USER MANUAL

LIS

Load Indicator System

AMCO VEBA
A HYVA GROUP COMPANY

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subject to change without notice

ORIGINAL INSTRUCTIONS

USER MANUAL
LIS
INDEX

A WARNINGS

A.1 PREMISE

Read these operating instructions carefully before using the device.
The operator's manual must always accompany the device and be suitably conserved.
Additional copies of this manual and technical informations can be obtained from authorized service centers. Please note that tampering with the instrument voids the warranty.
Therefore, in case of troubles, we recommend to contact only our authorized service centers.
The operator must comply with all regulations in force and make sure that the equipment is operated in compliance with the intended use.

A.1.1 WARNINGS

The operator must observe the following instructions:
- do NOT make changes to the equipment
- do NOT spill liquid on the transmitter and receiver
- do NOT expose the equipment to strong electromagnetic fields

- make sure that the load to be lifted is less than or equal to the maximum load capacity of LIS
- make sure that the hook lock is present and efficient
- do NOT lift loads using the tip of the hook
- do NOT make maneuvers which may cause excessive stress in the hook and in the instrument
- the operator shall use the LIS when a manual extension is mounted on the crane
- the LIS must be attached at the hook of the last manual extension
- turn off the device when not in use

The operator is liable for all damages resulting from improper use.

B USER MANUAL

B.1 CE MARK

CE mark includes the following data:
- Manufacturer
- Model
- Serial number
- Max. load capacity (*)
- CE marking

(*) the max load capacity of the instrument is not equal to the preset load threshold.

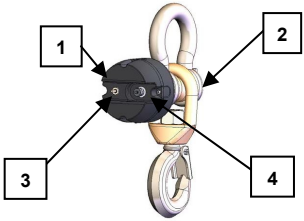
B.2 PICTOGRAMS

	Do NOT stand or go under suspended loads
	At the end of operating life, the product must be taken to a recycling center

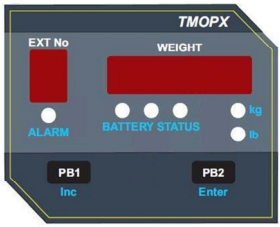
Marks and pictograms must not be removed.

B.3 DESCRIPTION OF THE EQUIPMENT

The purpose of LIS is to protect the structure of the manual extensions: it stops the lifting movements when the suspended load exceeds the preset load threshold. The LIS consists of:
- transmitter unit "LIS–T" complete of load cell with pin
- receiver unit "LIS-R"
- battery charger cable for LIS-T



LIS–T



Control panel (LIS-R)

1	Battery compartment
2	Load cell
3	Switch
4	Socket for battery charger

B.4 HOW TO MOUNT THE LIS-T ON THE MANUAL EXTENSION

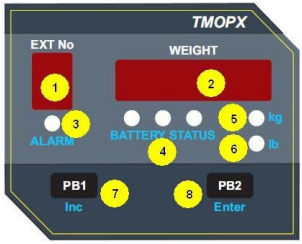
The radio contact between transmitter and receiver is ensured when the LIS-T is perpendicular to the axis of crane's extensions (see figure below).
This type of assembly must be respected:

B.5 PRELIMINARY CHECKS BEFORE OPERATION

Before starting work, the user must check the structural integrity and the correct functionality of all components of LIS.
Check carefully the contact surfaces between shackle and pin, and report eventually deformations, incisions and corrosion. Replace the components if their cross-section is reduced more than 10%.
Maintain clean the instrument.

B.6 HOW THE SYSTEM WORKS

B.6.1 LIS-R CONTROL PANEL



Ref.	LABEL	FUNCTION
1	Ext No	It displays the number of manual extensions used
2	WEIGHT	It displays the weight of the load suspended from the LIS hook
3	ALARM	If turned on, it indicates the intervention of the limiter
4	BATTERY STATUS	The LED bar indicator shows the battery charge status
5	kg	if the LED is turned on, the lifted load is displayed in kilograms
6	lb	if the LED is turned on, the lifted load is displayed in pounds
7	PB1/Inc	It allows to select the number of manual extensions mounted or to disable the limiter
8	PB2/Enter	It allows to convert the lifted load from kilograms to pounds and vice versa The limit values are always expressed in kilograms

START-UP
After installation is complete and the crane is powered, turn on the system by means of the switch of the LIS-T. At startup LIS-R shows the following sequence:

	C0 102	Identification code
	r 1.05	Software Version
	P2000	LIS max load capacity in kg

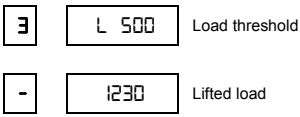
Then it is possible, by means of button 7, to select the number of manual extensions mounted (1/2/3/4) or to disable the limiter ("-"; see B.6.3).
After selection, check that the load threshold is equal to the rated capacity of the extension selected.
Now the LIS is active.

⚠ In case of lack of radio contact with the LIS-T, on the display 2 will appear:

-	-----	Load threshold

In this case, the system stops all crane movements except those recommended (see B.6.3, figure for "NO CAN-BUS"). Check that the LIS-T battery is charged and that the system is operating.

MANAGEMENT OF MANUAL EXTENSIONS
The "Inc" button allows to select the number of manual extensions mounted, 1/2/3/4 (and therefore the load threshold) or to disable the limiter selecting "-". For example:



The load thresholds are preset by the manufacturer.

To view the preset threshold, select with "Inc" button the number of manual extension (see following example).

B.6.2 3XL, 4XL, TOP CONTROL PANELS

If the crane is equipped with 3XL, 4XL or TOP, the load cell is controlled directly by the control system. The control system allows to:
- select the number of manual extensions with which you want to operate
- display the load lifted by LIS
- display warning messages
- display the alarm messages

See the following User Manuals for further information: UM_TOP, UM_3XL, UM_4XL.

The operating parameters are displayed only in the International System of Units.

B.6.3 HOW THE LOAD LIMITER WORKS

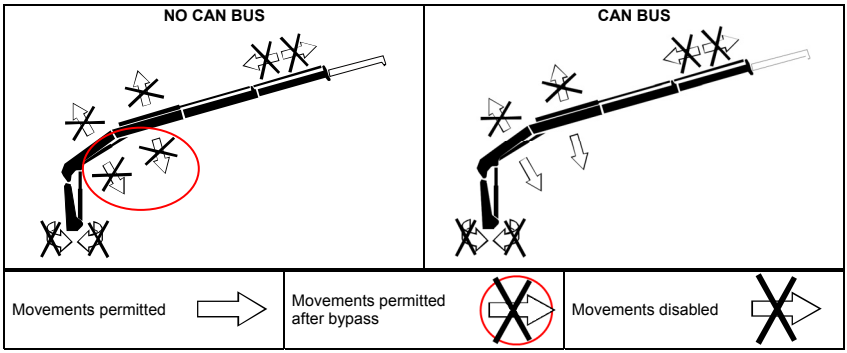
If a manual extension is selected, the LIS intervenes when the lifted load exceeds the set threshold (Led 3 flashing).

NO CAN BUS system

If the load threshold is exceeded, the system disables all crane movements (see figure below).
In order to enable all movements, you shall disable the LIS: press the "Inc" button till the symbol "-" appears (the load remains on the display).
Move the crane to a safe configuration by operating the recommended controls highlighted in red.

CAN BUS system

If the load threshold is exceeded, the system disables all crane movements, except those indicated (see figure below).
Move the crane to a safe configuration by operating the permitted controls.



After intervention of the LIS, extreme caution in the operations is required, because the manual extension is not protected by the limiter.
The operator is responsible for all damages resulting from deactivating the limiter and executing unrecommended movements.

C MAINTENANCE

C.1 WARRANTY TERMS

The manufacturer declines all responsibility for damage to the crane caused by failed maintenance.
Preventive routine maintenance refers to an use in non-corrosive environments. Failure to abide by this stipulation shall result in all guarantees being declared null and void.
All repairs, modifications and maintenance (excluding routine) must be performed exclusively by an authorized assistance center.
All repair reports drafted by authorised assistance centres following routine and extraordinary maintenance must be recorded and archived by the owner of the crane.

C.2 ORDINARY MAINTENANCE

The following routine maintenance should be performed by the user to ensure LIS efficiency:

- **LIS CLEANING**
- **REPLACING THE BATTERIES**

Do maintenance with device disassembled.

C.2.1 CLEANING THE LIS

In order not to damage the corrosion-proof layers the load sensor is provided with, it is recommended not to use hot cleaning agents, which must never exceed 50°C in temperature.
Use always biodegradable cleaning agents.

C.2.2 REPLACING THE BATTERIES

Execute the following procedure:
1) Open the battery compartment unscrewing 4 external screws
2) Turn the cover
3) Unscrew the 4 fixing screws of the mother board
4) Remove the connector and replace the batteries.
5) Close the compartment paying attention to reference mark.

In case of loss of fluid replace the batteries immediately.
Clean the battery compartment and wash your hands thoroughly if you touch the fluid.
Remove batteries from equipment before disposal.
Batteries must be disposed in accordance with the regulations in force.
Use only batteries with code 570200116 provided by the manufacturer.

C.3 PLANNED MAINTENANCE

The owner of LIS is responsible for contacting an authorised assistance centre to perform routine maintenance on the crane and accessories with the following intervals:

SERVICE 10: after the first 10 hours of service
SERVICE 100: after the first 100 hours of service
SERVICE 500: after the first 500 hours of service
SERVICE 1000: after the first 1000 hours of service
SERVICE "n# hours": every 1000 service hours

The maintenance register in Annex D.3 lists the checks which must be carried out during planned maintenance. The following legend explains the meaning of the symbols used in the annex.

Legend

 Visual check	 Setting	 Operating test

C.4 EXTRAORDINARY MAINTENANCE

Extraordinary maintenance means all maintenance not described as part of routine maintenance (e.g. problems relating to crane defects and accidents).
Extraordinary maintenance must be performed by an authorised assistance centre.

C.5 INACTIVITY

After long periods of inactivity (generally over 6 months) it's necessary to provide an extraordinary maintenance for the LIS in an authorized assistance center.

C.6 TAKING THE LIS OUT OF SERVICE

At the end of its working life or for other reasons, it may be necessary to take the LIS out of service.
You must contact an authorized assistance center to take the LIS out of service.

C.6.1 STORAGE

Protect the LIS from atmospheric agents (humidity, marine environment, etc.) with suitable package.
All LIS parts (plastics, batteries, etc.) must be properly disposed to protect the environment.

C.6.2 DISPOSAL

The LIS and all components must be disposed of by an authorised waste management company in accordance with current legislation.
Verify that all components cannot be re-used.

D ANNEXES

D.1 TECHNICAL DATA

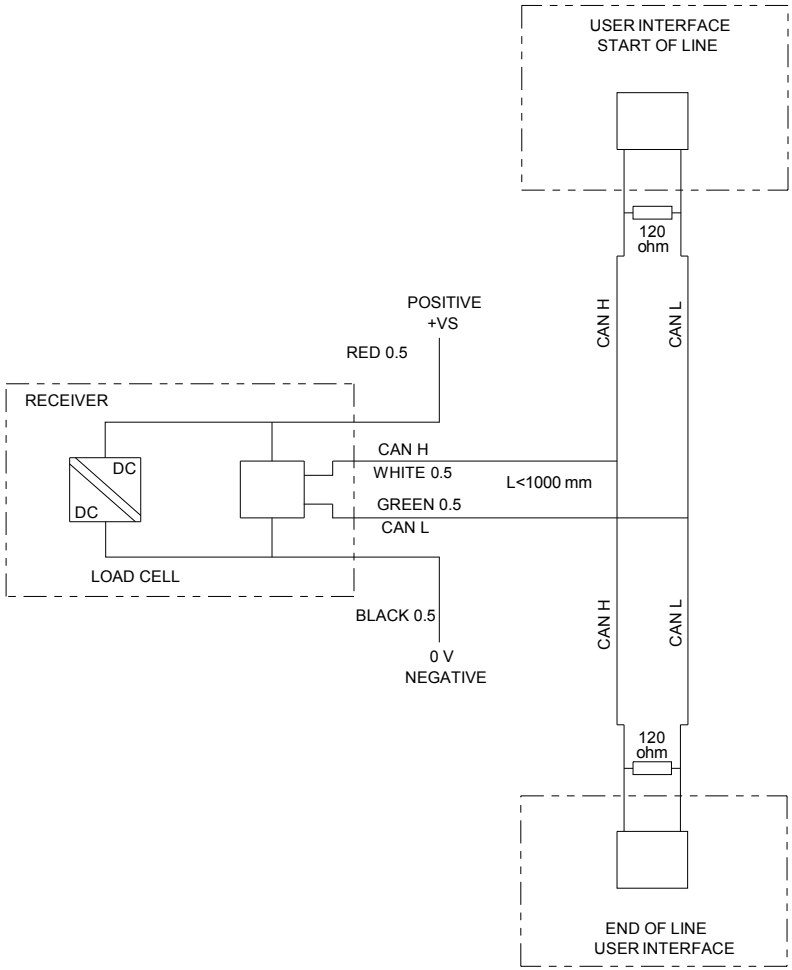
D.1.1 GENERAL SPECIFICATIONS

Model	**TMOPX-2**	**TMOPX-3.2**
Max load capacity	2000 kg	3200 kg
Sensibility	5 kg	10 kg
Battery type	Ni-MH 3,6V 2.4Ah	
Max Battery life	120 h	

D.1.2 SERVICE CONDITIONS

Operating temperature	-10°C to +50°C
Max. relative umidity	95% non-condensing
Protection leve	IP 65

D.1.3 ELECTRIC SCHEMATICS
CAN BUS SYSTEM CONNECTION



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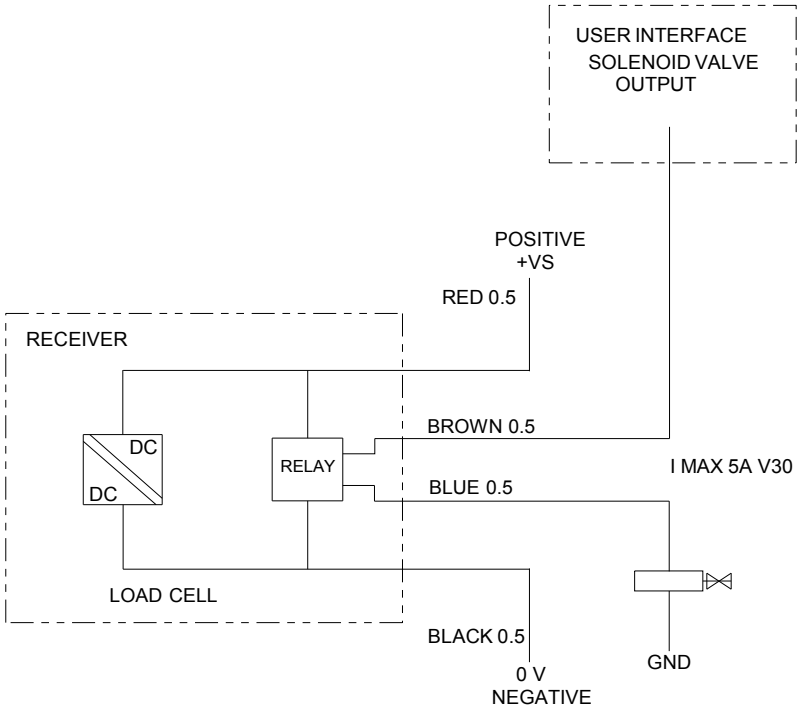
ELECTRIC DIAGRAM
NO CAN BUS SYSTEM CONNECTION



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D.2 TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSES	TROUBLESHOOTING
The crane can not lift with the LIS the rated load of the manual extension.	1) Wrong selection of number of extensions installed 2) Device not calibrated	1) Enter the right number of extensions installed 2) Go to an authorized assistance center to recalibrate the LIS
The crane can lift with the LIS a load greater than the rated load of the manual extension.	1) Wrong selection of number of extensions installed 2) Device not calibrated	1) Enter the right number of extensions installed 2) Go to an authorized assistance center to recalibrate the LIS
All crane movements are blocked, even though the LIS is not lifting any load.	1) LIS-T is powered off 2) The batteries are discharged	1) Turn on the LIS-T 2) Change the batteries

D.3 MAINTENANCE REGISTER

CRANE'S IDENTIFICATION DATA	
Model:	
Serial number:	
Year of manufacturing:	
Installer:	

MAINTENANCE SCHEDULE	SERVICE 10	
Calibration check	☐	
Functionality check	☐	
Structural check	☐	

Inspection and maintenance operations performed by

Authorized assistance center	
Signature	Date

The symbols are detailed in C.3.

MAINTENANCE SCHEDULE	SERVICE 100	
Calibration check	☐	
Functionality check	☐	
Structural check	☐	

Inspection and maintenance operations performed by

Authorized assistance center	
Signature	Date

The symbols are detailed in C.3.

MAINTENANCE SCHEDULE	SERVICE 500	
Calibration check	☐	
Functionality check	☐	
Structural check	☐	

Inspection and maintenance operations performed by

Authorized assistance center	
Signature	Date

The symbols are detailed in C.3.

MAINTENANCE SCHEDULE	SERVICE _000	
Calibration check	☐	
Functionality check	☐	
Structural check	☐	

Inspection and maintenance operations performed by

Authorized assistance center	
Signature	Date

These maintenance operations must be performed after every 1000 operating hours.
Print a new schedule and attach to user manual at each inspection.
The symbols are detailed in C.3.

D.4 EXTRAORDINARY MAINTENANCE MODULE

CRANE'S IDENTIFICATION DATA	
Model:	
Serial number:	
Year of manufacturing:	
Installer:	

FAULT DETECTED
INTERVENTION DESCRIPTION
MATERIALS NEEDED
ADDITIONAL NOTES

Inspection and maintenance operations performed by

Authorized assistance center	
Signature	Date