

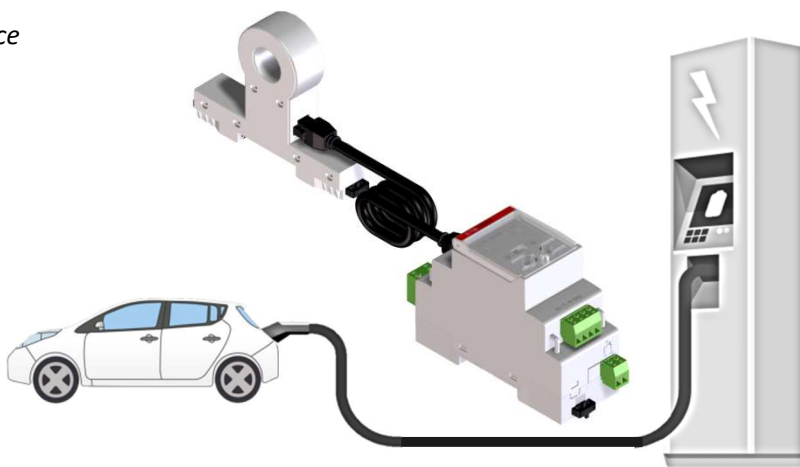
Residual Direct Current Monitoring Device

RDC-MD IEC 62955

for Electric Vehicle AC charging system

Upgrade your e-car AC charging system

Confirming to IEC 61851-1



DC6 serial RDC-MD contains two separated modules with detection module and monitoring module:

DC6-iRCS-32	Detection module with intelligent residual current sensor for residual direct current detecting. 
DC6-C1	Monitoring module - 1 channel with single reliable electric coupling to SCPD for power cutting within short time. 
DC6-C2	Monitoring module - 2 channels with double reliable electric coupling to SCPD for power cutting within short time. 

Function description

Residual direct current detection of the charging station takes place via the externally connected detection module. When the residual direct current in the charging station is more than the defined threshold value, the detection module will send the digital trip signal to the monitoring module to switch the relay and active the alarm indication.

Meanwhile, remote test and remote reset functionality is also available in the monitoring module for the communication with charge controller as safety consideration. Thus the charge controller could active the function test for residual current protection before the charging of the electric vehicle.

► DC6-C1 / DC6-C2

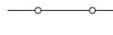
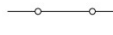
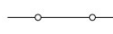
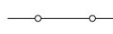
▼ DC6-iRCS-32



#	Element	Description
(1) L, N	Push-wire terminal	Connection to Un 230VAC
(2) S1, S2	Socket	Connection to intelligent residual current sensor
(3) ACT	LED green	Power status indication
(4) AL1	LED yellow	Alarm indication
(5) AL2	LED yellow	Alarm indication
(6) T	Button	Test button
(7) R	Button	Reset button
(8) AR	Sliding switch	Auto Reset mode, automatically reset one second after error recover.
(9) MR	Sliding switch	Manual Reset mode, manually reset with R button or remote R command.
(10) Err	Push-wire terminal	Together with "GND": alarm signal output for device error 12VDC output between "Err" and "GND" as active.
(11) T	Push-wire terminal	Together with "GND": remote test input for charge controller 12VDC input between "T" and "GND" for remote test. Refer to page 4.
(12) R	Push-wire terminal	Together with "GND": remote reset for charge controller 12VDC input between "R" and "GND" for remote reset. Refer to page 4.
(13) GND	Push-wire terminal	Together with "Err", "T", and "R": communication with charge controller
(14) 13, 14	Push-wire terminal	Relay alarm output 1
(15) 23, 24	Push-wire terminal	Relay alarm output 2

Relay output and alarm indication

▼ DC6-C2

#	Status	Relay 1	Relay 2	ACT-LED	AL1-LED	AL2-LED
1	Not ready for operation					
2	Ready for operation					
3	Ready for operation, channel 1 alarm					
4	Ready for operation, channel 2 alarm					
5	Ready for operation, channel 1&2 alarm					
6	Power on but S1 sensor dis-connected.					
7	Power on but S2 sensor dis-connected					
8	Power on but S1&S2 dis-connected					
9	Over-voltage or under-voltage alarm					

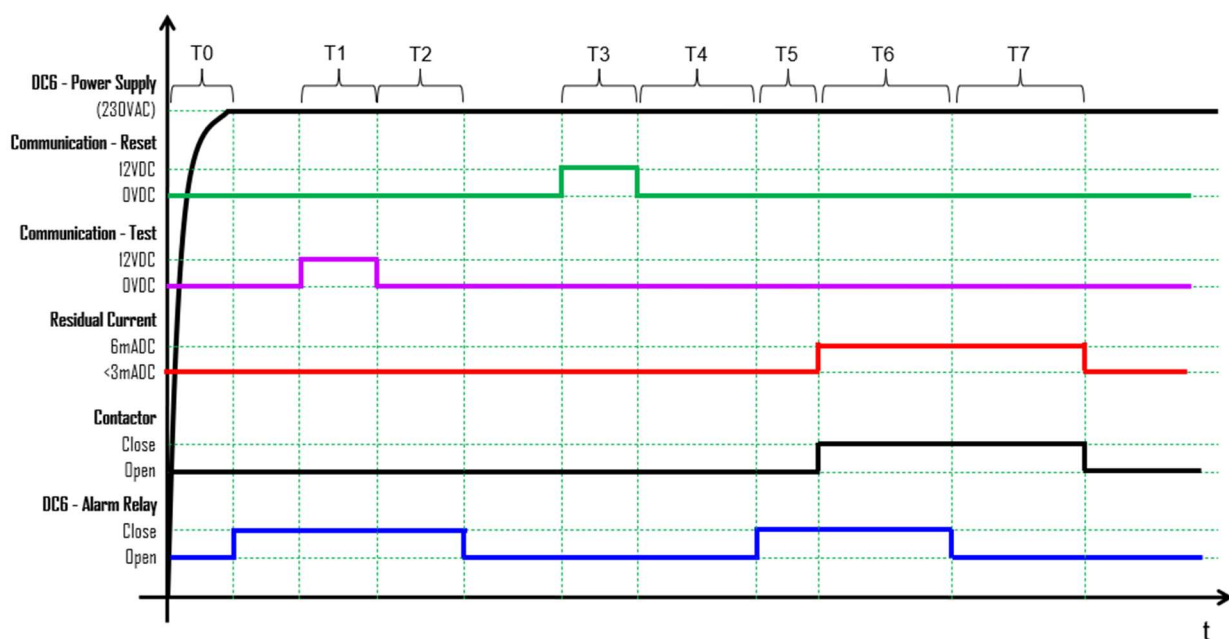
▼ DC6-C1

#	Status		Relay	ACT-LED		AL-LED
1	Not ready for operation					
2	Ready for operation					
3	Ready for operation, alarm					
4	Power on but sensor dis-connected					
5	Over-voltage or under-voltage alarm					

Remark:

- 1) Err signal will be triggered with 12VDC output when AL LED is flashing due to sensor dis-connection; Meanwhile, relevant relay output will be open for safety protection.
- 2) Over-voltage alarm range: > 252VAC; Under-voltage alarm range: < 196VAC. Relay no action.

Time slot for communication and operation

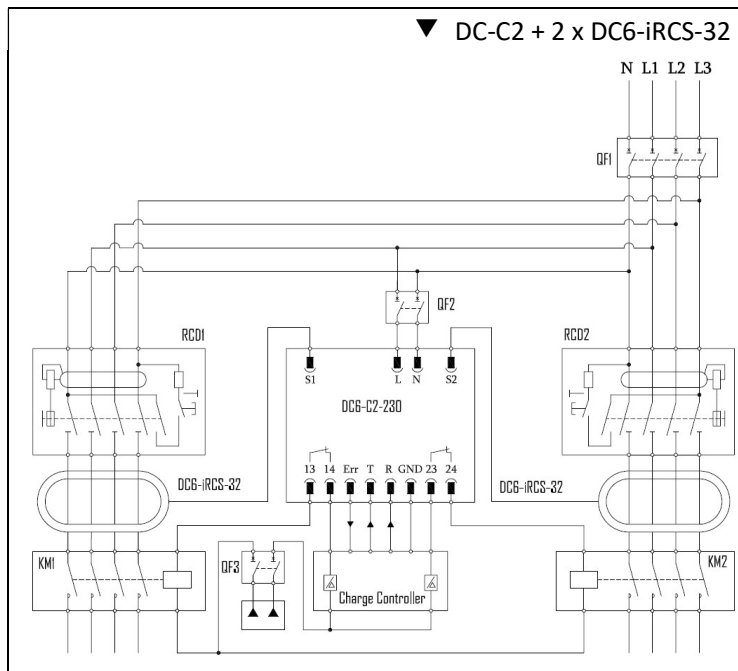
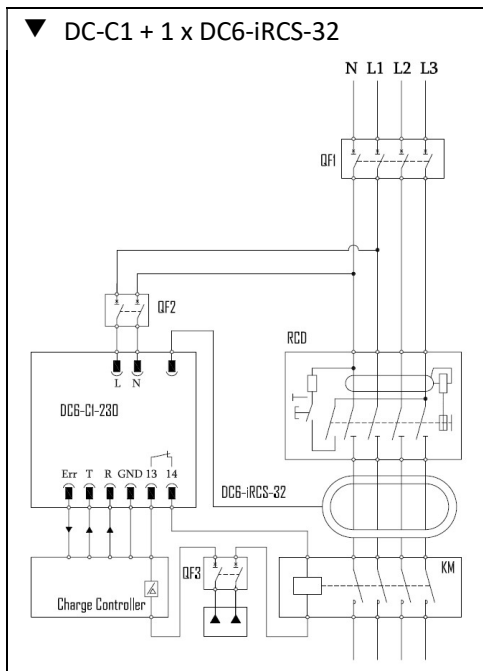


#	Description	Time Duration
T0	Power up for DC6-C1/C2	< 20ms
T1	Pulse DC for the communication remote test from charge controller	> 20ms
T2	Response time of DC6-C1/C2 alarm relay for remote test	< 200ms
T3	Pulse DC for the communication remote reset from charge controller	> 20ms
T4	Response time of DC6-C1/C2 alarm relay for remote reset	< 200ms
T5	Open to Close operation time for the contactor in main charge circuit	Up to the contactor
T6	Response time for DC6-C1/C2 and DC6-iRCS-32 to switch alarm relay	< 220ms @ DC 6mA < 100ms @ DC 60mA < 70ms @ DC 200mA
T7	Close to Open operation time for the contactor in main charge circuit	< 30ms

Remark:

T7 is limited to less than 30ms to ensure that the complete time slot to cut-off the power supply could be within 100ms when the residual direct current is more than 200mA according to the request of IEC 62955.

Proposed Wiring Diagram

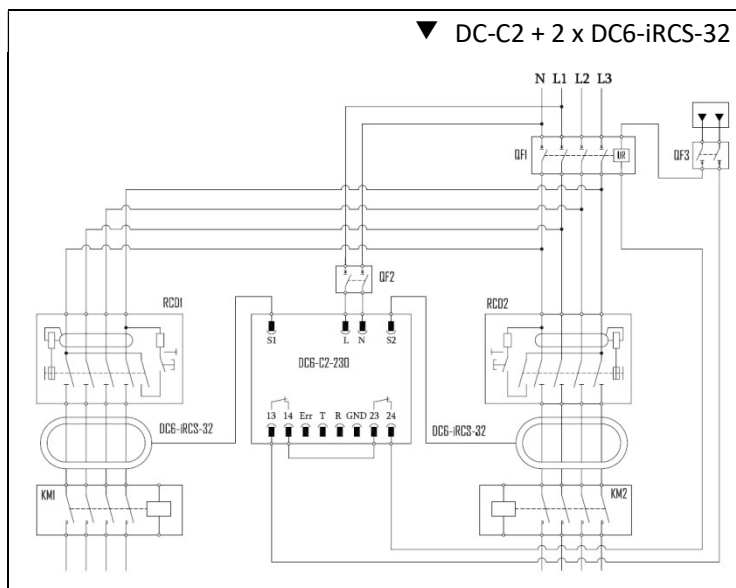
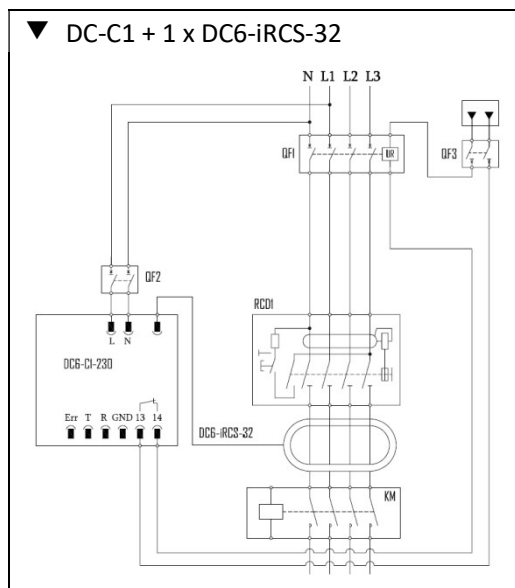


QF1:	MCB in main circuit	RCD1:	RCD for charging circuit 1 $I_{\Delta n} = 30\text{mA}$, Type A
QF2:	MCB in auxiliary circuit	RCD2:	RCD for charging circuit 2 $I_{\Delta n} = 30\text{mA}$, Type A
QF3:	MCB in control circuit	KM1:	Contactor in charging circuit 1
CC:	Charge Controller	KM2:	Contactor in charging circuit 2

Remark:

- 1) Close to Open operation time of used contactor KM1 and KM2 should be less than 30ms.
- 2) Time delay setting in the charge controller for power cut-off caused by residual current should be calculated to ensure the total time from alarm relay switched to off status in DC6 monitoring module to the contactor in the main charge circuit close-to-open switch time is less than 30ms.

Alternative Wiring Diagram



QF1:	MCB in main circuit	RCD1:	RCD for charging circuit 1 $I_{\Delta n} = 30\text{mA}$, Type A
QF2:	MCB in auxiliary circuit	RCD2:	RCD for charging circuit 2 $I_{\Delta n} = 30\text{mA}$, Type A
QF3:	MCB in control circuit	KM1:	Contactor in charging circuit 1
CC:	Charge Controller	KM2:	Contactor in charging circuit 2
UR:	Under-voltage Release		

Remark:

Operation time of used under-voltage release should be less than 30ms.

In this case, remote test and remote reset function for the communication with charge controller is not preferred to use.

Technical data

Rated voltage U_n	230VAC, 50/60Hz
Rated insulation voltage U_i	250VAC
Rated impulse withstand voltage U_{imp}	4000V
Overvoltage category	III
Pollution degree	2
Degree of protection	IP20
Rated DC residual operating current $I_{\Delta dc}$	0.006A
Rated DC residual non-operating current $I_{\Delta ndc}$	0.003A
Maximum rated current of the monitored circuit	32A (3P+N)
Diameter cable gland of residual current sensor	16mm
Cable length	0.5m
Operating time t_1 for residual current DC 6mA	<220ms
Operating time t_2 for residual current DC 60mA	<100ms
Operating time t_3 for residual current DC 200mA	< 70ms
Operating time t_4 for residual current AC 30mA	∞
Operating time t_5 for residual current AC 60mA	> 300ms
Operating time t_6 for residual current AC 150mA	> 80ms
Operating time t_7 for residual current AC 5A	> 80ms
Common alarm signal Err for charging controller	12±0.4 VDC
Remote test signal for charging controller	12±0.4 VDC, $t=20ms$
Remote reset signal for charging controller	12±0.4 VDC, $t=20ms$
Utilization category	AC-14/DC-13
Max. switching voltage	230VAC/30VDC
Max. switching current	5A
Electrical endurance	10,000
Rated impulse withstand voltage U_{imp}	2500V
Stripped length	7.0 mm
Torque for Power Supply terminals	0.50 ~ 0.60 Nm
Torque for Auxiliary circuit terminals	0.22 ~ 0.25 Nm
DC6-C1/DC6-C2 (L x W x H)	90 x 36 x 69 (mm)
DC6-iRCS-32 (L x W x H)	90 x 18 x 69 (mm)

