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RADIO MONITORING STATION

RMV-2003/1 UFR-3

(Lars 1* Radio Monitoring System)

CONTENTS:

NOTE! LARS 1 is the trademark of KP ELECTRONICS Company.

1. GENERAL SYSTEM DESCRIPTION:

RMV-2003/1 UFR-3 Monitoring Station is a unit destined for receiving and digital message decoding, basing on radio encode protocol Lars-1 developed by KP Electronics Company. Received messages are visualized on LCD display (2x16 characters) and sent to the Monitoring Station Software on PC operating. Communication between the Station Unit and the computer is realized using RS-232 connection with protocol RC-4000. Any RS-232 protocol can be supplied if a Monitoring System purchaser will deliver necessary information.

RMV-2003/1 UFR-3 Monitoring Station is compatible compatible with following units:

- **UNR-01VHF (UFR-3) - Advanced Messer Message Transmitter with Frequency Synthesizer,**
- **ATS-100, MAT - Original KP Electronics Message Transmitter with Frequency Synthesizer,**
- **RPT-2003/1 UFR-3 - Messer Repeater with Lars-1 encode protocol.**

In the Lars-1 radio monitoring system maximum account number is 8191 in the one Station ID group. All the radio units (end transmitters and repeaters) have also additional system marker - Station ID number from 0÷7. Station ID marker system enables for very flexible network configuration. Using the Station ID numbers, a network supervisor can to choose any radio unit group and decide is it visible or not for his Monitoring Station unit. Also the repeaters recognize the end transmitters by the Station ID markers and handles or not – in accordance to the setup settings. What's more the Station ID markers system enables to create several independent radio Systems operating on the same frequency channel.
The maximal capability of the RMV-2003/1 UFR-3 Monitoring Station is 8191 subscribers in each of the four Station ID group.
In the Lars-1 protocol messages, the event codes are one digit type (from 00÷FF range) and it is fully flexible programmable by the installer in accordance to the Monitoring Station software settings. The length of a digital message is about 500ms for all the messages.

- Transmitter UNR-01VHF (UHF)...

…can operate at 150-175MHz or 433MHz frequency range. One transmitter can to handle two independent objects and operate at 1 or 2 different frequencies, if required. Alarms are activated through the eight inputs parallel port. In the development process is the transmitter version where the alarm activation is executed by the alarm panel's phone line output (Contact ID information). All the transmitters are equipped with simply on-board alarm panel. It is enable to connect 4 alarm sensors directly to the transmitter inputs. Separated key input is destined to arm/disarm the panel. Any additional DC supplier is not needed, because UNR-01VHF transmitter series is equipped with its own battery charger and only 14VAC power is required.
All the UNR-01VHF transmitter parameters are easy programmed through the RS-232 communication port using special MESSER Download software (freeware).

- Repeater RPT-2003/1 UFR-3 (Lars-1)…

… is a multi microprocessor unit with separated receive, analysis, and transmit blocks operating simultaneously in the same real time. Messages are not simply relayed from the receiver to the transmitter, but are also decoded, analyzed, buffered, re-encoded again, and then transmitted to the RMV-2003/1 UFR-3 Monitoring Station.

Repeater RPT-2003/1 UFR-3 communicates to the Monitoring Station unit in the bi-directional mode. The Monitoring Station in the KP Lars-1 protocol acknowledges all the messages. When repeater will transmit a message, then waits for an answer with the receive confirmation (ACK signal code). If confirmation will not arrive, a message is sent again. A number of repetitions depend on the repeater setup settings. If the same message is received not by the one but more repeaters simultaneously and waits in its buffers for resending, then ACK signal code from the station will erase this message from all the units buffers – if the same ACK code will be set in all the repeaters setup settings.

Repeater unit has its own object number and Station ID marker, generates Periodic test reports, alarm and restore reports about the Tamper switch state, Battery Low level and 220VAC failure and restore information.
Repeater can receive messages with four any selected Station ID markers and resend to the monitoring station (or to the next repeater unit) with new created Station ID marker (0÷7). Repeater can to resend messages from the transmitters and other repeaters as well.

All the repeater's parameters are easy programmed using special MESSER Rpt_Terminal software (freeware) or standard Windows Hyper Terminal application.

- Monitoring Station RMV-2003/1 UFR-3…

…receives the messages from the end transmitters directly or/and through the repeaters retransmitted, too. The Messer Monitoring Station developed for the Lars-1 protocol is fully compatible with the RCI-4000 KP Electronics Station.
What's more the Messer Station can receive messages with four easy selected Station ID markers(!)

Monitoring Station shows on the LCD display all the received messages together with the Station ID markers, number of object, date and time of the message receiving.

Monitoring Station can on-line convert (on the display) received message event code into the description programmed in the setup mode. Example: received code 01 can be replaced with a sign ALARM, 02 - TAMPER, 06 - SYSTEM ON etc.

Monitoring Station has its own message buffer 16 384 events.

2. Lars-1 ENCODING PROTOCOL (UFR-3):

Nr of Objects:	8191,
Nr of Transmitters groups (STATION ID):	8,
Nr of Event codes (message types):	256 (00÷FF),
Digital message transmission time:	approx. 500 ms

3. STATION UNIT CONSTRUCTION:

RMV-2003/1 UFR-3 MONITORING STATION unit is usually provided as the small (195x65mm front panel dimensions) unit with input/output terminals to external transceiver and power supplier connect. It can be also ordered as the unit packed in the RAK 19" or PC Micro ATX standard box, then the radio transceiver, power supplier and the back up battery are set inside the box.
The Station has a modular construction containing of the follow blocks:

- Digital message decoder RM-2003. Except the main microprocessor Analyzer there are also: Received messages memory buffer (RAM 16 384 records), station setup memory (EEPROM) and RS-232 port.
- Digital message transmitter KB-2002. It's a special coder responsible for the answering (receive confirmation) to messages received from repeaters. There is also set an 8-buttons keypad and LCD display (2x16 characters). Display on-line shows all the received messages and enables to memory buffer reviewing. There are available all the typical information like time & date, object nr, report etc.;
- Analog, radio transceiver with frequency synthesizer Motorola GM-340,
- Power supplier with optional battery backup battery in RAK-19" version,

RAK 19" box Station unit is supplied of the external 14VAC/40W/2A transformer.

4. OPERATING FREQUENCY CHANNEL

OPERATING FREQUENCY

Station operating frequency channel depends of transceiver settings, only. Motorola GM-340 is equipped with programmable frequency synthesizer (Motorola ENVN 4005E software) operating in the 136÷174MHz (subtype: MW-304Ax) or 403÷470MHz (subtype: MW-504Ax),

TRANSCEIVER TERMINAL DESCRIPTION

1,6	-	SUPPLY +13.8VDC	5,9	-	COMMON GROUND
2	-	OUTPUT (RX Audio)	8	-	SQUELCH
3	-	INPUT (TX Audio)	7	-	SIGNAL LEVEL
4	-	PTT (RX/TX Switching)			

CONNECTOR CANNON-9 FEMALE type.

5. STATION UNIT FEATURES:

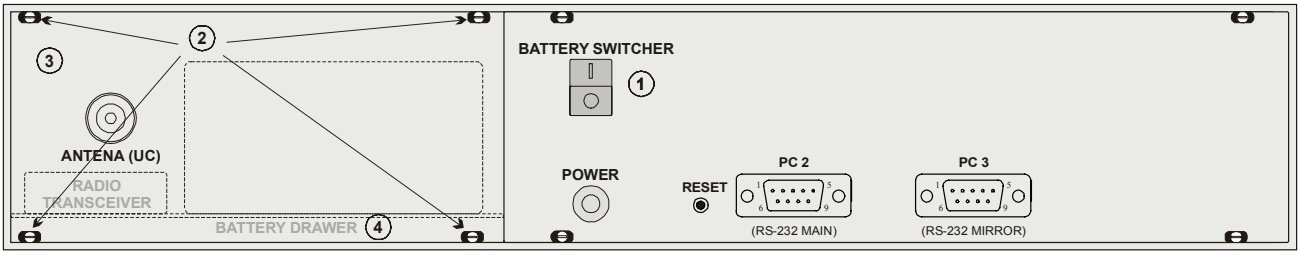
RMV-2003/1 UFR-3 Monitoring Station has following features:

- receive and decode messages encoded with Lars-1 radio protocol method (UFR-3),
- handle four selected transmitters group (Station ID),
- display a type (report code) of received message on the LCD display, together with time/date and ID Station,
- resend all received information to the PC Monitoring Station Software using RS-232 communication port,
- store last 16 384 received messages in memory buffer (RAM type) together with receive date/time and Station ID marker. Memory buffer reviewing does not stop receiving of the next coming messages (!)
- optional on-line replacing (on the on the LCD display) received message event code into the description programmed in the setup mode. Example: received code 01 is replaced with sign ALARM, 02 - TAMPER, 06 - SYSTEM ON etc.
- programming mode protected by the password.

7. STATION UNIT CONNECTORS:

RMV-2003/1 UFR-3 Monitoring Station is equipped with following input/output connectors:

PC2 - CANNON-9 MALE - RS-232 MASTER input/output for main Station Computer connection;
PC3 - CANNON-9 MALE - RS-232 MIRROR input/output for secondary Station Computer connection;

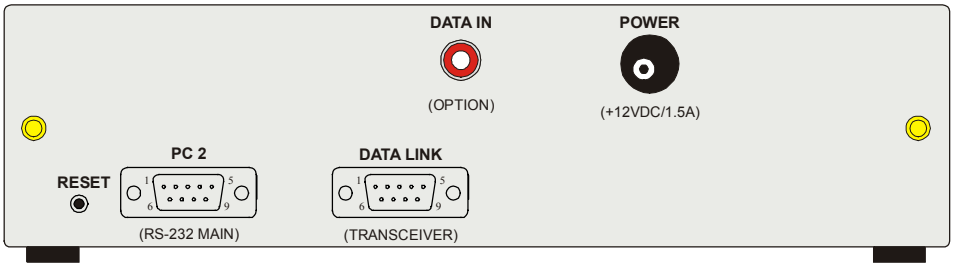


RAK19" BACK PANEL

OPTIONAL BATTERY EXCHANGE:

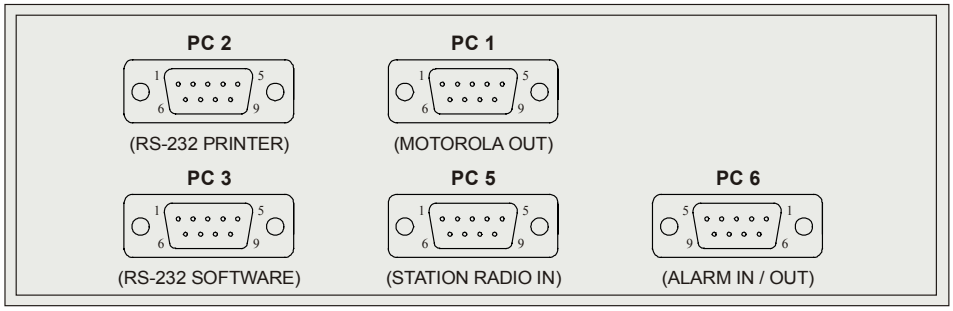
- **Make sure the external transformer is unconnected (!)**
- Switch off the battery using special battery switcher on the Station back panel (1)
- Unscrew the four holding screws (2) located on the left back cover (3)
- Pull out the left back cover together with a battery drawer (4) gently
- Replace a battery with new one
- Insert the battery drawer inside the box
- Tighten the holding screws.
- Switch on the battery and connect external transformer.

NOTE:
TAKE A HIGH CARE WITH THE INTERNAL CONNECTION CABLES WHILE THE BATTERY EXCHANGE OPERATION (!)



19cm BACK PANEL

STATION UNIT IN PC BOX VERSION:



PC BOX VERSION BACK PANEL

PC1*	-	CANNON-9 FEMALE	-	Internal Motorola transceiver input/output connector;
PC2	-	CANNON-9 MALE	-	not used;
PC3	-	CANNON-9 MALE	-	RS-232 connector for automation software communication;
PC5*	-	CANNON-9 MALE	-	Radio data input/output connector;
PC6	-	CANNON-9 FEMALE	-	not used;

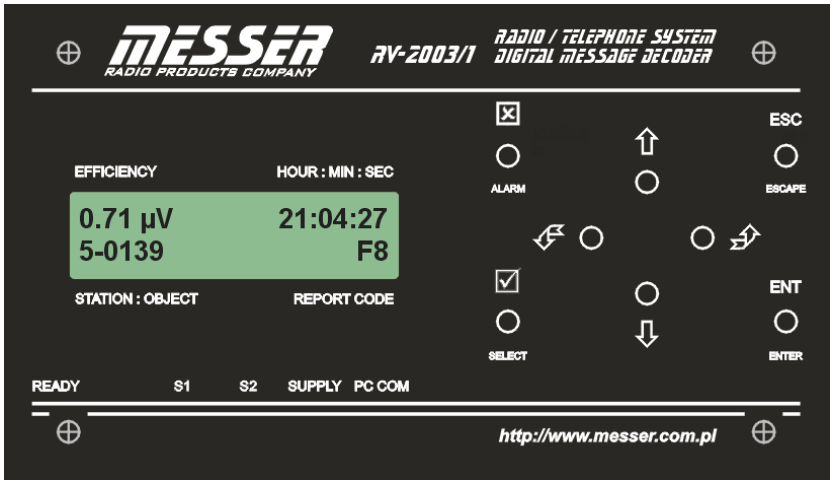
- PC1 connector must be connected to the PC5 with the special external cross-cable provided to the station.
- If you need to connect some other external transceiver, connect its to the PC5 in accordance to “OPERATING FREQUENCY CHANNEL” description.

PC BOX TYPE VIEW

8. KEYS' FUNCTIONS:

„√"	**-**	SELECT	-	In the setup mode - switch to change the settings ON→OFF or OFF →-ON,
„ENT"	**-**	ENTER	-	Select confirmation,
„ESC"	**-**	ESCAPE	**-**	Exit or Exit without saving,
„←,↑,→,↓"	-	CURSORS	-	Cursors moving,
„x"	**-**	ALARM	**-**	Alarm buzzer ON/OFF switch. WHEN IN ALARM CONDITION THE BUZZER IS MANUALLY SET OFF, THEN GENERATES SHORTS BEEPS SIGNALS IN EVERY 5 SEC TO REMIND TO SET ITS TO THE NORMAL MODE.

FRONT PANEL - KEYPAD AND LCD DISPLAY



FRONT PANEL OF THE PC BOX TYPE VERSION

9. LED INDICATORS:

„READY"	**-**	Pulses slow indicating proper Station operating mode.
„S1"	**-**	not used
„S2"	**-**	not used
„SUPPLY"	-	not used
„PC COM"	**-**	Is ON when there is no communication between Station to PC Monitoring Station Software more than 5 sec.

NOTE!
WHEN IN ALARM CONDITION THE ALARM INDICATOR IS ON - ALSO BUZZER SIGNAL IS BEING ON TILL THE MOMMENT THE ALARM CONDITION IS FINISHED.
BUZZER CAN BE SET OFF USING BOTTON „X" BUT THEN BUZZER GENERATES SHORTS BEEPS SIGNALS IN EVERY 5 SEC TO REMIND TO SET ITS TO THE NORMAL MODE.

10. STATION SETUP MODE:

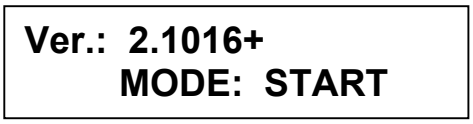
After the power supply is ON or the RESET switch is pressed on the back panel of the Station box, then query for the setup access code (PASSWORD) is displayed on the Station LCD module:

To not to open a setup mode, press ESC (ESCAPE) button or wait about 10sec, when the Station will automatically come to the normal message receive mode.
Factory default password is: four times pressed switch **„√"** and confirmed with the ENTER (ENT) switch.
If proper or anyone password is not set, then a Station comes to the normal operation mode (START description) in 10 second delay. Station is ready for the messages receiving.
If the proper access code is confirmed, then a Station comes to the setup mode. There are available following options to modify:
Use an „ENT" (ENTER) switch to open an option window or confirm the setting, „ESC" (ESCAPE) to exit a window without saving.

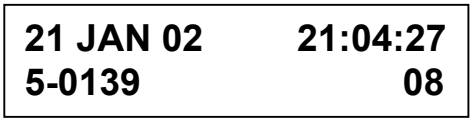
S01	-	FORMAT	-	information what the protocol can a Station operates with (!) Protocol is not changeable and depends of the Station unit version, only.
S02	-	RESERVE	-	option reserved for future solution.
S03	-	MESSAGE → ASCII	-	this optional function enables for on-line converting received messages (from 00÷FF report codes range) into description selected from the special Station description list. Example: While the 05 event code is received then an operator can see a TEST, ALARM or other selected description. Use ↑ or ↓ arrow buttons to select a message (report code) and ← or → to select description from the list. Set the blank description if a message should not to be converted.
S04	-	RESERVE	-	option reserved for future solution.
S05	-	RESERVE	-	option reserved for future solution.
S06	-	ID IN 1	-	this function allows to select any required Station ID number to be handled by the RMV-2003/1 station. Chosen Station ID number have to be associated with the additional number (on the right position of LCD) which will be used only for the RS-232 communication to identify the Station ID number in the external automation software system. Use ↑ or ↓ arrow buttons to change the Station ID number on the left LCD position. You can change the position (left into right or opposite) using and ← or → buttons. Sample: ID1: 001 → NR:05 means that messages received from the transmitters operating with Station ID =001 will be sent to the external computer with the identifier 05.
S07	-	ID IN 2	-	as above for second Station ID number selection.
S08	-	ID IN 3	-	as above for third Station ID number selection.
S09	-	ID IN 4	-	as above for fourth Station ID number selection. **NOTE: SET THE IDENTIFIER AS „___" TO TEMPORARY SWITCH OFF SELECTED STATION ID NUMBER FROM ITS HANDLING MODE.** **NOTE: PROGRAM THE IDENTIFIER AS „___" FOR ALL THE STATION ID (S06-S09) TO SET THE ALL ID STATION HANDLINGE MODE.**
S10	-	NEW PASSWORD	-	set new Station access code – any combination of the buttons (excluding ESC and ENTER), but four pressings only.

12. LCD DISPLAY SCREENS:

After the Setup mode is leaved, a Station comes to normal operation mode and is ready for radio messages receiving. The Station software number and MODE: START sign are displayed on the LCD screen:

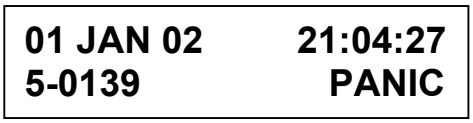


If the message is received the follow information are shown:



Receive hour **<21:04:27>**, a number of the Station ID marker (programmed in the setup mode) sent to the automation software through RS-232 communication port **<5>,** transmitter (object) number **<0139>** and report code number (message type) **<08>.**

If a report code 08 will be programmed in the setup mode (MESSAGE→ ASCII) to be converted into PANIC description, then LCD displaying is:



11. MESSAGE MEMORY BUFFER:

RMV-2003/1 UFR-3Monitoring Station is equipped with memory buffer to store in RAM type chip 16 384 last received messages. Recorded information consists of the Receive time/date, Report code (message report) and Transmitter (object) number.

Memory buffer reviewing does not stop receiving of the next coming messages (!)

To review a buffer, use → or ← cursor buttons to increase/decrease a record number +/- 1, or ↑ or ↓ cursor buttons to increase/decrease a record number +/- messages.

Sample memory buffer screen is:

```
01 JAN 02      21:04:27
5-0139       16379→08
```

16 379 data is a record position number in memory. MESSAGE→ ASCII converting is not active in memory buffer review mode.

To leave a memory review mode, press ESCAPE button. Memory review mode is automatically leaved when the front panel keypad buttons (cursors) are not used about 5 sec.

12. FIRST MESSAGE RECEIVING:

After the Setup mode is leaved, a Station comes to normal operation mode and is ready for radio messages receiving. The Station software number and MODE: START sign are displayed on the LCD screen:

```
Ver.:  2.1016+
      MODE:  START
```

RMV-2002 SYSTEM+ Monitoring Station is waiting for the nearest radio message. There are the only two main conditions to the Station could receive a message from selected, remote transmitter:

- The same frequency channel programmed in the end transmitter and Station transceiver module. See p.5 **OPERATING FREQUENCY** in this manual and see also Transmitter programming Manual,
- Accordance of Station ID INPUT number selected in the Station unit and Station ID number programmed into the remote transmitter. See an option S06 setup menu position and see also Transmitter programming Manual.

In case of receiving messages resent through the repeater, the accordance of the repeater Station ID OUT and Station ID INPUT have to be guaranteed.

13. RS-232 COMMUNICATION PROTOCOLS:

INITIALISATION

Use a standard NULL-MODEM type cable to connect a Station Master computer output to the required PC COM port where is PC Monitoring Station Software operating.

If any problem will appear, use the Messer testing software (see p.16 **PC SOFTWARE FOR COMPUTER OUTPUT TESTING**) provided by the Station unit producer. It will let to check is the problem with Station output (selected protocol, faulted cable) or the PC configuration (Station Software, com port configuration).

RS-232 OUTPUT PROTOCOL

RS-232 output protocol is fully compatible with the original KP Electronics RC-4000 communication protocol. It is one of the most popular output protocols used by many Monitoring Station Software producers like SIMS, SIMS II, CMS AlarmCenter, Kronos Next and many other:

From Station to PC: **_a,MM/dd/yy,GG:mm:ss,_ _ _b-cccc,_dd,13h**

13h - transmit data ending or the Station answer for PC query if no new message does not exist in the buffer,

From PC to Station: **(MMddrrGGmmss)**

? - query for the data,

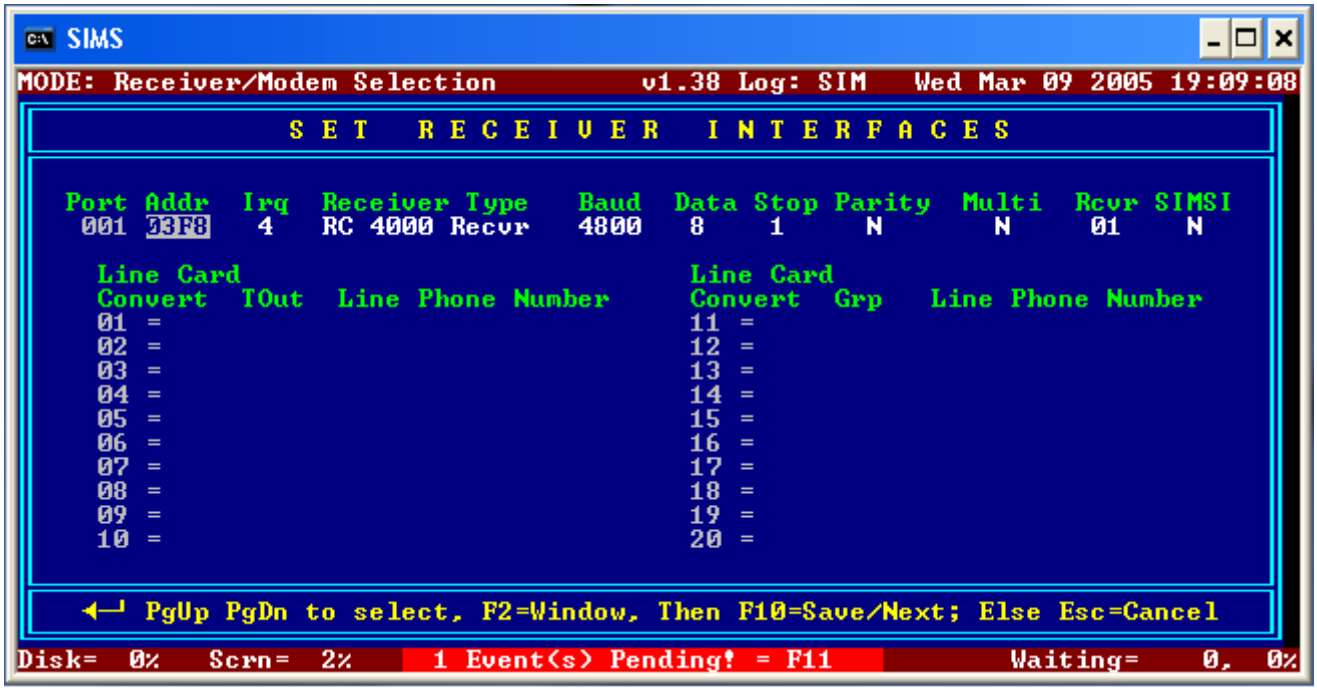
* - receive confirmation.

A legend:

_	-	a space	GG	-	an hour
a	-	the Station unit number	mm	-	a minute
MM	-	a month	ss	-	a second
dd	-	a day	b	-	coded Station ID nr *(dec)
yy	-	a year	cccc	-	the object number (dec)
/	-	a slash	dd	-	the message type (hex)
:	-	a colon			

The RS-232 settings for this protocol are: 8+1+NoParity+4800bps.
* See “STATION SETUP MODE” description

If you use the SIMS software please configure your driver settings as follow:



14. PC SOFTWARE FOR COMPUTER OUTPUT TESTING:

If any problem will appear at the communication between the Station unit and Monitoring Station Software, especially while the System installation process, use one of MESSER testing software provided with Station unit kit. It will let to check is the problem with Station output (selected protocol, faulted cable) or the PC configuration (Station Software, com port configuration).

MESSER Company provides two testing programs operating in Windows system environment (only the English Windows versions from '95 to XP were tested):

- **RV2k2.exe** for V_4800 output protocols testing.

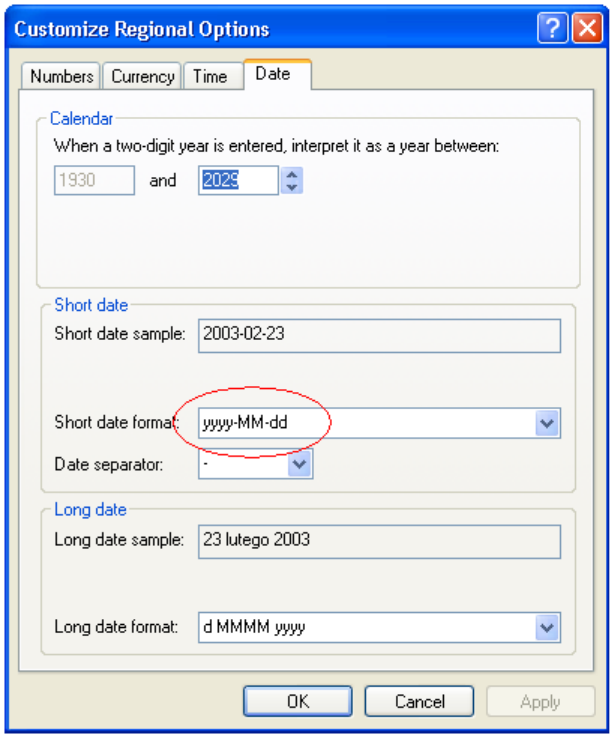
NOTES:

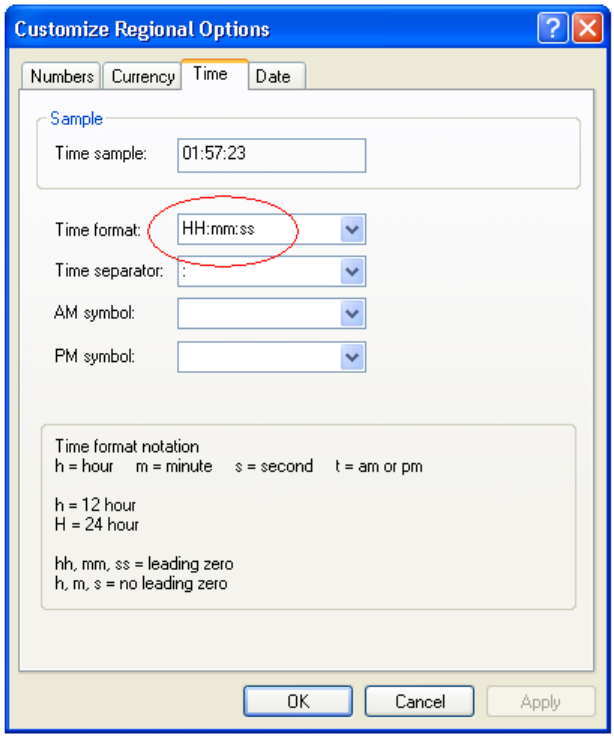
RV2k2.exe is not the monitoring station software but only the programs for port COM configuration, station unit output and cable connection testing.

Copy RV2k2.exe file to new created directory on the hard disc space and run required program without any additional installation process.

The Date and time format must be set as shown below for proper RV2k2.exe software operating. Check the settings in your computer directory:

Start / Settings / Control Panel / Regional and Language Options / Regional Options / Customize.





15. WARRANTY AND EXPLOITATION:

Messer warrants this product to be free from defects in materials and workmanship under normal use and service for a period of one year from the purchase date.

Messer's obligation is limited to repairing or replacing this product, at its option, free of charge for materials or labor, if it is proved to be defective in materials or workmanship under normal use and service. Messer shall have no obligation under this Limited Warranty or otherwise if the product is altered or improperly repaired or serviced by anyone other than Messer.

Messer does not represent that this product will prevent any person injury or property loss or damage by burglary, robbery, fire or otherwise; or that this product will in all cases provide adequate warning or protection. Purchaser understands that product is not insurance or a guarantee that fact of burglary, robbery or other events will not occur.

Purchaser understands that the product is basing upon the other units activity responsible to give information from the secured object. Consequently, Messer shall have no liability for any personal or object injury, property damage or any other loss based on claim that proper information was not delivered from the object because of this fact doesn't mean precisely that any Messer product failed to give an information.