provide this service if the loadbank is returned to our Head Office in Burton upon Trent and will disassemble the loadbank for correct recycling and disposal.

If you require to dispose of the loadbank locally all the components can be unbolted from the enclosure and separated for recycling.

The main metalwork components of the loadbank are:

- Enclosure: Mild Steel or Stainless Steel.
- Copper busbar.

The main electrical components of the loadbank are:

- Elements: Stainless Steel finning surrounding stainless steel tubing filled magnesium oxide and 80/20 nickel chrome resistance wire, and ceramic bushes.
- Reactors: Copper or aluminium wire wound around an iron core and insulating material.
- Cables and electrical connectors.
- Electronic control equipment including; Transformers, Fuses, Contactors, Relays and Switches.
- Printed Circuit Boards.

These devices can be recycled due to their low pollutant content.

It is the responsibility of the loadbank owner to ensure that disposal is carried out in accordance with local regulations. For environmentally friendly recycling and disposal of your electronic waste, please contact a local company certified for the disposal of electronic waste.