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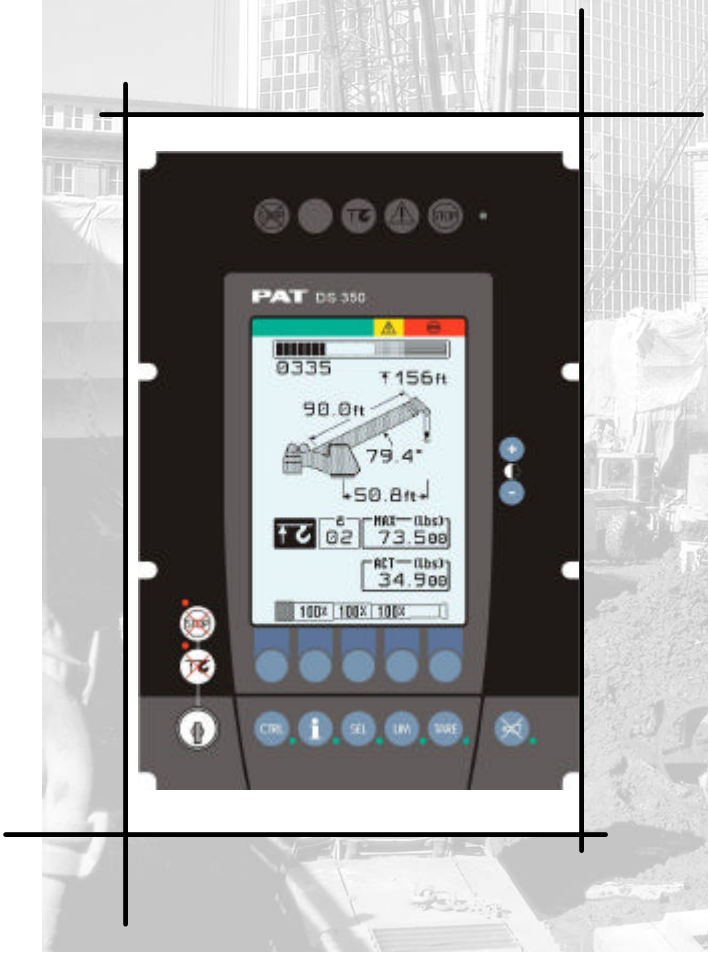
LOAD MOMENT INDICATOR

iFLEX5

Data Logger Operation



DATA LOGGER OPERATOR'S MANUAL

P/N 031-300-190-175 REV - 10/17/2003

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MANUAL REVISIONS

REV	DATE	NAME	DESCRIPTION
-	10/17/03	PH	ECN 02-64

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1 GENERAL INFORMATION

The PAT data logger has been designed to provide the essential information and knowledge of how the crane used and operated.

WARNING: The data logger is an operational aid that can provide LMI system configurations and operating data.

The data can be setup to record the following data:
- Acquisition of the extreme values during a hoisting event (DOS-Drive CAN)
- Acquisition of messages
- Acquisition of utilization counters
- Data memory organization with circular buffer
- Direct reading of a memory card with a PC (DOS-Drive CAN)

2 PREREQUISITES

2.1 HARDWARE

IFLEX CU : 021 020 06 0003
DOS-DRIVE CAN with memory card 16/32 MByte
PC with PCMCIA slot for parameterization via terminal and data management

2.2 SOFTWARE

LMI program version CGMK 1.42up (C-Structure)
C-Structure: PC program DS350C for parameterization of the data and load chart files
PC program iTOOL5 / iFLASH V4.95 for parameterization, download.
PC program AUSWERT V2.06up for data management

3 LIFTING DATA (DOS-DRIVE CAN)

3.1 LIFTING DATA RECORD

A lifting data record consists of a fixed data block (62 byte) and a variable data block (0..16 byte).

Designation	Number of bytes
Identification code “LI”	2
Number of bytes of a hoisting data record	1
Date of begin of lift	6
Time at begin of lift	6
Time at end of lift	6
Average load	2
Maximum load	2
Radius at begin of lift	2
Radius at maximum load	2
Radius at maximum utilization	2
Radius at end of lift	2
Operating mode at end of lift	4
Reeving at end of lift	1
Status byte	1
Bit 0: reserve	
Bit 1: utilization 102 %	
Bit 2: utilization 125 %	
Bit 3: overload LMI	
Bit 4: operating mode or buzzer, resp., acknowledged	
Bit 5: LMI bridged	
Bit 6: A2B switch bridged	
Bit 7: operating mode without outriggers	
Maximum utilization	1
Maximum rated load with maximum utilization	2
Main boom angle with maximum radius	2
Minimum main boom angle	2
Current number of the hoisting event	2
Parameterization of the additional data in DGA 2.12 (C-Structure), DGA 102 (G- Structure)	1
Operating mode selection	2
Digital inputs (bit 0..7)	1
Maximum pressure piston-side cylinder	2
Maximum pressure rod-side cylinder	2
Bit 5: unit metric/domestic	1
Reserved	1
Radius at minimum main boom angle	2
Maximum radius	2
Parameterization of the additional data in DGA 2.12 (C-Structure), DGA 102 (G- Structure)	
Bit 0: maximum wind speed	2
Bit 1: main boom length at begin of lift and end of lift	4
Bit 2: angle of luffing jib at begin of lift and end of lift	4
Bit 3: Maximum load moment	2
Bit 4: Tip height at begin of lift and end of lift	4

3.2 LIFTING DATA ACQUISITION

During the acquisition of the lifting data, the datalogger can pass trough 4 different conditions. Cycle time is 0.5 seconds.

Condition	Description
System start	Condition upon switching on the system (1st cycle). Initialization of the ring buffer for mean value determination of the load via 10 cycles. Furthermore, it is recognized whether or not a hoisting event was active when switching off the system.
Begin of lift	Condition when the load threshold for the begin of a hoisting event has been fallen below. The begin of a new hoisting event is detected, the flags for hoisting data acquisition are initialized. The condition "begin of lift" can be initialized after the condition "system start" or "end of lift".
Lifting active	Condition when the load threshold for the begin or end of a hoisting event has been exceeded. The end of the current hoisting event is detected, the flags for the extreme values are acquired. If the operating mode or the reeving is modified, the hoisting event is ended. Furthermore, the counters are incremented in this condition. The condition "hoisting active" can be initialized after the condition "begin of lift".
End of lift	Condition when the load threshold for the end of a hoisting event is fallen below or when the hoisting event is ended for other reasons (hoisting event active when switching off the system, modification of the operating mode or the reeving in the condition "hoisting active"). In this condition, the hoisting data record is completed and stored onto the flashcard. The condition "end of lift" can be initialized after the condition "hoisting active" or "system start".

4 MESSAGES

The messages are only stored in the program cycle of the activation. Further storage can only be effected after deactivating and reactivating.

Message	Description
System start	identification code “ON”
	date
	time
System end	identification code “OF”
	date
	time
LMI error	identification code “EE”
	time
	error no.
Overload LMI	identification code “OC”
	time
	radius
	load
	utilization
	maximum rated load
	main boom angle
	pressure piston-side cylinder
	pressure rod-side cylinder
	main boom length
	load moment
Utilization counter calibrated	identification code “CC”
	date
	time
	1st counter
	2nd counter
	3rd counter
	4th counter
	5th counter
	crane operation with/ without outriggers
Invalid calibration of the utilization counters	identification code “CD”
Maximum permissible counter reading reached	identification code “CT”
	date
	time
	counter reading reached
Reeving changed (DOS-Drive CAN)	identification code “RV”
	reeving before the change
	time
Operating mode changed (DOS-Drive CAN)	identification code “OM”
	operating mode before the change

	time
Reeving changed (Overload recorder) - only saved if lift is active	identification code “RV”
	reeving **after** the change
	Time
Operating mode changed (Overload recorder) - only saved if lift is active	Identification code “OM”
	operating mode **after** the change
	time
A2B bypass	identification code “A2”
	date
	time
	bypass: active: 8, not active: 0
LMI bypass	identification code “UB”
	Date
	Time
	bypass: active: 4, not active: 0

Message	Description
Changing the time	identification code “TI”
	reserved
	date
	new time
	old time
Changing the date	identification code “DA”
	reserved
	new date
	time
	old date

5 SPECIAL LMI ERRORS

Error codes see documentation of the LMI.

The following codes are logged, but not displayed on the console.

Error code	Cause
A1	A2B switched
A3	Prewarning LMI

The following code is not logged, but displayed on the console.

Error code	Cause	Elimination
DA	Datalogger write error	To quit the error message, press the horn button on the console. To see the cause of the error look at the status display at terminal operation. Data should be transferred and checked ASAP.
DB	Datalogger setup error	To quit the error message, press the horn button on the console. To see the cause of the error look at the status display at terminal operation. Data should be transferred and checked ASAP. New setup of the datalogger is required.
DC	Datalogger watchdog activated	To quit the error message, press the horn button on the console. To see the cause of the error look at the status display at terminal operation.
DD	Battery empty	To quit the error message, press the horn button on the console. Change battery on the main board

6 UTILIZATION COUNTERS

The counters serve for acquiring the utilization thresholds during the hoisting events. A counter comprises parametric values and working values.

6.1 PARAMETRIC VALUES

The parametric values of the counters are stored in the serial crane data file. The configuration is carried out in the datalogger menu of the LMI program .

Parametric value	Description
Operating mode	counter 1..5 for **operating mode with/without outriggers** bit 0: counter 0 (0=with outriggers, 1=without outriggers) ... bit 5: counter 0 (0=with outriggers, 1=without outriggers)
Switch-on value	**switch-on threshold**: utilization threshold in %, if counter 1..5 is activated
Switch-off hysteresis	**switch-off hysteresis** in % ref. Switch-off value, if counter 1..5 has been incremented and deactivated (switch-off threshold = switch-on threshold - switch-off hysteresis)
Counter reading	**Maximum permissible counter reading** of counter 1..5

6.2 WORKING VALUES

The working values are stored in the battery-buffered RAM and are retained after switching off the system. The counters are incremented during the acquisition of the hoisting data in the condition “hoisting active”. The initialization is effected automatically whenever the parametric values change.

Description
Counter 1..5 activated/deactivated
Counter 1..5 maximum permissible counter reading reached/not reached
Current counter reading (0..0 x FFFF FFFF)

The actual counter information is saved into the header information block of the datalogger file after every start of the system.

7 COMMUNICATION WITH A PC

For initialization, parameterization, diagnosis and data evaluation a PC communicating with the iflex5 system via the serial interface is required.

7.1 TERMINAL OPERATION

PC terminal program with ANSI emulation, 9600 baud, 8N1 (for example GBASE terminal, AUSWERT V2.06up, iTOOL5 V4.95up)

Functions
Status display
Initialization
Configuration

7.1.1 Status display

Message	Comment
"F= Datalogger"	A datalogger module has been configured. Menu selection for the datalogger to se the time, date, utilization counters, setup DOS-DRIVE CAN .
"1" .. "3"	Condition of hoisting data acquisition: 1=begin of lift, 2=hoisting active, 3=end of lift
"LI" "ON" "OFF" "EE" "OC" "CC" "CD" "CT" "TI DA"	Hoisting data record or message saved (Hoist data is not saved at the overload recorder)
dosdrive_filepos:xxxx	Actual address of the datalogger file (DOS-Drive CAN)
dosdrive_laststatus	Status of the DOS-DRIVE CAN (DOS-Drive CAN)

Dos drive status (DOS-Drive CAN)

0	DOS_DRIVE_SUCCESS
1	DOS_DRIVE_EACCES
2	DOS_DRIVE_EINVACC
3	DOS_DRIVE_EMFILE
4	DOS_DRIVE_ENOENT
5	DOS_DRIVE_EBANDF
6	DOS_DRIVE_EBADNAME
7	DOS_DRIVE_EBANDSLOT
8	DOS_DRIVE_ENOSPACE
9	DOS_DRIVE_EVERIFY
20	DOS_DRIVE_GenERROR
21	DOS_DRIVE_HardwareBAD
22	DOS_DRIVE_NoSuchSLOT
23	DOS_DRIVE_NoCARD
24	DOS_DRIVE_HeaderBAD
25	DOS_DRIVE_SektorBAD
26	DOS_DRIVE_UnknownMEMORY
27	DOS_DRIVE_EraseERROR
28	DOS_DRIVE_NotEnoughMEMORY
29	DOS_DRIVE_WriteCardERROR
30	DOS_DRIVE_WritePROT
31	DOS_DRIVE_ReadCardERROR
40	DOS_DRIVE_TIMEOUT_ERROR
41	DOS_DRIVE_RECEIVE_ERROR
42	DOS_DRIVE_LENGTH_ERROR
43	DOS_DRIVE_CHECKSUM_ERROR
44	DOS_DRIVE_COMMAND_ERROR
45	DOS_DRIVE_PARAMETER_ERROR
46	DOS_DRIVE_FLASH_ERROR
128	DOS_DRIVE_NO_RTOS_MEM
129	DOS_DRIVE_NOT_INIT
130	DOS_DRIVE_NO_BAUDRATE
131	DOS_DRIVE_CAN_NOT_INIT
132	DOS_DRIVE_CAN_NO_ANSWER
133	DOS_DRIVE_ILLEGAL_TAN
134	DOS_DRIVE_TIMEOUT
135	DOS_DRIVE_TOO_MANY_BYTES
137	DOS_DRIVE_CHANNEL_ERROR
138	DOS_DRIVE_FILE_NOT_OPEN
139	DOS_DRIVE_END_OF_FILE
140	DOS_DRIVE_NO_CONNECTION
252	DOS_DRIVE_PARTLY_RESPONSE
253	DOS_DRIVE_ONLY_ACK
254	DOS_DRIVE_NOSTATUS
255	DOS_DRIVE_BUFFER_NOT_FREE

Status 0 and 252..255 is ok. The rest are errors and cause an error “E DA” on the console.

7.1.2 Data logger menu

Action	Remarks
selection “F”	Jump to datalogger menu, call of the user number.

7.1.3 setup of the data logger

Functions
Input of crane number
Setup of a memory : format, create file (DOS-Drive CAN), erase file (overload recorder)

Action	Remarks
selection “L”	Memory is initialized. After the event is ended, the system is restarted.

7.1.4 Configuration of the utilization counters

Functions
Display current values
Change values

Step no.	Action	Remarks
1	selection “C”	Calibration of utilization counters
2	selection “1..5”	Input number of utilization counter (1..5), current values are saved, current values are displayed
3	selection “1..5”	Change values

7.1.5 Initialization of the time base

Functions
Display current date and time
Change date and time

Step no.	Action	Remarks
1	selection “T”	initialize time base, current date and time are displayed
2	selection “1..2”	change date, time After the event is ended, the system is restarted

7.2 DATA EVALUATION

7.2.1 File with all Data

DOS-Drive CAN

The PC program GBASE or AUSWERT is used for data evaluation. The data transfer is carried out direct on the PC with PC CARD drive..

Functions
File with all data and actual utilization counter values
Presentation

7.2.2 Presentation in GBASE

Step no.	Action	Remarks
1	Selection “F2 FILE”	
2	Selection “F2 VIEW FILE”	Select file, select desired data
3	Viewing of the data	The hoisting data and the messages are successively presented in columns. In the last column, the parametric and the working values of the counters are presented

8 USER GUIDANCE

8.1 SETUP

Step no.	Action
1	Parameterization LMI
2	Connect DOS-DRIVE CAN with the iflex5
3	Switch on the LMI Terminal display: **LMBP02: F= Datalogger** **LMBP02: Init CAN Datalogger** (DOS-Drive CAN)
6	Press the button “F” Terminal display: **USER NO:**
7	Input of the user number, then press the button “ENTER” Terminal display: **<< Datalogger System Setup >>** **< T > Setup Time base** **< L > Initialize Memory card** **< C > Counter Calibration**
8	Press the button “T”, then setup date and time After every change the system resets to. Only after a reset the system clock is changed.
9	Press the button “C”, then setup the utilization counters. The utilization counters are deactivated, if the maximum count, option “<2> Counter Limit” of the respective counter is set to “0”
10	Press the button “L” Terminal display: **Crane No: <crane number>**
11	Input of the crane number, or enter old crane number. Press the button “ENTER” Terminal display: **Crane number: 12345678** **Format_Datalogger: dosdrive_format_status:0** (DOS-Drive CAN) **Create_File: dosdrive_create_status:0** (DOS-Drive CAN) Reset is carried out Terminal display: **LMBP02: F= Datalogger** **LMBP02: Init CAN Datalogger** (DOS-Drive CAN) ➲ **CAN_Datalogger: OF** **CAN_Datalogger: ON** data logger is now prepared for operation

8.2 READING OUT A MEMORY CARD DIRECT WITH PC **(DOS-DRIVE CAN)**

step no.	**action**
1	Switch off iflex5
2	Take memory card out of the DOS-DRIVE CAN slot
3	Copy the data logger file from the memory card to the hard disk of the PC
4	put memory card into the DOS-DRIVE CAN slot
5	Switch on iflex5