OPTIONS MANUAL

UNINTERRUPTIBLE POWER SUPPLY (UPS)

SLC X-PERT

80.. 400 kVA

salicru

General index

1. SRC-2 RELAY CARD OPTION

1.1. CONTENTS OF PACKAGE

The package of the SRC-2 device contains the following component:

- SRC-2 Interface card with installation kit support

Fig. 1. Contents of package

1.2. FUNCTION

The SRC-2 card is used to repeat to a remote location some UPS status and alarms, by means of SPDT (Single-Pole-Double-Throw) voltage free contacts.
In normal condition with no Alarms and all Status Ok, all the relays Status are energized.

1.3. INSTALLATION

For the installation of the board SRC-2 it is necessary to switch off completely the UPS, or transfer the load on MBCB (Manual Bypass). Refer to the operating manual of the UPS for the correct procedure.

WARNING!:
During manual bypass operation the load is supplied directly by the mains, therefore continuous supply is not guaranteed.

- Open the UPS front panel door
- Locate the SRC-2 SLOT and check that the cable connected to the SLOT is W29A.
- Connect the W29A flat cable on CN1 connector of SRC-2 board, then install the device in the SLOT.

Provide, therefore, to connect the signal cables to the states / alarms that must be monitored.

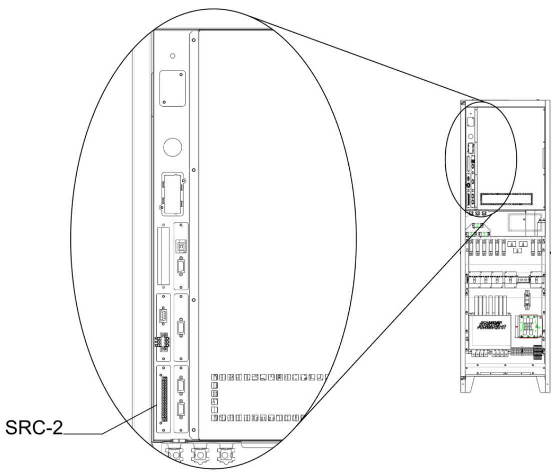

Fig. 2. SRC-2 board installation for SLC X-PERT 80-160 kVA

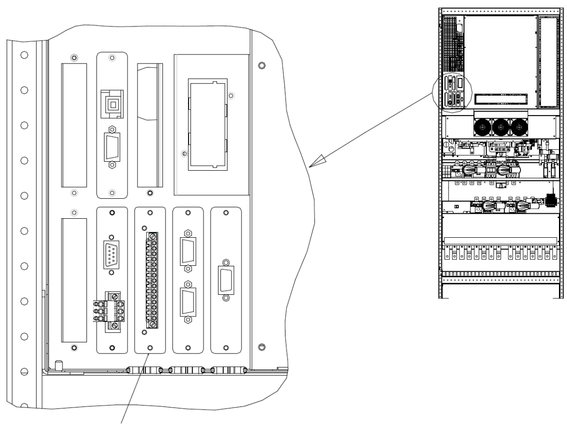

Fig. 3. SRC-2 board installation for SLC X-PERT 200-250-300 kVA

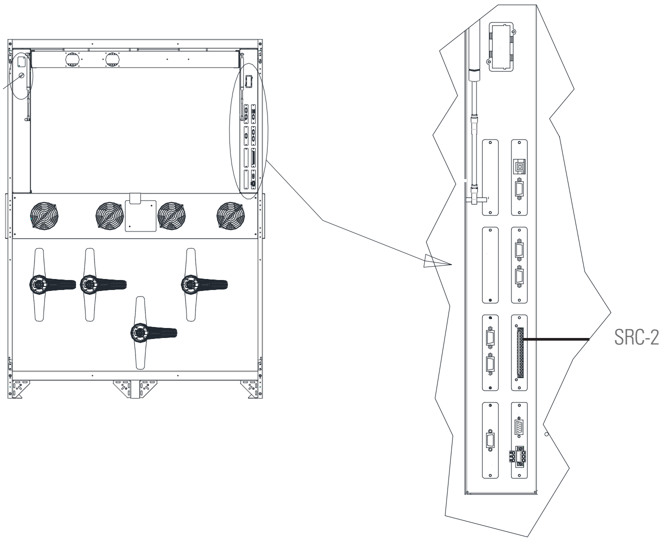

Fig. 4. SRC-2 board installation for SLC X-PERT 200-250-300 kVA

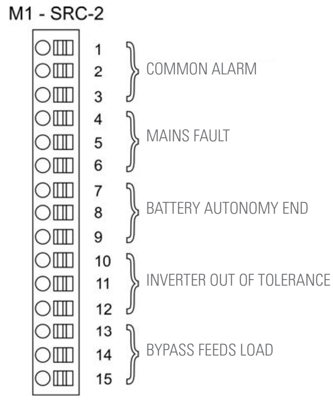

Fig. 5. SRC-2 terminal board

1.4. OPERATION

Start up the UPS following the correct procedure (refer to the UPS Operating Manual).
Verify that, without any alarms and with all status present, all the relays are energized.

Relay	Alarms/Status	Status	M1		Led	
			Pins	Status in normal operation	Name	Status in normal operation
RL1	Alarm = A30 COMMON ALARM	Not energized if alarm is present	2-3	Closed	DL1	On
			1-2	Open		
RL2	Alarm = A1 MAINS FAULT	Not energized if alarm is present	5-6	Closed	DL2	On
			4-5	Open		
RL3	Alarm = A9 BATTERY AUT END	Not energized if alarm is present	8-9	Closed	DL3	On
			7-8	Open		
RL4	Alarm = A13 INV OUT OF TOL	Not energized if alarm is present	11-12	Closed	DL4	On
			10-11	Open		
RL5	NORMAL MODE Alarm = A16 BYPASS → LOAD	Not energized if alarm is present	13-14	Closed	DL5	On
			14-15	Open		
	ECO MODE Status = S7 BYPASS → LOAD	Energized if status is present	14-15	Closed		
			13-14	Open		

Tab. 1. SRC-2

CRelay output characteristics:

250 VAC voltage 1A current
30 VDC voltage 1A current resistive load

At the end of the abovementioned operations, close/place the front panel door of the UPS and start up the UPS, following the instructions indicated in the operating manual of the unit.

2. THERMAL PROBE OPTION

2.1. FUNCTIONS

The thermal probe for battery cabinet accessory allow to carry out a thermal compensation by measuring the temperature of the battery compartment / cabinet.
The UPS is able to recognize the presence of the temperature probe automatically, to carry out the measurement and to perform a thermal compensation of the battery.
The compensation of the battery charging voltage is carried out according to the graph shown in Picture 1, where the compensation voltage is subtracted from the floating voltage at a temperature of 20°C.

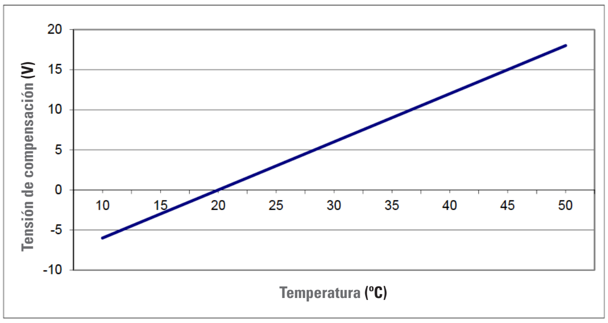

Fig. 6. Battery compensation algorithm

Once the device has been properly installed, the temperature measurement/s can be read on the UPS front panel. In fact, a new surfing menu "Temperatures" where the information will be displayed, will be shown in the measurements section.

2.2. INSTALLATION

2.2.1. UPS EQUIPPED WITH THERMAL PROBE OPTION

To install thermal probe for battery cabinet already assembled by the manufacturer on the UPS it is necessary to switch off completely the UPS, or transfer the load on MBCB (Manual Bypass). Refer to the operating manual of the UPS for the correct procedure.

WARNING!:
During manual bypass operation the load is supplied directly by the mains, therefore continuous supply is not guaranteed.

The interface board for thermal probe is already installed on THE UPS.

- Open the UPS front panel door.
- Connect the thermal probe to the interface board connector, Fig. 7, Fig. 8 and Fig. 9.
- Remove the battery cabinet front panel door and place the thermal probe between the battery trays on free air, in central position if possible.

WARNING!:
When inserting the probe into the battery compartment or into the external battery cabinet, we recommend that you pay special attention not to short-circuit the battery.

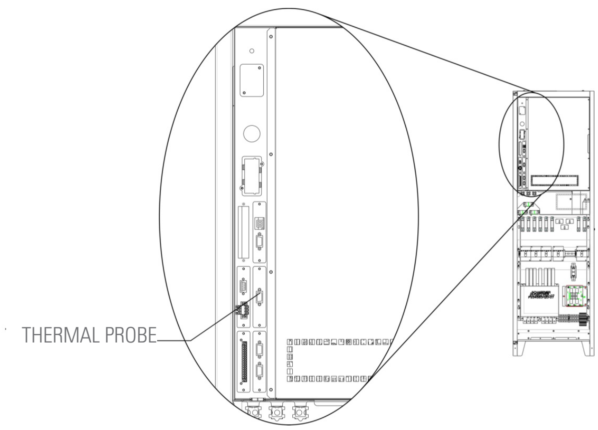

Fig. 7. Thermal probe interface board installation in SLC X-PERT 80-160 kVA

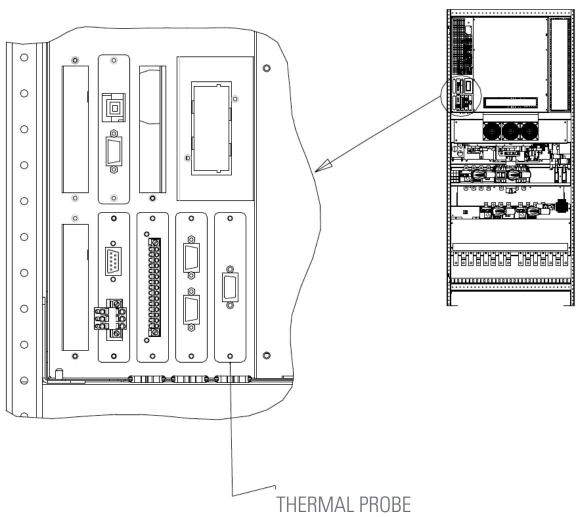

Fig. 8. Thermal probe interface board installation in SLC X-PERT 200-250-300 kVA

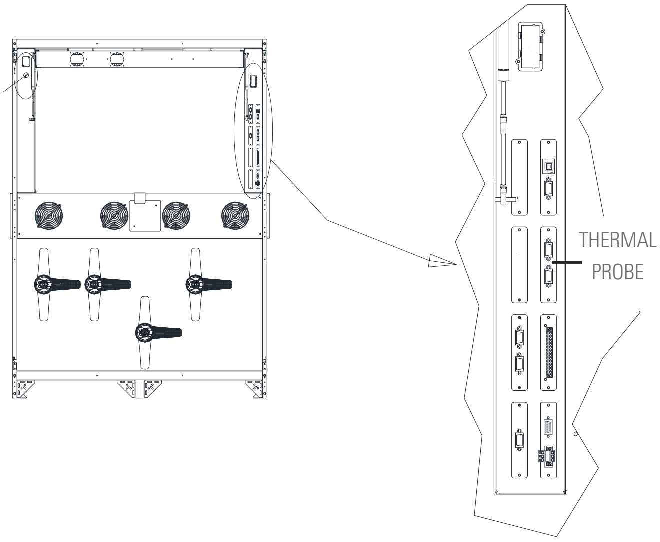

Fig. 9. Thermal probe interface board installation for SLC X-PERT 400 kVA

At the end of the above mentioned operations, close/place the front panel door of the UPS, put back the front panel of the battery cabinet and start up the UPS, following the instructions indicated in the operating manual of the unit.
To ensure that the installation has been carried out properly, go to the "Temperatures" menu in the "Measurements" section and make sure the values read match the actual temperatures.

2.2.2. INSTALLATION THERMAL PROBE KIT ACCESSORY

2.2.2.1. Contents of package

The package of the THERMAL PROBE device contains the following components:

- DR-ST interface card with installation kit support
- Thermal probe

Fig. 10. Contents of package

2.2.2.2. Installation

To install thermal probe for battery cabinet it is necessary to switch off completely the UPS, or transfer the load on MBCB (Manual Bypass). Refer to the operating manual of the UPS for the correct procedure.

WARNING!:
During manual bypass operation the load is supplied directly by the mains, therefore continuous supply is not guaranteed.

After transferring the load to the Manual Bypass and switching the UPS off, for the correct installation of the thermal probe follow the instructions:

- Open the UPS front panel door
- Locate the thermal probe slot and check that the cable connected to the SLOT is W30.
- Connect the W30 flat cable on CN2 connector of DR-ST board, then install the device in the SLOT.
- Connect the thermal probe to the interface board connector.
- Remove the battery cabinet front panel door and place the thermal probe between the battery trays on free air, in central position if possible.

WARNING!:
When inserting the probe into the battery compartment or into the external battery cabinet, we recommend that you pay special attention not to short-circuit the battery.

At the end of the above mentioned operations, close/place the front panel door of the UPS, put back the front panel of the battery cabinet and start up the UPS, following the instructions indicated in the operating manual of the unit.
To ensure that the installation has been carried out properly, go to the "Temperatures" menu in the "Measurements" section and make sure the values read match the actual temperatures.

3. REMOTE PANEL OPTION

3.1. CONTENTS OF PACKAGE

The package of the REMOTE PANEL device contains the following components:

- Remote panel
- AC/DC power supply (230 Vac – 12 Vdc)
- Installation and user manual (this document)

Fig. 11. Contents of package

3.2. FUNCTION

The remote panel is used to display 4 independent visual alarms. Each event activates the flashing of the last LED "General Alarm" and an acoustic signal that can be silenced by the user. The regular operating conditions of the UPS are indicated by the lighting of LED "UPS OK".

3.3. INSTALLATION

To install remote panel it is necessary to switch off completely the UPS, or transfer the load on MBCB (Manual Bypass). Refer to the operating manual of the UPS for the correct procedure.

WARNING!:
During manual bypass the load is supplied directly by the mains, therefore continuous supply is not guaranteed.

To install the remote panel it is necessary to carry out an interconnection between the CN2A connector of the remote panel and the SRC-2 card via a 5-wire cable.
To perform the connection you need to open the remote panel removing the two screw. The cable must pass through the hole illustrated in Fig. 18.

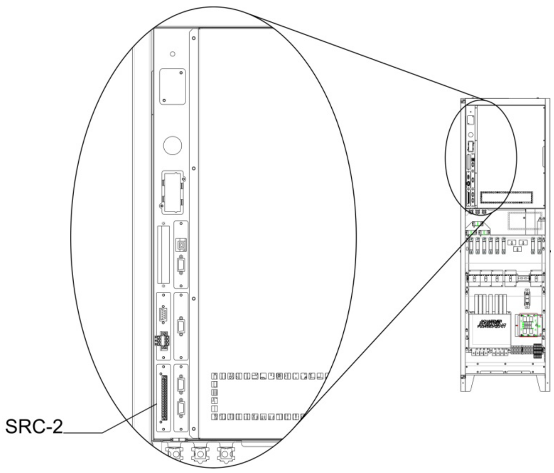

Fig. 12. Terminal board M1 of UPS' board SRC-2 for SLC X-PERT 80-160 kVA

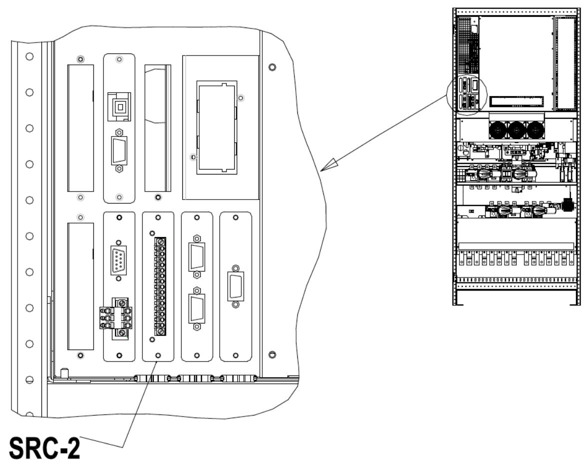

Fig. 13. Terminal board M1 of UPS' board SRC-2 for SLC X-PERT 200-250-300 kVA

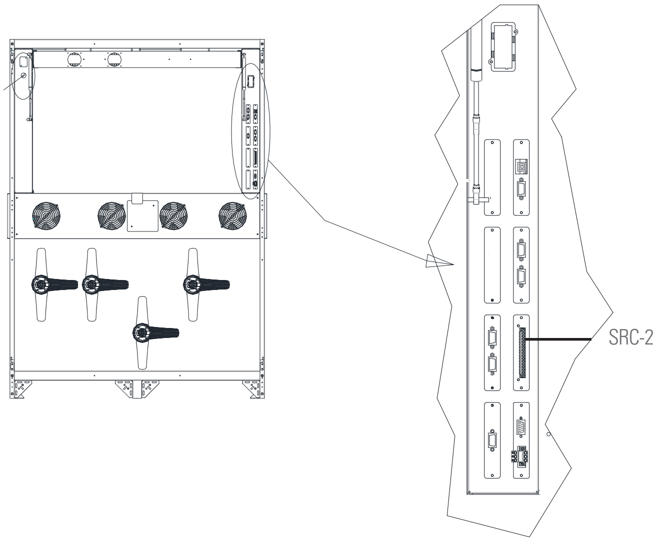

Fig. 14. Terminal board M1 of UPS' board SRC-2 for SLC X-PERT 400 kVA

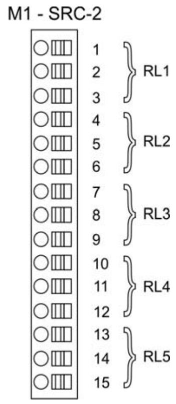

Fig. 15. Detail of M1 connection terminals

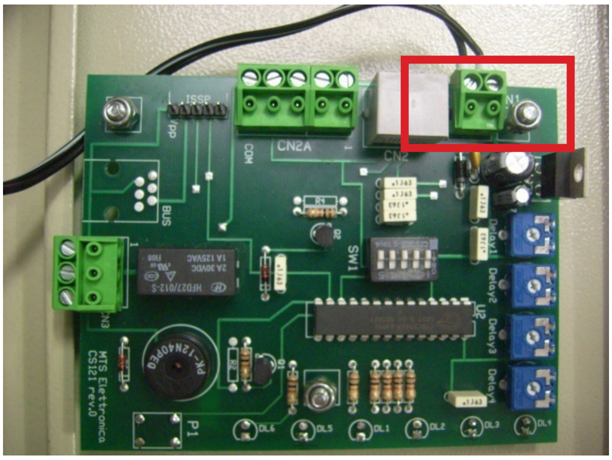

Fig. 16. Remote panel connector CN2A

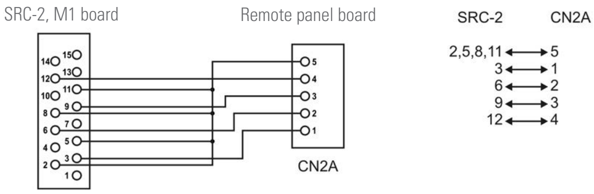

Fig. 17. Schematic example of the connection between the remote panel and UPS' board SRC-2

SRC-2			PANEL REMOTO
Relé	**Alarmas**	**Pin M1**	**Pin CN2A**
RL1	Alarma general	2	5
		3	1
RL2	Fallo de red	5	5
		6	2
RL3	Final de autonomía de la batería	8	5
		9	3
RL4	Inversor fuera de tolerancia	11	5
		12	4

Tab. 2. UPS-Remote panel connections

Fig. 18. Remote panel: cable hole

Then close the remote panel and feed it via the AC/DC power supply provided with.
At the end of the above mentioned operations, close/place the front panel door of the UPS and start up the UPS, following the instructions indicated in the operating manual of the unit.

3.4. OPERATION

Start the UPS following the start-up procedure (refer to the operating manual of the UPS).
At the end of the UPS start-up, in case of normal operation, namely with no alarm present, the indication “UPS OK” must be displayed on the remote panel **(green LED)**.
Following alarms are displayed on the panel::

Displayed alarms	LED colour
Inverter out of tolerance	Red
Battery autonomy end	Red
Mains failure	Red
General alarm	Red

Tab. 3. Alarms shown

Led “General alarm” lights every time an alarm is present on the UPS.
Whenever an alarm is present on the remote panel, an acoustic signal will also be activated that can be silenced by the user (by pressing the relevant button) and the last LED on the remote panel "GENERAL ALARM" will light.

The remote panel must be powered by a power supplied by the UPS in order to continue to have information on the operating status even without network.

4. REMOTE CONNECTION RS485 INTERFACE

4.1. CONTENTS OF PACKAGE

The package of the REMOTE CONNECTION RS485 device contains the following components:

- RS485 Interface board SLOT-REM-PV RS485
- Installation and user manual (this document)

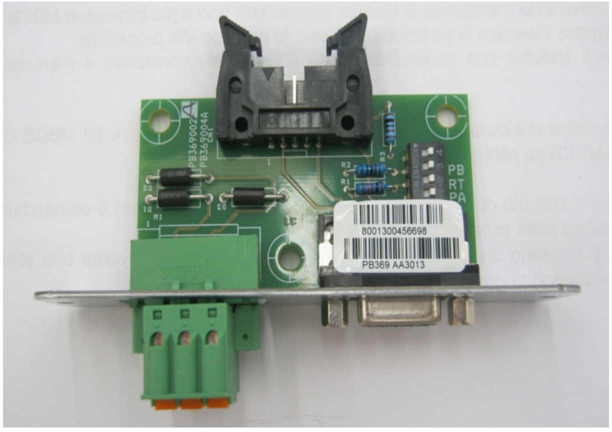

Fig. 19. Contents of package

4.2. FUNCTION

A subset of the Modbus-RTU protocol is implemented over an RS485 bus.
UPS works as a client in a client-server architecture, that is, the UPS is normally in listening mode. Only in case of a request it will answer and therefore occupy the line for the transmission. At the end of the transmission, it will release the line for further request.
As per RS485 standard specifications, maximum cables length must not exceed 400m.

Modbus is developed by MODICON Inc. USA. In case of irregularity the document "Modicon Modbus Protocol Reference Guide" should be referenced.

4.3. INSTALLATION

To install remote board it is necessary to switch off completely the UPS, or transfer the load on MBCB (Manual Bypass). Refer to the operating manual of the UPS for the correct procedure.

WARNING!:
During manual bypass the load is supplied directly by the mains, therefore continuous supply is not guaranteed.

After transferring the load to the Manual Bypass and switching the UPS off, for the correct installation of the thermal probe follow the instructions:

- Open the UPS front panel door
- Locate the SLOT-REM slot and check that the cable connected to the SLOT is W33.
- Connect the W33 flat cable on CN1 connector of SLOT-REM-PV interface board, then install the device in the slot.

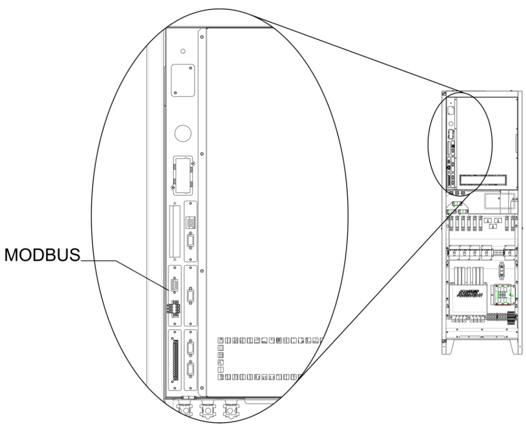

Fig. 20. RS485 interface board installation in SLC X-PERT 80-160 kVA

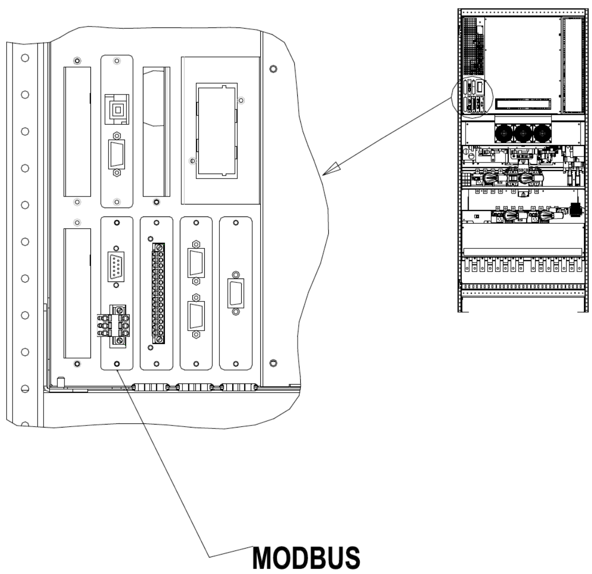

Fig. 21. RS485 interface board installation in SLC X-PERT 200-250-300 kVA

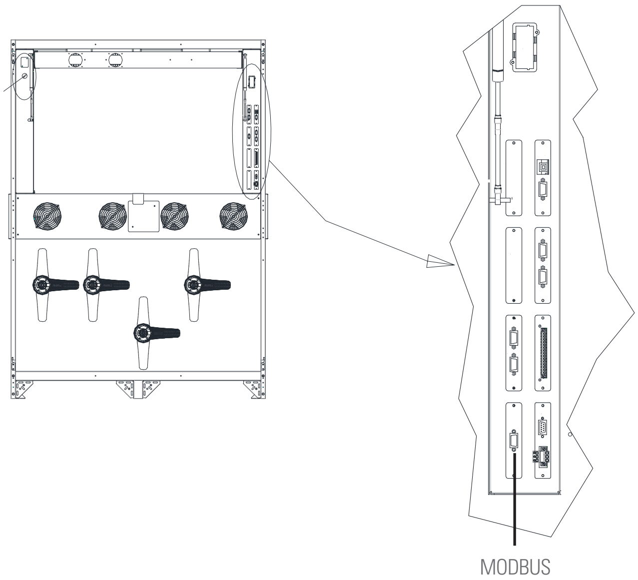

Fig. 22. RS485 interface board installation in SLC X-PERT 400 kVA

At the end of the above mentioned operations, close/place the front panel door of the UPS and start up the UPS, following the instructions indicated in the operating manual of the unit.

4.4. MODBUS DESCRIPTION

4.4.1. CABLE SPECIFICATION

Protocol ModBus is a high-level communication protocol (layer 7 of the OSI model) which defines the format and the communication mode between a "Master" that interrogates the system and one or more "Slaves" that reply to the Master's queries.
The protocol defines how the Master and the Slave establish and interrupt the communication, how the transmitter and the receiver must be identified, the exchange modality of error messages and the error detection technique.
One Master can be connected to up to 247 Slave units on a ModBus line.
Only the Master may start a transmission, which can be of "question/answer" type with a single Slave, or of "broadcast" type, where the message is sent to all the devices and there is no reply from the Slaves.
The transmission occurs in RTU (Remote Terminal Unit) mode and the end of the request message to the device is identified by an interval of 100ms where no data is received. The structure of questions and answers is the following:

Slave address	Function	Data	CRC
1 byte	1 byte	"N" bytes	2 bytes

he functions made available by the protocol are identified via the codes contained in the PDU (Protocol Data Unit).

4.4.2. CABLE SPECIFICATION

The minimum specification requirements for the cable used to connect the data network are listed below.

- ❒ Type of cable: **twisted pairs**
- ❒ Minimum cross section: **22 AWG**
- ❒ Shield on each pair: **provided**
- ❒ Cable shielding: **copper braid (coverage > 65%)**
- ❒ Operating temperature: **-20° C … +80° C**
- ❒ Velocity of propagation: **> 66%**
- ❒ Capacity: **< 80 pF**
- ❒ Nominal attenuation: **< 2 dB/mt @ 1 MHz**
- ❒ Maximum operating voltage: **300Vrms**

4.4.3. CONFIGURATION DIP-SWITCHES OF MODBUS NETWORK

A termination resistor can be installed on UPS and the communication network be properly biased by simply moving a dip-switch installed on the Modbus interface card PB369 (SLOT-REM-PV).

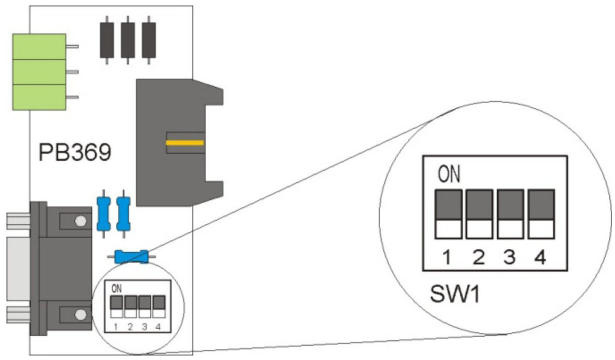

Fig. 23. Dip-switch of interface card Modbus PB369

4.4.4. TERMINATING THE DATA NETWORK

To connect the termination resistor of the data line, simply move dip-switch 2 to ON.

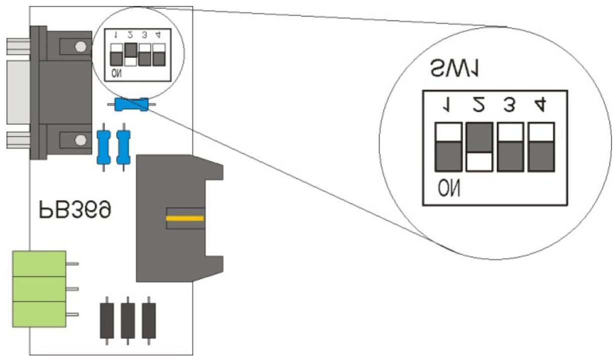

Fig. 24. Data line termination on card PB369

4.4.5. BIASING THE DATA NETWORK

To bias the data line, simply move dip-switch 1 and dip-switch 3 to ON.

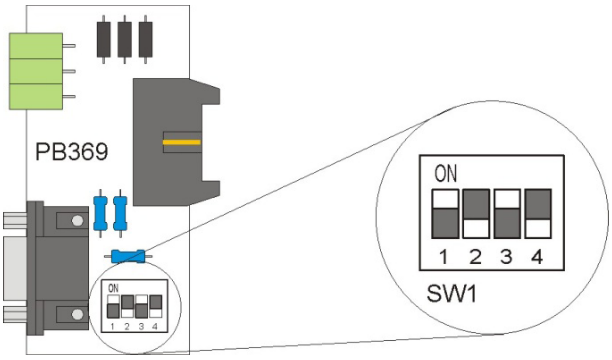

Fig. 25. Data line biasing on card PB369

4.4.6. RS485 CONFIGURATION

The default configuration parameters of RS485 ModBus communication that can be changed via the interface software are:

- ❒ Baud Rate: **9600**
- ❒ Start bit: **1**
- ❒ Data bit: **8**
- ❒ Stop bit: **1**
- ❒ Parity: **No**
- ❒ Hardware flow control: **none**

Only the ModBus function **Read Holding Register (0x03)** is implemented in the system.

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4.4.7. CONNECTION TERMINAL BOARD

The following picture shows the pins configuration of the SUB-D9 and M1 connector of the card PB369.

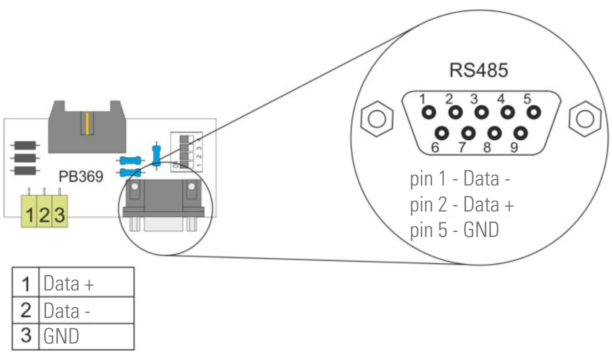

Fig. 26. Connector SUB-D9 on card PB369

Follow general rules about wiring connection.

- Connection cables must be of "twisted-pair" shielded type, in order to reduce the noise that may deteriorate the quality of transmission.
- For the impedance matching of the communication network (termination), the resistors of the devices connected at the beginning and at the end of the transmission line must be used.
- The biasing can be performed on two different points of the network (using a maximum of 2x devices).

4.5. OPERATION

After the installation of the Board SLOT-REM-PV interface it is necessary to set the properly address of the Mod-Bus device.
You can change the Mod-Bus address from UPS display.
If the programming of the new Mod-Bus address will be fine, the led will change the colour, orange-yellow-green, if an error occur, the led will became red and a message will be displayed.
The query message specifies the starting register and quantity of register to be read.
Registers are addressed starting at zero.
The register data in the response message are packed as two bytes per register. For each register, the first byte contains the high order bits and the second contains the low order bits.
32-bit UPS values are packed in two registers and, again, the first register contains the high order bits.

The following registers are supported by function code 03:

REGISTER	DESCRIPTION	BIT	FORMAT	RANGE	NOTES
		Booster			
		Input Analog Measures			
7	Input voltage RMS (phase U)	0-15	Integer	0/9999	x10 V
8	Input voltage RMS (phase V)	0-15	Integer	0/9999	x10 V
9	Input voltage RMS (phase W)	0-15	Integer	0/9999	x10 V
10	Input current RMS (phase U)	0-15	Integer	0/9999	x10 A
11	Input current RMS (phase V)	0-15	Integer	0/9999	x10 A
12	Input current RMS (phase W)	0-15	Integer	0/9999	x10 A
13	Input mains frequency	0-15	Integer	0/999	x10 Hz
14	Input power	0-15	Integer	0/99999	x 10 kVA
15	Input power factor	0-15	Integer	0/100	%
		Bypass analog measures			
27	Bypass voltage RMS (phase U)	0-15	Integer	0/9999	x10 Vac
28	Bypass voltage RMS (phase V)	0-15	Integer	0/9999	x10 Vac
29	Bypass voltage RMS (phase W)	0-15	Integer	0/9999	x10 Vac
30	Bypass frequency	0-15	Integer	0/9999	x10 Hz
16	DC negative voltage	0-15	Integer	0/999	x10 Vdc
17	DC positive voltage	0-15	Integer	0/999	x 10 Vdc
18	DC Voltage	0-15	Integer	0/999	x10 Vdc
19	Battery current	0-15	Integer	-999/999	x10 A
20	Battery autonomy	0-15	Integer	0/9999	s
21	Battery autonomy	0-15	Integer	0/100	%
22	Battery temperature	0-15	Integer	-999/999	x10°C
		Alarms / Status / Info			
1	A01 – Mains fault	0	boolean		
	A02 – Input wrong sequence	1			
	A03 – Booster stopped	2			
	A04 – Booster fault	3			
	A05 – DC voltage Fault	4			
	A06 – Battery in test	5			
	A07 – BCB Open	6			
	A08 – Battery discharge	7			
	A09 – Battery autonomy end	8			
	A10 – Battery fault	9			
	A11 – Shortcircuit	10			
	A12 – Stop timeout short circuit	11			
	A13 – Inverter out of tolerance	12			
	A14 – Bypass wrong sequence	13			
	A15 – Bypass fault	14			
	A16 – Bypass feed load	15			

REGISTER	DESCRIPTION	BIT	FORMAT	RANGE	NOTES
2	A17 – Retransfer blocked	0	boolean		
	A18 – MBYP Close	1			
	A19 – OCB Open	2			
	A20 – Overload	3			
	A21 – Thermal image	4			
	A22 – Bypass switch	5			
	A23 – EPO Close	6			
	A24 – High temperature	7			
	A25 – Inverter off	8			
	A26 – Comunication error	9			
	A27 – EEPROM Error	10			
	A28 – Critical fault	11			
	A29 – Maintenance required	12			
	A30 – General alarm	13			
	A31 – MBCB Bus close	14			
	A32 – EPO Bus close	15			
3	A33 – Asymmetric load	0	boolean		
	A34 – Service required	1			
	A35 – Diesel mode	2			
	A36 – Dc fast shutdown	3			
	A37 –	4			
	A38 – Inverter feed load	5			
	A39 – Inverter error loop	6			
	A40 – SSI fault	7			
	A41 – Booster error loop	8			
	A42 –	9			
	A43 – Current error loop	10			
	A44 –	11			
	A45 – High temperature SSW	12			
	A46 – Lost redundancy	13			
	A47 – Sending parameters error	14			
	A48 – Reception parameters error	15			
4	A49 – Test mode error	0	boolean		
	A50 –	1			
	A51 – Battery temperature out of tolerance	2			
	A52 – Inverter blocked	3			
	A53 – Firmware Error	4			
	A54 – Can error	5			
	A55 – Parallel cable disconnect	6			
	A56 – Terna unbalanced	7			
	A57 – Input current unbalance	8			
	A58 – Inverter current unbalance	9			
	A59 – Backfeed relay on	10			
	A60 –	11			
	A61 –	12			
	A62 –	13			
	A63 – Starting sequence blocked	14			
	A64 –	15			

REGISTER	DESCRIPTION	BIT	FORMAT	RANGE	NOTES
5	S01 – Booster Ok	0	boolean		
	S02 – Battery Ok	1			
	S03 – Inverter Ok	2			
	S04 – Inverter feed load	3			
	S05 – Inverter Synchronized	4			
	S06 – Bypass Ok	5			
	S07 – Bypass feed load	6			
	S08 – Slave Synchronized	7			
	S09 –	8			
	S10 – Rectifier standby	9			
	S11	10			
	S12 – Battery standby	11			
	S13 – Battery charge	12			
	S14 – Battery on charge I	13			
	S15 – Battery on charge V	14			
	S16	15			
6	S17	0	boolean		
	S18	1			
	S19	2			
	S20	3			
	S21	4			
	S22	5			
	S23	6			
	S24	7			
	S25	8			
	S26	9			
	S27	10			
	S28	11			
	S29	12			
	S30	13			
	S31	14			
	S32	15			
44	UPS name (ch.0)	0-15	Ascii	0/255	
45	UPS name (ch.1)	0-15	Ascii	0/255	
46	UPS name (ch.2)	0-15	Ascii	0/255	
47	UPS name (ch.3)	0-15	Ascii	0/255	
48	UPS name (ch.4)	0-15	Ascii	0/255	
49	UPS name (ch.5)	0-15	Ascii	0/255	
50	UPS name (ch.6)	0-15	Ascii	0/255	
51	UPS name (ch.7)	0-15	Ascii	0/255	
52	UPS name (ch.8)	0-15	Ascii	0/255	
53	UPS name (ch.9)	0-15	Ascii	0/255	
54	UPS serial number (ch.0)	0-15	Ascii	0/255	
55	UPS serial number (ch.1)	0-15	Ascii	0/255	
56	UPS serial number (ch.2)	0-15	Ascii	0/255	
57	UPS serial number (ch.3)	0-15	Ascii	0/255	
58	UPS serial number (ch.4)	0-15	Ascii	0/255	
59	UPS serial number (ch.5)	0-15	Ascii	0/255	
60	UPS serial number (ch.6)	0-15	Ascii	0/255	
61	UPS serial number (ch.7)	0-15	Ascii	0/255	
62	UPS serial number (ch.8)	0-15	Ascii	0/255	

REGISTER	DESCRIPTION	BIT	FORMAT	RANGE	NOTES
63	UPS serial number (ch.9)	0-15	Ascii	0/255	
64	OEM serial number (ch.0)	0-15	Ascii	0/255	
65	OEM serial number (ch.1)	0-15	Ascii	0/255	
66	OEM serial number (ch.2)	0-15	Ascii	0/255	
67	OEM serial number (ch.3)	0-15	Ascii	0/255	
68	OEM serial number (ch.4)	0-15	Ascii	0/255	
69	OEM serial number (ch.5)	0-15	Ascii	0/255	
70	OEM serial number (ch.6)	0-15	Ascii	0/255	
71	OEM serial number (ch.7)	0-15	Ascii	0/255	
72	OEM serial number (ch.8)	0-15	Ascii	0/255	
73	OEM serial number (ch.9)	0-15	Ascii	0/255	
74	Device type	0-15	Integer	0/255	
75	UPS nominal power	0-15	Integer	0/9999	kVA
76		0-15	Integer	0/9999	V
77		0-15	Integer	0/9999	%
78		0-15	Integer	0/9999	%
79	Inverter nominal voltage RMS	0-15	Integer	0/9999	V
80	Inverter nominal voltage tolerance	0-15	Integer	0/9999	%
81	Bypass nominal voltage RMS	0-15	Integer	0/9999	V
82	Bypass nominal voltage tolerance	0-15	Integer	0/9999	%
83	Output nominal voltage RMS	0-15	Integer	0/9999	V
84	Output nominal voltage tolerance	0-15	Integer	0/9999	%
85	Mains nominal frequency	0-15	Integer	0/9999	Hz
86	Mains nominal frequency tolerance	0-15	Integer	0/9999	%
87	Bypass nominal frequency	0-15	Integer	0/9999	Hz
88	Bypass nominal frequency tolerance	0-15	Integer	0/9999	%
89	Battery capacity	0-15	Integer	0/9999	Ah
90	Battery nominal autonomy	0-15	Integer	0/9999	min
91	Floating voltage	0-15	Integer	0/9999	Vdc
92	Battery autonomy end threshold	0-15	Integer	0/9999	Vdc
93	Parallel enabled	0-15	Boolean	0/1	
94	Parallel index	0-15	Integer	0/8	
95	Number of units in parallel	0-15	Integer	0/8	
96	ModBus address	0-15	Integer	0/255	
97	Rectifier firmware – version	0-15	Integer	0/999	
98	Rectifier firmware – revision	0-15	Integer	0/999	
99	Rectifier firmware – work in progress	0-15	Integer	0/999	
100	Rectifier firmware – personalization	0-15	Integer	0/999	
101	Inverter firmware – version	0-15	Integer	0/999	
102	Inverter firmware – revision	0-15	Integer	0/999	
103	Inverter firmware – work in progress	0-15	Integer	0/999	
104	Inverter firmware – personalization	0-15	Integer	0/999	
105	SSW firmware – version	0-15	Integer	0/999	
106	SSW firmware – revision	0-15	Integer	0/999	
107	SSW firmware – work in progress	0-15	Integer	0/999	
108	SSW firmware – personalization	0-15	Integer	0/999	
23	Inverter voltage RMS (phase U)	0-15	Integer	0/9999	x10 Vac
24	Inverter voltage RMS (phase V)	0-15	Integer	0/9999	x10 Vac
25	Inverter voltage RMS (phase W)	0-15	Integer	0/9999	x10 Vac

REGISTER	DESCRIPTION	BIT	FORMAT	RANGE	NOTES
26	Inverter frequency	0-15	Integer	0/999	x10 Hz
31	Output voltage RMS (phase U)	0-15	Integer	0/9999	x10 Vac
32	Output voltage RMS (phase V)	0-15	Integer	0/9999	x10 Vac
33	Output voltage RMS (phase W)	0-15	Integer	0/9999	x10 Vac
34	Output current RMS (phase U)	0-15	Integer	0/9999	x 10A
35	Output current RMS (phase V)	0-15	Integer	0/9999	x 10A
36	Output current RMS (phase W)	0-15	Integer	0/9999	x 10A
37	Output frequency	0-15	Integer	0/999	x10 Hz
38	Output power	0-15	Integer	0/99999	x 10 kVA
39	Output power	0-15	Integer	0/99999	x 10 kW
40	Load percentage (phase U)	0-15	Integer	0/999	%
41	Load percentage (phase V)	0-15	Integer	0/999	%
42	Load percentage (phase W)	0-15	Integer	0/999	%
43	UPS temperature	0-15	Integer	-999/999	x10 °C

Tab. 4. ModBus bytes mapping

5. GALVANIC INSULATION AND ADAPTATION TRANSFORMER

5.1. INTRODUCTION

The scope of this manual is to briefly describe the parts that compose the isolating section of the rectifier and / or bypass line and to guide the user to a correct installation of the equipment in its operating environment.
The user will have to read and carry out correctly the instructions given in this manual with particular attention to safety according to CEI 64-8 standards and DPR 46-90.

The manufacturer declines all responsibility of damage to people or things due to nonfulfilment of the above instructions.

5.2. GENERAL DESCRIPTION

5.2.1. EXTERNAL TRANSFORMER CABINET

To obtain galvanic insulation and/or voltage adaptation to the rectifier and / or bypass line a isolating transformer assembled in a suitable cabinet is supplied.

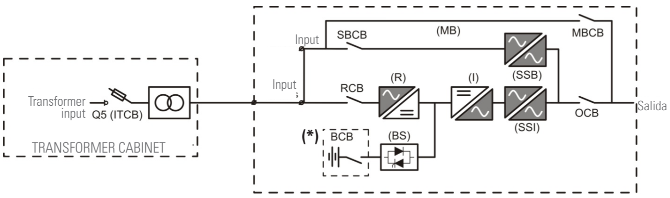

Fig. 27. Block diagram

*** INTERNAL SWITCH ONLY FOR SLC X-PERT 80-160 kVA**

Due to the presence of the Q5 **(ITCB)** switch for the supply of the isolating transformer, the start-up, shut-down and manual bypass procedures are different to those described in the operating manual. Therefore please read carefully the correct start-up, shut down and manual bypass procedure described in this manual section 5.2.1 and section 5.2.2.

As wrong start-up procedures can cause the interruption of the power supply and/or bad damage to the equipment the manufacturer declines any responsibility of damage to people or thing due to the nonfulfilment of the given instructions.

5.2.1.1. CONNECTION OF THE EXTERNAL CABINET

For the UPS a single input for rectifier and bypass is provided. Therefore the isolating transformer supplies also the rectifier, Fig. 28, in addition to the bypass line.
.

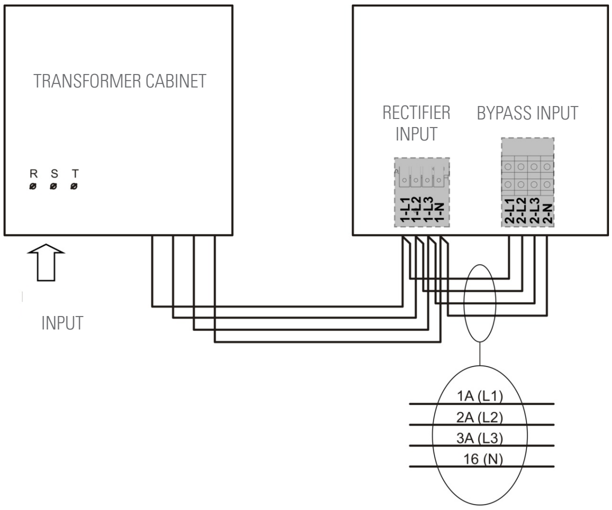

Fig. 28. Connection of the transformer cabinet and the UPS

5.2.2. INTERNAL TRANSFORMER (only for some models)

To obtain galvanic insulation and/or voltage adaptation to the bypass line an isolating transformer is assembled inside the UPS.

For SLC X-PERT 80 kVA, internal isolation transformer option is available only if the internal batteries aren't installed

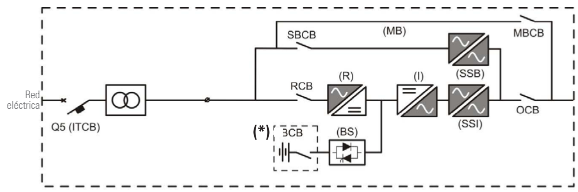

Fig. 29. Block diagram

*** NOT MOUNTED IF INSTALLED Q5 (ICTB)**

Since this is always of applications related to specific requests from the customer, the mechanical dimensions of the cabinet are defined from time to time. Contact the technical department for detail information.

Due to the presence of the Q5 **(ITCB)** switch for the supply of the isolating transformer, the start-up, shut-down and manual bypass procedures are different to those described in the operating manual, as follow.

5.2.3. OPERATING PROCEDURES

⚠ As wrong start-up procedures can cause the interruption of the power supply and/or bad damage to the equipment the manufacturer declines any responsibility of damage to people or thing due to the nonfulfilment of the given instructions.

5.2.3.1. START-UP PROCEDURES

Close Q5 **(ITCB)** to supply the UPS, then follow the UPS operating manual.

5.2.3.2. SHUT-DOWN

Follow the operating manual, then open Q5 **(ITCB)**.

5.2.3.3. MANUAL BYPASS PROCEDURE

Follow the operating manual: DO NOT OPEN Q5 **(ITCB)**.

:

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