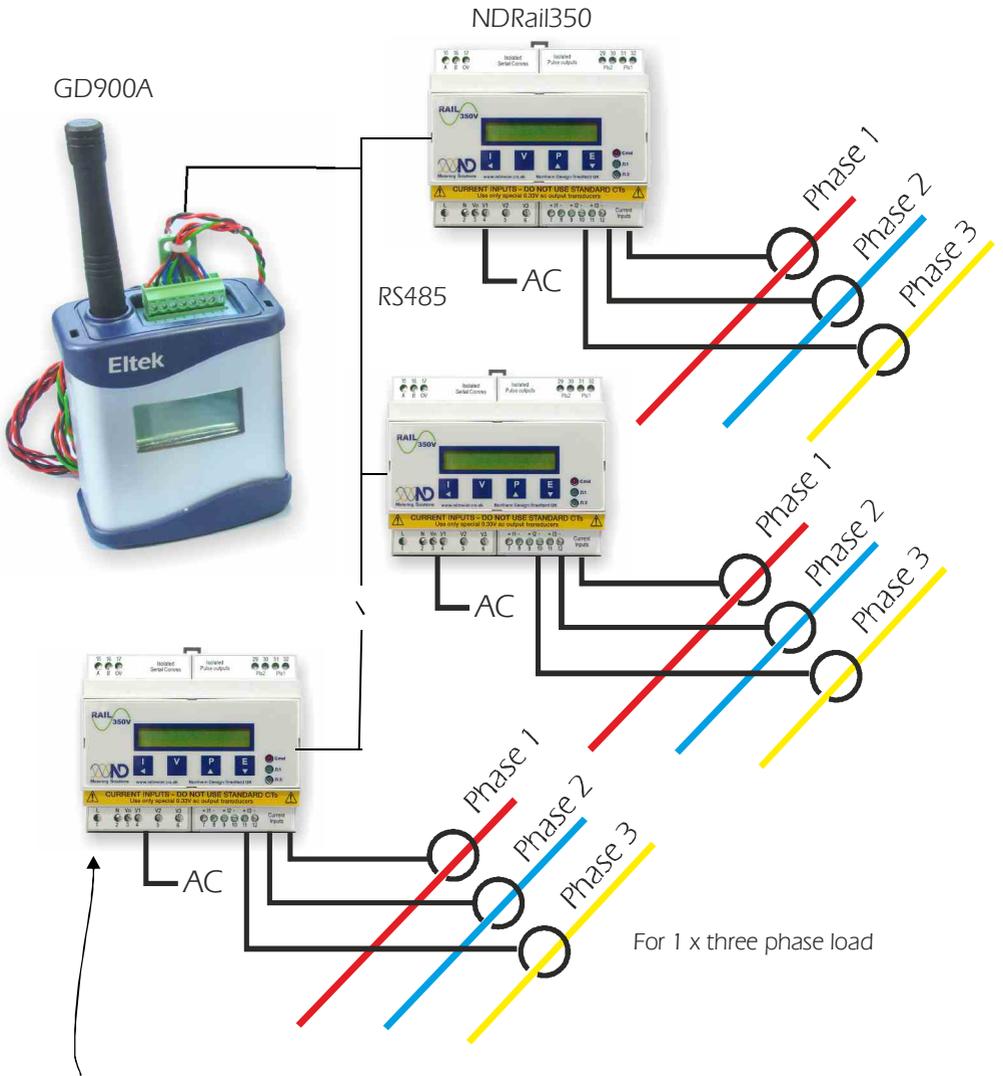


# Eltek TU1043 - GenII GD900A Energy monitor (multi-drop NDRail350) transmitter user instructions

## System configuration diagram



Maximum of 6 x ND350V can be used with 1 x GD900A

## Introduction

The GD900A is part of the Eltek GenII family of transmitters.

The GD900A can be used with up to six parallel connected NDRail350 energy monitors and appropriate current transformers, providing comprehensive monitoring and patterns of use of multiple three phase supplies. The system is ideal for retro fit energy monitoring. The GD900A can be used alongside all other GenII transmitter types. (See Eltek brochure "Telemetry Energy Monitoring" on the Eltek website: [www.eltekdataloggers.co.uk/literature.shtml](http://www.eltekdataloggers.co.uk/literature.shtml))

The system comprises:

- GD900A transmitter,
- Up to 6 NDRail350 monitors (1 x three phase load meter),
- NDMeter CTs (up to 18 CTs can be used per GD900A)
- DSP10-12 DIN rail mounting power supply to power the GD900A.

All components can be supplied by Eltek.

The GD900A has an input for 6 x NDRail350 energy monitors (Modbus RS485)

Each NDRail350 has an input for 1 x three phase load:

- 3 x CT (AC333mV)
- 3 x AC230V nominal
- 1 x AC230 nominal to power the unit

Parameters measured per NDRail350 are 3 x voltage, 3 x current, 3 x power factor ( $\cos\phi$ ), kWh and kvarh.

## GD900A channel assignment

- Channels can be presented at the RX250AL together with those from any other GenII transmitter and can be reordered during TX Setup or when configuring the RX250AL.
- Channels can only be renamed when configuring the RX250AL with Darca software.
- The GD900A assumes the identity of up to 6 ‘virtual transmitters’, each of which represents a connected NDRail350. Each virtual transmitter has its own serial number.
- The channels of a virtual transmitter are labelled A through L.
- RX250AL channels are numbered 1 through 247.
- A fully loaded GD900A with 6 x NDRail350s connected can occupy 72 channels of the RX250AL.

### Transmitter channels for an individual NDRail350 / virtual transmitter:

<b>Tx Channel</b>	<b>Phase/Range</b>	<b>Resolution</b>	<b>Function in Darca</b>
A	V1 0-500VAC	0.1	Voltage
B	V2 0-500VAC	0.1	Voltage
C	V3 0-500VAC	0.1	Voltage
D	I1 0-1000A	0.1	Current
E	I2 0-1000A	0.1	Current
F	I3 0-1000A	0.1	Current
G	P1 0-1	0.01	Power factor (PF)
H	P2 0-1	0.01	Power factor (PF)
I	P3 0-1	0.01	Power Factor (PF)
J	65000		Pulse count kWh
K	65000		Pulse count kvarh
L	Ext power to GD900A	1	State

**CTs that can be used with the NDRail350 (all AC333mV output at range)**

Type	Range	Size mm	Cable dia	CT open	CT closed
SCL8-5 SCL16-50 SCL16-100	0-5A 0-50A 0-100A	43 x 37 x 32 51 x 45 x 27 51 x 45 x 27	8mm 16mm 16mm		
SCT19-150 SCT32-400 SCT51-800	0-150A 0-400A 0-800A	51 x 53 x 17 82.5 x 85 x 27 121 x 127 x 32	19mm 32mm 51mm		

Other SCT19 models available: 5, 10, 15, 20, 30, 50, 70 and 100A - refer Eltek

Other SCT32 models available: 70, 100, 150, 200, 250, 300, 400 and 600A - refer Eltek

Other SCT51 models available: 600, 1000A - refer Eltek

SCL can be operated at range x 1.21 continuously

SCT can be operated at range x 1.31 continuously

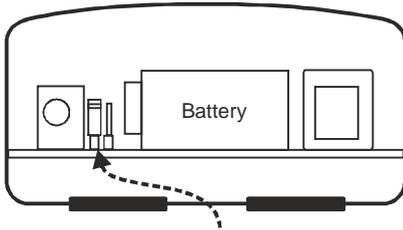
Important note:

CTs have a moulded arrow impressed on the case, the CT must be mounted on the power cable so that the arrow points to the load!

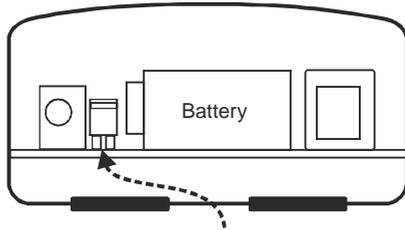
CT wiring : Black is positive, White is negative.

## GD900A Links

The transmitter contains a rechargeable battery to maintain the GD900A operational should the AC supply fail. For despatch the battery is disconnected (to prevent total discharge). To connect the battery when received, remove the two bottom cover retaining screws to reveal:



Shipping;  
The red link is installed as shown..



To commission:  
Remove the red link and install as above

## Battery charging, recovery and endurance

The PCB mounted 150mAh 6V NiMh battery is charged at approximately 4mA. A fully discharged battery requires 36 hours charge to reach 80% capacity. The TX is fully functional if the battery is discharged when external power is applied. A charged battery can provide 24 hours standby should the AC supply fail. Settings are not lost if the battery is fully discharged.

The battery is PCB mounted. Should replacement be necessary, the transmitter must be returned to Eltek or our approved distributor.

External power required is 12VDC regulated. The preferred power supply is the type DSP10-12. This DIN rail mounting power supply is provided with screw down connections for ease of installation. The max demand current from the external power supply is 50mA.

## Indicators and concealed push switch

The push switch is located behind a small access hole located at the rear of the transmitter. To activate the switch a small screwdriver or unfurled paper clip can be used. (When initially powered the transmitter is displayed for 5 seconds)

Red LED cadence due to activation of the concealed push switch:

Function	Activate switch for	LED cadence	LCD
Tx disable	5 seconds	5 x fast flashes	After 5 seconds displays OFF
Tx enable (when configured)	5 seconds	1 continuous 5 sec flash	After 5 seconds displays sensor information
Test transmissions approximately every 5 sec for 2 minutes.	2 second	Short flash at time of transmission	No change

Red LED (D5) due to GD900A being configured or not configured:

GD900A condition	LED	Note	LCD
GD900A not configured	"Blink" every 8 seconds		Battery gauge displayed only
GD900A configured	Short flash at time of a transmission	A transmission occurs at a random time within the set TX interval	See Display below

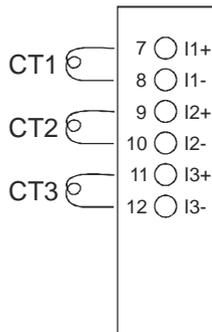
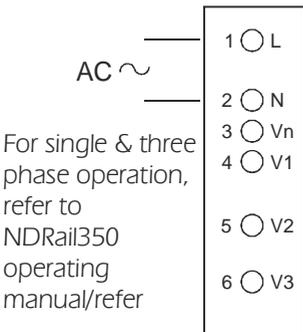
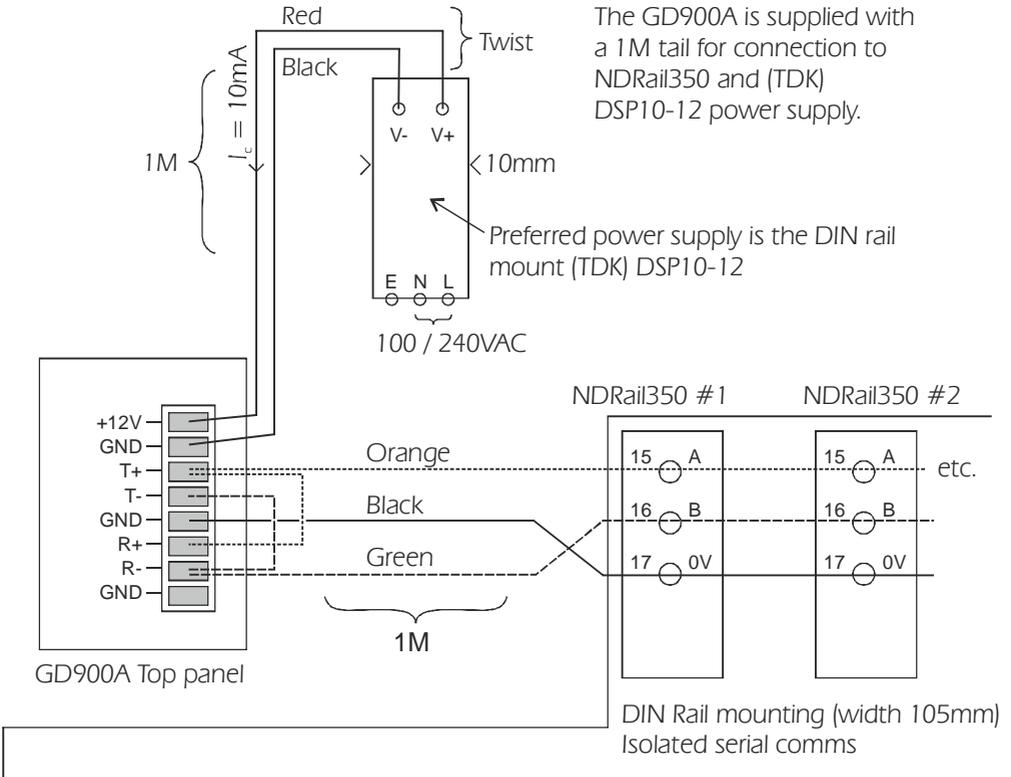
## LCD

The LCD includes a battery condition gauge active at all times:  (Battery gauge will flash if battery discharge imminent). Only configured channels are displayed. The LCD scrolls through the configured channel values.

If channels A-K are configured but the NDRail350 is not connected or communications have failed, the display will read "OPEN". If channel L is configured, this display will read 0 if no external supply is connected or 1 if external 12VDC is connected.

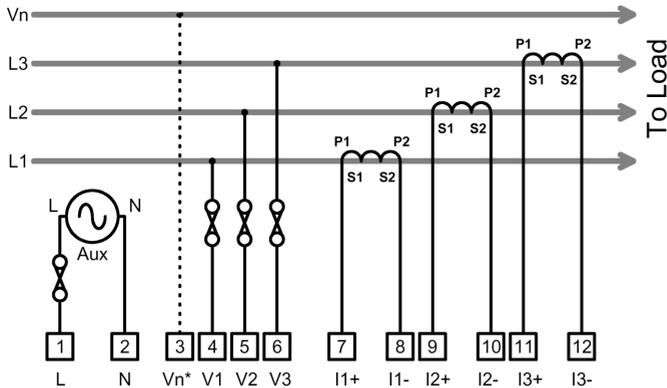
Note: If the GD900A is to be stored or will not be connected to a charging source for more than 48 hours, the GB90A should be disabled (put into hibernate mode, i.e. TX disable mode) to prevent total battery drain and possible loss of settings. Press the concealed push switch for 5 seconds. The LCD will now read OFF.

# Connecting the GD900A, NDRail350, CTs and (TDK) DSP 10-12 power supply:



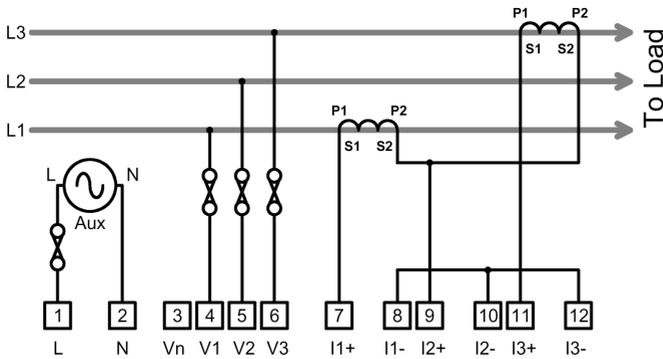
Note: Wire CT black to 11 + and white to 11- etc.  
Connect only CTs with the same range value!

## NDRail350 connections

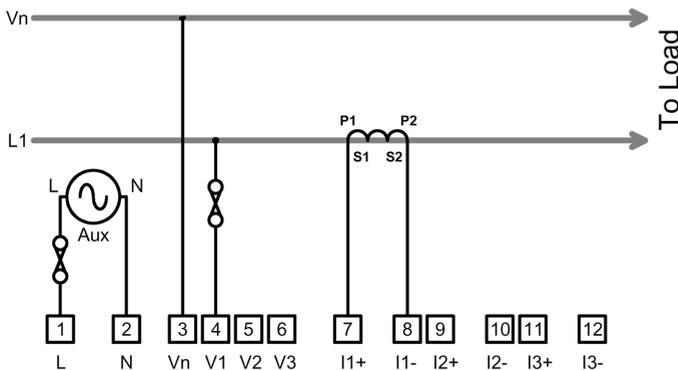


Ensure fuses are wired in as shown!  
 A suitable Din rail mounting fuse holder is type CSFL4U (for fuse 1A 5 x 20mm fuse, not included) and end plate type CSFLEPU. Refer to Eltek.

### 3-Phase 3 wire (2 x CTs)



### Single Phase



Where applicable V1 (4), V2 (5), V3 (6) can be linked to L(1). A fuse must be used (see note above) from L supply to L(1)

## Configuring the ND Rail 350 communications settings for use with the GD900A

Each NDRail350 meter connected to the GD900A must be configured with the correct baud rate and meter address for the system to function correctly. The baud rate of each meter should be set to 19200 and the addresses of the connected meters should be set sequentially starting at 1. You can program the meters using the buttons on the front panel.

### To enter programming mode:

Press and hold  and  together until the display shows **Ct**

### To change a setting value:

Press  or  until the required value is set.

### To move to the next setting:

Press  until the next page in the list is displayed.

Parameters are set in the following order:

Ct	Un	PLr	PLt	Pto	Hr	br	Addr	trUE	Auto	Storing
current	voltage	pulse output rate	pulse on time	pulse test	hours run	baud rate	meter address	voltage input mode	CT auto rotation mode	store setup

5  
50  
100  
150  
400  
800

↓  
The CT range can be selected from this list. All ranges are recorded with one decimal place resolution in the GD900A.

↓  
set to 19200.

↓  
set first meter's address to 1, second meter's address to 2, etc.

↓  
To close programming, scroll to **Storing** and wait until the word **Storing** disappears. The display will revert back to the previous parameter.

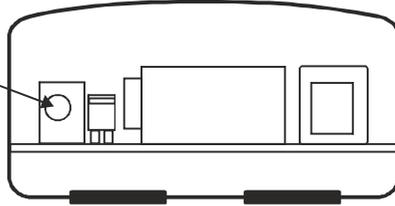
## GD900A configuration using Darca software

Refer to the Quick start guide (ref TU1008) supplied with the RX250AI or download from <http://www.eltekdataloggers.co.uk/literature.shtml>.

Connect the LCTX3 to the “Comms” socket:

To access the Comms connector, remove the two screws securing the case bottom to reveal the Comms connector. (Note GD900A cannot be configured by the logger only).

Comms connector



As a precaution disconnect the external 12VDC power supply before inserting the LCTX3 jack into the comms socket. The external 12VDC can now be connected.

When configuration is completed disconnect the external 12VDC power supply before removing the LCTX3 jack. If the unit is not intended for immediate use, park the battery link so as to disconnect the internal battery. (See GD900A links page 4)

Launch Darca and open the **Squirrel Channel to Transmitter Channel Assignments** window.

Before setting the Tx channels set the **TX Interval**:

The screenshot shows the 'Squirrel Channel to Transmitter Channel Assignments' window. At the top, there are buttons for 'Help', 'Refresh', '<< Prev V Tx', 'Next V Tx >>', 'Next Transmitter >>', and 'Close Transmitter Co...'. The main area is divided into sections. The 'Transmitter: Tx-20001 (Virtual Tx 1 of 6)' section includes fields for 'Sensor-On time (s): 0', 'User Preferred Tx Int: 00:00:20', 'Tx Interval: 00:05:00', and 'Device Type: A20'. There are also buttons for 'Set Sensor On Time', 'Set Log Int & Preferred Tx Int', 'Set Tx Interval', and 'Set Device Type'. To the right, a summary box shows 'Total transmitter channels: 12', 'Used transmitter Channels: 0', 'Free transmitter Channels: 12', and 'Battery Level (%): 65'. On the far right, there are buttons for 'Delete All Tx Ch...', 'Set/Delete Selected T...', and 'Auto Set (All Channels + Inter...'. Below this is a 'Channel:' section with 'Current Squirrel Start Channel: 1' and an 'Update Channel Allocation' button. The bottom section is a table with columns for 'Tx Chan:', 'Range:', 'Sq Chan:', and 'Match:'. The table lists channels A through L with their respective ranges and square channel assignments. Channel L is highlighted in blue.

Tx Chan:	Range:	Sq Chan:	Match:
A	Voltage (0.0 to 500.0 V )	3	
B	Voltage (0.0 to 500.0 V )	4	
C	Voltage (0.0 to 500.0 V )	5	
D	Current (0.0 to 1000.0 A )	6	
E	Current (0.0 to 1000.0 A )	7	
F	Current (0.0 to 1000.0 A )	8	
G	Power Factor (-1.00 to 1.00 )	9	
H	Power Factor (-1.00 to 1.00 )	10	
I	Power Factor (-1.00 to 1.00 )	11	
J	Pulse Count (0 to 65000 kWh )	12	
K	[EU Range] Pulse Count (0 to 65000 kvarh )	13	
L	Voltage (0.0 to 1.0 Ext )	14	

# GD900A method of operation

## Sampling the meters

The GD900A reads and stores the values from the NDRail350 meter(s) every 10 seconds. It waits 1 second between reading each connected meter. 17 sets of values per meter are stored and a rolling average is kept. To check the system is operating correctly, you can verify that this is happening by watching the **Cmd** light on the front of the NDRail350 meters.

## Transmitting the data

At each transmission the GD900A transmits the average of the 17 values for voltage, current and power factor. The actual transmission time of the virtual transmitters begins at a random point of time within the transmission interval. The virtual transmitters 1 through 6 (or as many are configured) will transmit in order, each transmission 1 second apart after the transmission time of the first virtual transmitter. The default TX interval is preset to 5 minutes but can be altered as required.

## A note about 'Virtual Transmitters'

For ease of use, The multiple ND Rail 350 meters connected to a GD900A transmitter will appear as a series of 'virtual transmitters' in Darca (and are treated as such by the receiver/logger). Each virtual transmitter will have its own serial number. These virtual transmitter serial numbers run sequentially starting with the GD900A's serial number. For example:

GD900A serial number: 20001  
ND350 address 1: virtual transmitter serial number: 20001  
ND350 address 2: virtual transmitter serial number: 20002  
ND350 address 3: virtual transmitter serial number: 20003  
ND350 address 4: virtual transmitter serial number: 20004...etc.

After configuring the transmitter channels for the first NDRail350 in Darca's **Squirrel Channel to Transmitter Channel Assignments** window, you can move to the next connected meter in the list by clicking **Next V Tx** (Next virtual transmitter). The next meter can then be configured in the same way. To move back to the previous meter in the list, use **<< Prev V Tx** (previous virtual transmitter).

## Configuring a virtual transmitter

- For Tx channels A to L: select only the channel range from the drop down as shown in the screen shot and click on **Set Channel**. DO NOT ATTEMPT to use the **Edit EU Range** box.
- Channels D, E and F are fixed 0-1000A; ensure the range type setting on the NDRail350 matches the range of the connected CT! See operating manual (see link on Page 8)
- Channel L monitors connection of the external power supply: 0 = not connected and 1 = 12V connected. Darca Plus can use these values to set an alarm should the AC supply fail.
- **Device Type** should always be set to **A20**.

## GD900A specification

Frequency:	Default is 434.225Mhz (other frequencies are available)
Tx compliance:	To EN300 220 -1
Tx output power:	10mW ERP
Useable Tx interval:	typically 10 seconds to 15 minutes
On air duration:	approximately 400mS
Environment:	Indoor only, rated IP40
Temperature Range:	-10 to +55°C compliant to EN300 220-1, operational -30 to +60°C
Humidity:	95% non condensing
Size:	85mm x 78mm x 42mm (excluding 75mm antenna)
Weight:	250g
Connection strip:	8 x miniature pitch rising cage connector (included)
Antenna:	Supplied compressed spring, L=75mm, Gain -3db
Antenna connector:	SMA
Fixing:	WBG wall fixing bracket (optional)
Battery type:	PCB mounted (6V) 0.17Ah Ni-mH
Battery endurance:	typically >24 hours if battery fully charged
Charging time:	typically 36 hours from discharged to 80% capacity
Max lead length to ND Rail350V (screened twisted pair):	<20M

## NDRail350 support information

Brochure: [http://www.ndmeter.co.uk/files/ND\\_350V\\_Retro-Fit\\_Meter\\_Brochure.pdf](http://www.ndmeter.co.uk/files/ND_350V_Retro-Fit_Meter_Brochure.pdf)

User manual: [http://www.ndmeter.co.uk/files/ND\\_PowerRail350\\_Manual.pdf](http://www.ndmeter.co.uk/files/ND_PowerRail350_Manual.pdf)

Installation manual: packed with product

SCL CT brochure: [http://www.ndmeter.co.uk/files/SCL\\_Retro-fit\\_Current\\_Sensors.pdf](http://www.ndmeter.co.uk/files/SCL_Retro-fit_Current_Sensors.pdf)

SCT CT brochure: [http://www.ndmeter.co.uk/files/SCT\\_Retro-fit\\_Current\\_Sensors.pdf](http://www.ndmeter.co.uk/files/SCT_Retro-fit_Current_Sensors.pdf)

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