

<p>Example: Mobile phone Nokia 8850</p> <ol style="list-style-type: none"> 1. Press "Menu" 2. Select "Messages" 3. Select "Outbox" 4. If messages are stored in the Outbox, they must be erased. Select "Read"->"Options"->"Erase" to delete messages. Do the same check for the Inbox. 5. After verifying that both the Outbox and the Inbox are empty, select "Write messages". 6. Start by entering the message to be sent at a PSTN error. <p>NOTE: the message must be started and ended with an exclamation mark (!) and is size limited to max. 40 characters. These rules apply to any message to be delivered by the TS100.</p> <p>Message example: !PSTN Error Dualtech IT!</p> <ol style="list-style-type: none"> 7. Once the message is written, press "Options" followed by "Save". The message is now stored at position 1 of the SMS storage area of the SIM card. It's essential that the messages are stored in the correct order since the TS100 fetches messages at predefined positions at an SMS transfer. 8. As message number 2, the message to be sent at restoral of the PSTN error is stored. <p>Message example: !PSTN Error Dualtech IT restored!</p> <ol style="list-style-type: none"> 9. As message number 3, the message to be sent at activation of "SW/AL Input" is stored. 10. As message number 4, the message to be sent at restoral of "SW/AL Input" is stored. 	<p>Ex: Mobile phone Ericsson A1018s</p> <ol style="list-style-type: none"> 1. Enter menu system and select "Mail" 2. Select "Read messages" 3. If any messages are previously stored, they must be erased. Press "Yes"->"right arrow" and "Yes" 4. After verifying that there are no messages previously stored, select "Send message" followed by "New". 5. Start by entering the message to be sent at a PSTN error. <p>NOTE: the message must be started and ended with an exclamation mark (!) and is size limited to max. 40 characters. These rules apply to any message to be delivered by the TS100.</p> <p>Message example: !PSTN Error Dualtech IT!</p> <ol style="list-style-type: none"> 6. Once the message is written, press "No" to take one step back in the menu system. Select "Read messages". The newly written message is found marked as "To send". Press "Yes"->"right arrow"->"No"->"Yes". The message is now stored in the SIM card. The phone informs about the SIM card memory location the message is stored to. Verify that the message ends up in position 1 of the SIM card. It's essential the the messages are stored in the correct order since the TS100 fetches messages at predefined positions at SMS transfer. 7. As message number 2, the message to be sent at restoral of the PSTN error is stored. <p>Message example: !PSTN Error Dualtech IT restored!</p> <ol style="list-style-type: none"> 8. As message number 3, the message to be sent at activation of "SW/AL Input" is stored. 9. As message number 4, the message to be sent at restoral of "SW/AL Input" is stored.
---	---

Setting up for system programming

Note that if no SMS features are desired, no system programming is required.

1. Mount the antenna into the GSM transceiver.
2. Store SMS messages to be sent by the TS100 into the SIM card, using an ordinary cellular phone. See section "Setting up SIM card for SMS transferring".
3. Insert a GSM SIM card into the unit SIM card reader. NOTE: The SIM card must not be protected with a PIN code. If required, turn PIN code off using an ordinary cellular phone.
4. Connect supply voltage (10-25 VDC) to socket "Supply Input". During a start up period all TS100 LED's will flash, whereafter the LED's commence idle indication (Green LED flashing, yellow LED lit and rest of the LED's switched off).
5. When system's in idle mode (green LED flashing, yellow LED lit indicating system's in GSM mode): Connect an ordinary tone dialling telephone set to socket "Line Output". Lift hook and verify that a dialling tone is received from the TS100.
6. Use the telephone set to program the TS100 unit. See section "Programming the TS100".

Programming the TS100

The TS100 may be programmed to deliver SMS messages to optional receiver(s) at the following events:

1. PSTN Error activated – SMS alarm message sent to receiver phone number 1
2. PSTN Error restored – SMS restore message sent to receiver phone number 1
3. SW/AL input activated (short circuited) – SMS alarm message sent to receiver phone number 2
4. SW/AL input restored – SMS restore message sent to receiver phone number 2
5. Output effected by remote control - SMS status message sent to receiver phone number 3

The actual messages to be sent are stored into the unit SIM card. See section "Setting up SIM card for SMS transferring". Any message may be stored for delivery. The only restriction is a maximum length of 40 characters and that the message must be started and ended with an exclamation mark (!).The SMS receiver phone numbers may be stored either into the SIM card (default) or directly into the TS100 non-volatile memory area. At an SMS transfer event, the TS100 will fetch the phone number from either of the two areas and fetch the message to be sent from the SIM card memory area.

Setup commands to the TS100 during programming are always entered in the following context:

****X*Y#** where X is the setup function addressed and Y is the new setting desired.

To enter programming mode, an installer PIN code is required. After entering the correct PIN code, all programming parameters may be altered/updated.

To start a programming session, lift hook on the telephone handset, verify that a dialling tone is received from the TS100 and start by entering the installer code accordingly:

****8*(Installer PIN, default 1111)#**

If the code is accepted, the TS100 LED's will "roll" for 3 seconds, whereafter the dialling tone returns. Programming mode is now entered. NOTE: The installer PIN code will be required again if the telephone handset hook is put back on.

In programming mode the following parameters may be altered/updated:

****1*xxxxxxx#**

Update/enter receiver phone number 1 in system processor non-volatile memory. Note that phone number programming is not required if the system is set to fetch SMS receiver phone numbers from the SIM card memory area.

Example: ****1*0708756365#**

Phone number 0708756365 is stored as receiver phone number 1.

****1*#**

Delete receiver phone number 1

Sockets

"Supply Input":
 "NC":
 "O1 O/C OUT"

"GSM OUTPUT":

"LINE OUTPUT":
 "PSTN INPUT":
 "SW/AL INPUT":

"E2":

"E3":

"E1 E1":

LED's

Green LED:
 Yellow LED:
 Red LED:
 All three LED's:

Supply voltage input. Max ratings: 10-25 VDC
 Not Used
 Remote controllable open collector output.
 Closes to/breaks from GND (C)
 Direct access to the TS100 GSM channel (only while PSTN line is intact)
 Line Out to alarm transmitter.
 PSTN connection socket.
 Normally open alarm input for SMS transfer.
 May also be set to NO input used to force the TS100 to switch "Line Output" from PSTN to the GSM channel.
Open collector output, optional NC/NO. Close to/Breaks from GND at GSM Error.
Open collector output, optional NC/NO. Close to/Breaks from GND at PSTN Error.
 Potential free output indicating removal of cabinet lid, Normally Closed.

Operating status TS90SMS.
 System in GSM or PSTN mode (lit=GSM)
 GSM Error.
 GSM signal strength / Ongoing call via the GSM channel / SMS transfer in progress / Searching for GSM operator network (at unit start up)

Supply Voltage:
 10-25 VDC.

Current Consumption:

At standby approx. 200 mA.
 At transmission via the GSM approx. 350 mA.
 At an incoming call, generating ring signal approx. 600 mA

Configuration Switch

ON = 1 
 OFF = 0

1 2 3 4 5 6 7 8

1 & 2, PSTN Error alarm delay time (sec)

00: 5, 01: 30, 10: 120, 11: 240

3 & 4, GSM Error alarm delay time (sec)

00: 10, 01: 60, 10: 300, 11: 1200

5, Talk time limitation (via the GSM)

0: No limitation, 1: 10 min. talk time limit

6, Alarm outputs NC or NO

0: NC, 1: NO

7, Switch board option

0: No switch board, 1: TS100 ignores first digit dialled by the alarm transmitter.




8, Indication of LED's

0: Normal, 1: GSM signal strength indication

7&8, Enhanced switchboard option

If set to "1 1" TS100 ignores two first digits dialled by the alarm transmitter.

Indications (LED's)

-  Green
-  Yellow
-  Red

Green LED ("Run")

Flashing: TS100 OK

Yellow LED ("GSM/PSTN")

Lit: Output "Line Output" switched to GSM channel. *Off:* PSTN Line to "Line Output".

Red LED 2 ("Supply Error")

Lit: Supply Voltage below appr. 11 VDC.
Off: Supply Voltage above appr. 11 VDC.

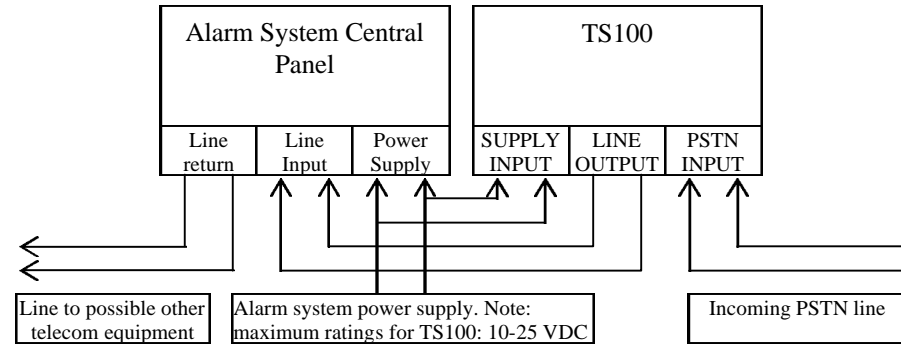
Red LED 1 ("GSM Error")

Lit: GSM Error alarm output activated.
Off: GSM channel OK.

LED's "rolling" indicates outgoing call via the GSM channel, SMS transfer or programming update OK. LED's flashing indicates TS100 searching for GSM network (at unit start up).



TS100 - System description & Installation directives













In normal use, the TS100 unit is installed as first client on incoming PSTN line. The alarm transmitter gets access to the line through the TS100 LINE OUTPUT socket. The TS100 constantly supervises the incoming PSTN line. At a line failure, LINE OUTPUT will immediately switch to GSM mode, providing a simulated PSTN line to the alarm transmitter.

After the delay time set on the TS100 Configuration Switch, the error output PSTN ERROR will be activated providing an alarm trig to the alarm transmitter. If the PSTN ERROR output is connected to an alarm input on the alarm transmitter, this trig will result in that the alarm transmitter dials and reports a PSTN error over the GSM network. Consecutive alarms will of course also be dialled and reported by the alarm transmitter via the GSM network.

As soon as the TS100 detects restoration of the incoming PSTN line, LINE OUTPUT will be switched back to the real PSTN, and the PSTN ERROR output will be released.

TS100 – Screw Sockets

									
- + SUPPLY INPUT	NC O1 O/C OUT	O2 O2 GSM OUTPUT	O3 O3 LINE OUTPUT	I1 I1 PSTN INPUT	I2 C SW/AL INPUT	E1 E1 TAMPER OUTPUT	E2 E3 GSM/PSTN ERROR	- + POWER OUTPUT	

SUPPLY INPUT: Power supply connection socket.
 Maximum ratings: 10-25 VDC
 NC: Not Used

O1: Remote controllable open collector output.
 Closes to or breaks from GND.

O2-O2: Direct access to GSM line (only when PSTN line is intact)

O3 – O3: Line output, PSTN or simulated PSTN.

I1 – I1: Connection socket for incoming PSTN line.

I2 - C: Normally open input, optionally used for SMS alarm transferring or to force the TS100 to switch to GSM mode.

E1 – E1: Potential free tamper output, activated at removal of the TS100 cabinet lid.

E2: Open collector GSM error output, optional NO/NC. Activated at a GSM error.

E3: Open collector PSTN error output, optional NO/NC. Activated at a PSTN error.

<u>**2*xxxxxx#</u>	Update/enter receiver phone number 2
**2*#	Delete receiver phone number 2
<u>**30*xxxxxx#</u>	Update/enter receiver phone number 3. NOTE: 30, not 3.
**30*#	Delete receiver phone number 3
<u>**4*xxxxxxxxxx#</u>	Update/enter date and time to the TS100 real time clock.
Example: **4*020517123500#	When pushing #, date and time is immediately updated to: 2002-05-17, 12:35:00
<u>**6* 0 or 1 #</u>	The SW/AL input should operate as an SMS alarm input (default) or as an input used to force the TS100 to switch to GSM mode regardless of PSTN line status.
Example: **6*1#	SW/AL input used as an SMS alarm input (factory setting).
**6*0#	SW/AL used to at activation force the TS100 to switch to GSM mode regardless of status on incoming PSTN line.
<u>**7* 0 or 1 #</u>	At an SMS transfer event, the receiver phone numbers is fetched from the SIM card storage area (default) or from the system processor non-volatile memory.
Example: **7*1#	At an SMS transfer event, receiver phone number is fetched from the SIM card memory area (factory setting).
**7*0#	At an SMS transfer event, receiver phone number is fetched from the system processors non-volatile memory area.
<u>**80*xxxx#</u>	Update the installer PIN code.
Example: **80*4567#	The installer PIN is updated to 4567.
<u>**81*xxxx#</u>	Update remote control PIN code (default:1234).
Example: **81*4567#	The remote control PIN code is updated to 4567.
<u>**82*1-9#</u>	Update number of ring signals put through by the TS100 at an incoming call, before auto-answering for remote control of system output. Factory setting: 6.
Example: **82*3#	Number of ring signals put through by the TS100 before auto-answering for remote control is updated to 3.

NOTE: After entering the # in every setting, the TS100 will acknowledge the update by “rolling” the LED’s for 3 seconds, whereafter the dial tone will return in the telephone handset. If the dial tone returns immediately without LED’s rolling, the update was not accepted and has to be re-done. If the dialling tone disappears totally, the telephone handset hook needs to be put back on, re-lifted, installer PIN entered again to access programming mode, and programming continued. However, the settings that were accepted during the programming session do not need to be re-entered.

Additional features in TS100 software revision 1.1 (not available in revision 1.0):

<u>**90*xxxxxx#</u>	<i>Enter temporary SMS receiver phone number for system settings report.</i>
<u>**91*#</u>	<i>Request system settings report to temporary SMS receiver phone number. An SMS message containing system settings will be delivered to temporary phone number entered with **90*xxxxxx#</i>

This feature is used to verify new programming settings after a programming session.

Setting up SIM card for SMS transferring

Note that if no SMS features are desired, no SIM card programming is required.

The TS100 may be programmed to at an SMS transfer event, fetch the receiver phone number either from the SIM card (factory setting) or from the system processor non-volatile memory. If the TS100 is set to fetch the phone numbers from the SIM card, phone numbers must be programmed into the card:

1. Put the SIM card in an ordinary cellular telephone.
2. Add new entry ALNOA in the SIM phone book. Give ALNOA the phone number desired as receiver phone number 1 (PSTN Error/PSTN Restored).
3. Add new entry ALNOB in the SIM phone book. Give ALNOB the phone number desired as receiver phone number 2 (Input SW/AL activated/restored).
4. Add new entry ALNOC in the SIM phone book. Give ALNOC the phone number desired as receiver phone number 3 (Status report after remote controlling the TS100 output).

SMS messages to be sent must always be stored into the unit SIM card. The messages may have a maximum length of 40 characters and must be started and finished off with an exclamation mark (!).

- At a PSTN Error the TS100 will fetch the message stored in SIM card position 1 and deliver it to receiver phone number 1.
- At PSTN restoral, the TS100 will fetch the message stored in SIM card position 2 and deliver it to receiver phone number 1.
- At activation of the SW/AL input (if the input is setup as an alarm input, see section “Programming the TS100”) the TS100 will fetch the message stored in SIM card position 3 and deliver it to receiver phone number 2.
- At restoral of the SW/AL input, the TS100 will fetch the message stored in SIM card position 4 and deliver it to receiver phone number 2.

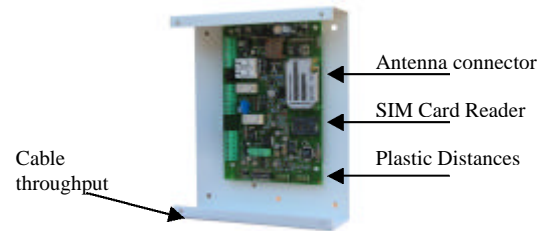
Messages are stored into the SIM card accordingly:

1. Put the SIM card into an ordinary cellular phone.
2. Make sure that no messages are previously stored in the Inbox or the Outbox of the SIM card message area.
3. After ensuring that both the Inbox and the outbox are empty, write a new message (max 40 characters, finished off with an exclamation mark (!)).
4. Store the message. When doing this, the message will be stored in SIM card position 1.
5. Write and store the next message. The message will be stored into SIM card position 2.
6. Write and store the next message. The message will be stored into SIM card position 3.
7. Write and store the next message. The message will be stored into SIM card position 4.

See next page for programming examples using either a Nokia or an Ericsson cellular phone.

NOTE: It’s essential that the messages are stored into the correct SIM card positions. This means that if only SW/AL related messages are desired (no PSTN Error related SMS messages) SIM card positions 1 and 2 must still be filled to make sure that the desired messages are stored into position 3 and 4. Then, to skip PSTN related messages, just leave out the receiver phone numbers for these messages.

TS100 – assembly directives



1. Push the plastic distances from behind through the circuit board mounting holes of the TS100 cabinet.
2. Snap the TS100 circuit board onto the plastic distances.
3. Gently push the antenna connector into the TS100 GSM transceiver.
4. Put the rubber cable throughput into the cable throughput hole in the TS100 cabinet.

TS100 - Installation

If system was previously programmed, remove the telephone handset used for programming from output "Line Output".

1. Connect incoming PSTN line to socket "PSTN Input"
2. Connect alarm transmitter line input to socket "Line Output".
3. Connect alarm outputs "Tamper Output ("E1" "E1")" (activated at removal of the cabinet lid), "E3" (activated at PSTN Line error.) and "E2" (activated at any kind of GSM error) to alarm inputs of the alarm transmitter. NOTE: E2 and E3 are open collector outputs breaking from or closing to GND.
4. Mount the antenna into the GSM transceiver.
5. Insert a GSM SIM card into the unit SIM card reader.
6. TS100 immediately starts up when supply voltage is connected to socket "Supply Input". During a start up period all LED's will flash, whereafter the LED's commence idle indication (Green LED flashing and rest of the LED's switched off).
7. Locate suitable antenna placement by switching DIP switch number 8 to "ON" position. This makes the LED's indicate the signal strength of the GSM network (similar to an ordinary mobile telephone).
8. Test the system by removing the PSTN Line from socket "PSTN Input". Output "Line Output" immediately switches to GSM channel and after the delay time stated by the configuration DIP switch, alarm output "E3" is activated, an alarm event is triggered on the alarm transmitter connected to the TS90SMS, and the transmitter dials to report the PSTN error via the GSM channel.
9. If so wanted, an ordinary telephone may be connected to socket "GSM Output". Via this socket it's possible to make ordinary speech calls vis the GSM network as long as the PSTN line is intact.

NOTE: The TS100 may also be used as single communication channel where no PSTN line is available. In this case, just ignore the parts concerning the connection of the PSTN line and the TS100 alarm outputs. Also note that the GSM OUTPUT socket is of no use in this configuration.

Placing the antenna

Locate suitable antenna placement using DIP 8 of the TS90 "Configuration Switch" (normally, the antenna may be mounted on top of the TS90 cabinet). Put the antenna cable through the cut out corner of the TS100 cabinet.

Inserting a SIM card

Open the lock on the SIM card holder by pushing it gently in the opposite direction than the one shown by the arrow located on the holder. Fold back the SIM card holder. Insert the SIM card gently into the holder. The SIM card circuits should be turned down towards the connectors of the SIM card holder. Fold down the SIM card holder. Close the lock on the card holder by pushing it in the arrow direction.

Important notes

- ✓ TS100 must be located first on incoming PSTN Line!
- ✓ Make sure the GSM SIM card used is not locked with a PIN code. Use an ordinary cellular phone to turn the PIN code protection off
- ✓ If TS100:s alarm outputs ("Tamper Output (E1 E1)", "GSM Error (E2)" and "PSTN Error (E3)") are to be used, the alarm transmitter connected to the unit must be programmed with alarm characters corresponding to these errors.
- ✓ Alarm transmitter must always dial area code before alarm centre telephone number.

TS100 – remote control possibilities

The TS100 output marked "O1 O/C OUT" may be activated/deactivated from remote. To access the remote control possibilities, a call is made to the TS100 unit, a PIN code is entered at request from the TS100, and desired action is stated. The TS100 will perform the action desired and return a status SMS message to the phone number programmed as SMS receiver phone number 3, verifying that the action has been taken.

1. Call the TS100 unit (make a call to the phone number of the SIM card located in the unit) from a tone dialling telephone handset.
2. When detecting an incoming call, the TS100 will auto-answer and reply with one short beep.
3. Enter remote PIN code (default: 1234) on the calling telephone keypad.
4. TS100 will acknowledge the code with a new short beep. If the wrong code is entered, the TS100 will immediately hang up the call.
5. After getting an acknowledge of the PIN code, the following remote options are available:

Digit entered on the calling telephone keypad	Action taken by the TS100
0	Output O/C OUT is immediately deactivated (broke from GND)
1	Output O/C OUT is immediately activated (closed to GND)
9	Output O/C OUT is not effected, but a status SMS message is delivered to SMS receiver phone number 3

6. Any order will be acknowledge with three short beeps and a status SMS message: **Dualtech IT AB, Time: 12:35:28, Output: ON** will be delivered to SMS receiver phone number 3 (if programmed).

Additional remote feature in TS100 software revision 1.1 (not available in revision 1.0):

After receiving the "PIN code accepted beep", push 3 for remote PIN code update. TS100 will reply with a new short beep. Now enter new remote PIN code (4 digits, 0-9). When pushing the fourth digit, the TS100 remote PIN will immediately be updated. Action is acknowledged with three short beeps.